



January 5, 2023

Pickard Architects

13215 Penn Street Suite 300
Whittier, CA 90602

Attention: David Pickard

Subject: **Golden Oaks Senior Living
Whittier, California
Revised Exterior Noise and Exterior Façade Analysis
Veneklasen Project No. 7762-001**

Dear David:

Veneklasen Associates, Inc. (Veneklasen) has completed our review of the Golden Oaks Senior Living project located in Whittier, California. This report predicts the exterior noise level at the site using measurements and computer modeling. Using this information, interior noise levels were calculated based on the exterior noise exposure and the construction types proposed. From this, the exterior façade design was determined. This report represents the results of our findings.

1.0 INTRODUCTION

This study was conducted to determine the impact of the exterior noise sources on the Golden Oaks Senior Living project in Whittier, California. Veneklasen's scope of work included calculating the exterior noise levels impacting the site and determining the method, if any, required to reduce the interior and exterior sound levels to meet the applicable code requirements of the State of California and the City of Whittier.

The project consists of a 2-story, 25-unit senior living facility. The project is bound by Norwalk Boulevard to the west, a gas station to the north with Whittier Boulevard beyond, residential to the west, and residential across an alley to the east.

2.0 NOISE CRITERIA

CNEL (Community Noise Equivalent Level) is the 24-hour equivalent (average) sound pressure level in which the evening (7 pm–10 pm) and nighttime (10 pm – 7 am) noise is weighted by adding 5 and 10 dB, respectively, to the hourly level. Since this is a 24-hour metric, short-duration noise events (truck pass-by's, buses, trains, etc.) are not as prominent in the analysis.

Leq (equivalent continuous sound level) is defined as the steady sound pressure level which, over a given period of time, has the same total energy as the actual fluctuating noise.

2.1 Interior Noise Levels - Residential

The State of California Building Code (Section 1206, "Sound Transmission") and the City of Whittier Noise Element state that interior CNEL values for residential land uses are not to exceed 45 CNEL in any habitable room.

If the windows must be closed to meet an interior level of 45 CNEL, then a mechanical ventilating system or other means of natural ventilation shall be provided.

3.0 EXTERIOR NOISE ENVIRONMENT

3.1 Noise Measurements

Traffic on Norwalk Boulevard is the primary source of noise affecting the site. Veneklasen visited the site on Thursday, January 14, 2021 and placed a meter on the roof of the existing building to capture the hourly sound levels on the site for a 24-hour period. Table 1 and Figure 1 show the location and summary of the noise measurements.

Table 1 – Measured Sound Levels

Location	Loudest Daytime Hour, Leq dBA	CNEL
Roof	75	73

Figure 1 – Aerial View of Project Site Showing Measurement Locations



3.2 Computer Modeling

Veneklasen has utilized the Traffic Noise Model computer software program developed by the FHWA (Federal Highway Administration TNM 2.5) in order to predict vehicular noise levels at various locations. The primary purpose of the computer model was to determine how the noise environment will change due to traffic and site changes.

3.3 Overall Exterior Exposure

Based on the computer model and measurements, Veneklasen calculated the noise level at different locations across the project site. To simplify the presentation of the exterior noise levels, Veneklasen has separated the site into locations based on the sound exposure and required mitigation. The predicted sound levels at each zone, shown in Figure 2 and Figure 3, are listed in Table 2 below.

Table 2 – Exterior Noise Levels

Location	Floor	Exterior Noise Level, CNEL
Zone A	Both	70-73
Zone B	Both	65-69
Remaining Units	2	< 65

