

February 28, 2024

Linc Housing

3590 Elm Avenue
Long Beach, California 90807

Attention: Frances Sarmiento | Senior Project Manager

Subject: **Soquel Dr & 41st Ave**
Soquel, California
Exterior Noise and Exterior Façade Acoustical Analysis
Veneklasen Project No. 5125-010

Dear Frances:

Veneklasen Associates, Inc. (Veneklasen) has completed our review of the Soquel Affordable Multi-Family project located in Soquel, California. This report predicts the exterior noise level at the site using 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 Soquel Affordable Multi-Family project in Soquel, 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 U.S. Department of Housing and Urban Development (HUD).

The project consists of a 5-story new construction development with 146 apartment units across Levels 2 through 5 and 91 parking stalls. The ground floor will have an on-grade podium parking garage and resident-serving amenity space. Amenity spaces will include a Community Center, Fitness Area, and Roof Deck. The project is bounded by Soquel Drive to the north, 41st Avenue to the east, existing commercial uses to the west and south, and an existing residential use at the center-eastern portion of the site.

2.0 NOISE CRITERIA

DNL (Day-Night Level) is the 24-hour equivalent (average) sound pressure level in which the nighttime (10 pm – 7 am) noise is weighted by adding 10 dB to the hourly level. Since this is a 24-hour metric, short-duration noise events (truck pass-by’s, buses, etc.) are not as prominent in the analysis.

2.1 HUD Standards

The Noise Regulation for HUD is defined in Title 24 Part 51 Subpart B – Noise Abatement and Control. Section 51.101(9) states that the interior noise level DNL shall not exceed 45.

Section 51.103 defines the site acceptability standards, and section 51.104(a) defines the noise attenuation requirements. These are summarized in Table 1 below. Standard construction is assumed to provide 20 dB of reduction, so that the interior standard will be met for noise levels up to DNL 65. Additional attenuation is required for exterior noise levels above 65 so that the interior noise level does not exceed DNL 45.

The HUD exterior noise goal for outdoors in residential areas is 65 DNL. This typically applies to shared common outdoor use areas.

Table 1 - HUD Site Acceptability Standards

Condition	Exterior Noise Level, DNL	Attenuation Requirements
Acceptable	≤ 65	None: standard construction provides attenuation of 20 dB
Normally Unacceptable	65 – 70	An additional 5 dB of attenuation (25 dB total) for noise sensitive uses
	71 – 75	An additional 10 dB of attenuation (30 dB total) for noise sensitive uses
Unacceptable	>75	Special Approval required

2.2 Interior Noise Levels - Residential

The State of California Building Code (Section 1206, “Sound Transmission”) and the County of Santa Cruz Noise Element state that interior DNL values for residential land uses are not to exceed 45 DNL in any habitable room.

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

3.0 EXTERIOR NOISE ENVIRONMENT

Figure 1 provides an aerial view of the project site.

Figure 1 – Aerial View of Project Site



3.1 Roadway Sources

Traffic on 41st Avenue and Soquel Drive is the primary source of noise affecting the site. Daily traffic count data for these roadways was obtained from the Santa Cruz County Regional Transportation Commission (SCRTC). A vehicle type breakdown was not available, so Veneklasen used the HUD defaults for arterial roads in urban areas, with medium and heavy trucks each comprising 4% of total traffic. Roadway-specific hourly traffic distributions were not available, so Veneklasen used the HUD default assumption that 15% of ADT occurs during nighttime hours.

HUD guidelines state that wherever possible, the noise environment should be predicted for at least 10 years beyond the predicted construction completion date. Roadway-segment-specific traffic growth rates were derived from baseline (2017) estimates and future cumulative (2035) predictions for peak hour traffic from the *Transportation Impact Analysis (Final Report)* for the Santa Cruz Nissan Project previously proposed on a portion of the current project site. Traffic information is summarized in Table 2, with supporting information in Appendix III.

Table 2 – Summary of Traffic Information

Roadway	ADT			Speed	% Growth/year ^b	Night %	Road Width	Calculated 2035 ^c		
	2015	2022	2035 ^b					Cars	Med. Trucks	Heavy Trucks
41st Ave.	14551	NA	16900	25 mph	0.8%	15%	62 to 79 ft	15548	676	676
Soquel Dr.	NA	22387	24700	35 mph	0.8%	15%	54 ft	22724	988	988

Notes:
^a ADT counts from Santa Cruz County Regional Transportation Commission (SCRTC), *Santa Cruz County Weekday Average Daily Traffic Counts 2014-2022*.
^b Predicted/derived based on peak hour traffic estimates and future predictions from *Santa Cruz Nissan Transportation Impact Analysis Final Report*, April 7, 2017, Kimley-Horn.
^c Vehicle type distributions based on distribution percentages from G. Foerst, HUD, Memorandum, 12/3/79, "Using the Noise Assessment Guidelines".

3.2 Railway and Airport Sources

No nearby railroads or airports were identified that could impact the project site.

Supporting information is shown in Appendix III.

3.3 Project Site Exterior Noise Levels

The DNL Calculator on the HUD website was used to predict future exterior noise levels using the information shown in Table 2 above and the locations shown in Figure 2. The calculated DNLs at these locations are summarized in Table 3. The calculations are attached in Appendix I.

Figure 2 – Noise Assessment Locations (NALs)



Table 3 – Exterior Noise Levels

Location	Façade Context (if applicable)	Noise Source	Effective Distance to Source (ft)	Source Noise Level, DNL	Exposure Loss (dB)	Combined Noise Level, DNL
NAL1	NW corner	41st Ave	385	59	-12	73
		Soquel Dr	60	73	0	
NAL 2	NE corner	41st Ave	180	64	-4	70
		Soquel Dr	100	70	0	
NAL 3	Easternmost section, N side	41st Ave	85	69	0	69
		Soquel Dr	270	63	-2	
NAL 4	Easternmost section, S side	41st Ave	85	69	0	69
		Soquel Dr	385	61	-4	
NAL 5	South	41st Ave	250	61	-5	57
		Soquel Dr	295	63	-12	
NAL 6	SW corner of inner courtyard	Soquel Dr	220	65	-3	62
Outdoor Use Area (W side)		Soquel Dr	185 to 220	65 to 66	-5	60 to 61

3.4 Overall Exterior Exposure

Based on the calculated noise levels at façade locations represented by NALs, VA established noise level ranges for different horizontal segments of the project building façades. To simplify the presentation of the exterior noise levels, VA has separated the project façades into zones based on the sound exposure and required mitigation. The horizontal extent of each zone is depicted in Figure 3. The predicted sound level ranges for each zone are listed in Table 4 below.

Table 4 – Noise Zones

Location	Floor	Exterior Noise Level, DNL
Zone A	Levels 2 through 5	70-73
Zone B	Levels 2 through 5	65-70
Remaining Units	All	< 65

Figure 3 – Noise Zones



4.0 INTERIOR NOISE CALCULATION

4.1 Exterior Façade Construction

Plans (schematic design sheets) currently available to Veneklasen do not specify exterior façade wall construction or specific proportions of framed