Figure 2– Noise Zones Floor 1

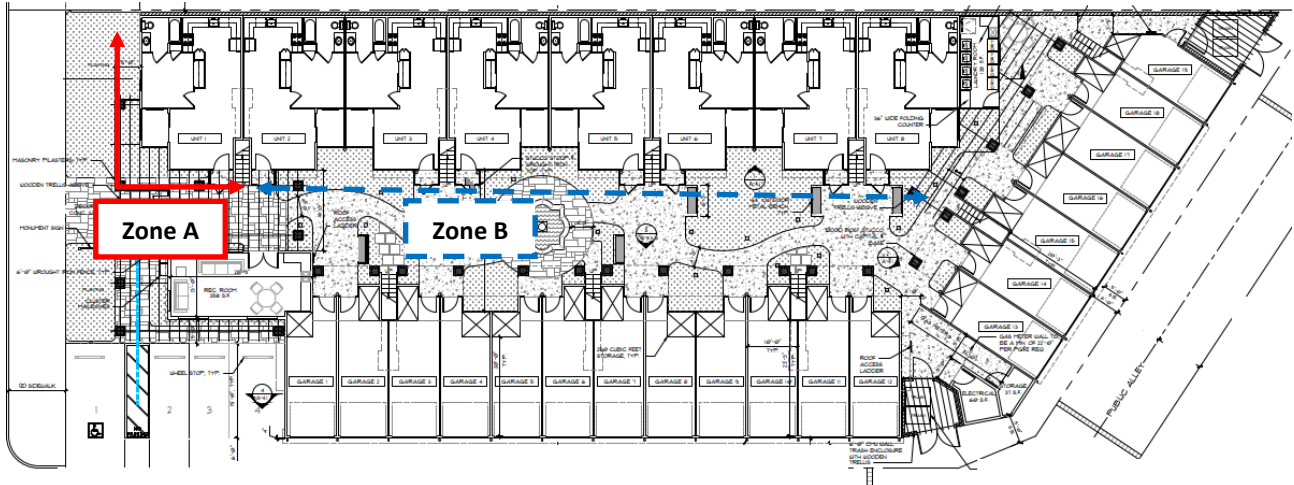
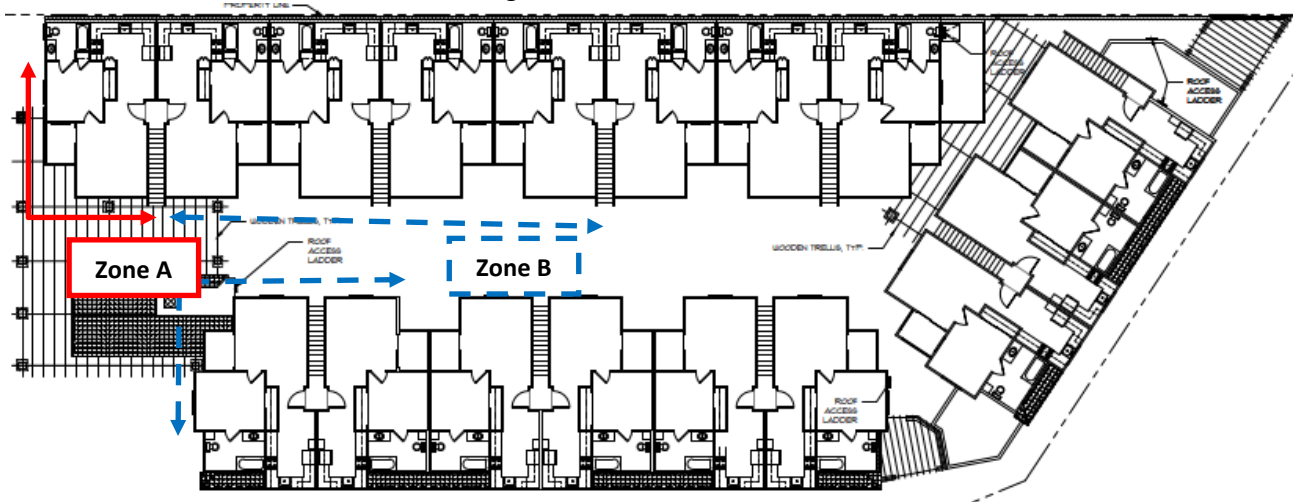


Figure 3– Noise Zones Floor 2



4.0 INTERIOR NOISE CALCULATION

4.1 Exterior Façade Construction

Calculations were based on the drawings supplied on December 21, 2021. The plans show that the exterior wall will consist of cement block wall stucco assumed to be over sheathing on wood studs with a single layer of gypsum board on the interior and batt insulation in the cavity.

Veneklasen’s calculations included the roof path, but this was insignificant in the interior noise level calculated.

Veneklasen utilized the glazing ratings (glass, frame and seals) shown in Appendix I. Appendix I shall be the acoustical specification for the exterior windows and doors.

4.2 Interior Average Noise Level (CNEL) – Residential

Veneklasen calculated the interior level within the residential units given the measured noise environment and the exterior facade construction described above. Table 3 shows the predicted interior CNEL noise levels based on the windows and doors with STC ratings as shown and glazing construction as described in Appendix I.

Table 3 – Calculated Interior CNEL Noise Levels

Location	Floor	Exterior Noise Level, CNEL	Window/ Door Rating	Interior Noise Level, CNEL
Zone A	Both	70-73	STC 35	<45
Zone B	Both	65-69	STC 30	<45
Remaining Units	2	< 65	STC 30	<45

4.3 Mechanical Ventilation - Residential

Because the windows and doors must be kept closed to meet the noise requirements, mechanical or other means of ventilation may be required for all units in Zones A and B. The ventilation system shall not compromise the sound insulation capability of the exterior facade assembly.

5.0 SUMMARY

The following summarizes the acoustical items required to satisfy the noise criteria as described in this report.


Residential

- Exterior wall assembly is acceptable as described in Section 4.1.
- The roof assembly was included in our calculations and is not a significant path of sound and can remain as designed.
- Windows and glass doors with minimum STC ratings as shown in Table 3 with Transmission Loss and STC ratings in Appendix I are required. Appendix I shall be the acoustical specification for the exterior windows and doors.
- Residential mechanical ventilation, or other means of natural ventilation, may be required for all units in Zones A and B.

Various noise mitigation methods may be utilized to satisfy the noise criteria described in this report. Alteration of mitigation methods that deviate from requirements should be reviewed by the acoustical consultant.

If you have any questions or comments regarding this report, please do not hesitate to contact us.

Sincerely,
Veneklasen Associates, Inc.



Cathleen Novak
Associate

APPENDIX I – GLAZING REQUIREMENTS

In order to meet the predicted interior noise levels described in Section 4.0, the glazing shall meet the following requirements:

Table 4– Acoustical Glazing Requirements: Minimum Octave Band Transmission Loss and STC Rating

Nominal Thickness	Minimum Transmission Loss						Min. STC Rating
	Octave Band Center Frequency (Hz)						
	125	250	500	1000	2000	4000	
1" dual	21	18	27	34	37	32	30
1" dual	23	22	32	37	38	38	35

The transmission loss values in the table above can likely be met with the following glazing assemblies:

1. STC 30: 1/8" monolithic – 3/4" airspace – 1/8" monolithic
2. STC 35: 1/4" monolithic – 1/2" airspace – 1/4" monolithic

An assembly’s frame and seals may limit the performance of the overall system. Therefore, the window and door systems selected for the project shall not be selected on the basis of the STC rating of the glass alone, but on the entire assembly including frame and seals. Additionally, the assemblies given above are provided as a basis of design, but regardless of construction, the octave band Transmission Loss (TL) and STC value of the system selected must meet the minimum values in Table 4 above.

Independent laboratory acoustical test reports should be submitted for review by the design team to ensure compliance with glazing acoustical performance requirements. Laboratories shall be accredited by the Department of Commerce National Voluntary Laboratory Accreditation Program (NVLAP). Labs shall be pre-approved by Veneklasen Associates. Tests shall be required to be performed in North America. Lab tests and lab reports shall be in compliance with ASTM standard E90 and be no more than 10 years old from the date of submission for this project.

If test reports are not available for a proposed assembly, the assembly, including frame, seals and hardware, shall be tested at an independent pre-approved NVLAP-accredited laboratory to demonstrate compliance with the requirements of this report. Veneklasen shall be invited to witness acoustical testing completed and reserves the right to exclude test reports from laboratories that are not pre-approved by Veneklasen.

APPENDIX II – MEASURED HOURLY NOISE LEVELS

Location	Start Time	Duration	LAeq
Roof	12pm	1:00:00	69
	1pm	1:00:00	69
	2pm	1:00:00	70
	3pm	1:00:00	70
	4pm	1:00:00	69
	5pm	1:00:00	74
	6pm	1:00:00	70
	7pm	1:00:00	68
	8pm	1:00:00	68
	9pm	1:00:00	66
	7am	1:00:00	69
	8am	1:00:00	69
	9am	1:00:00	70
	10am	1:00:00	69
11am	1:00:00	69	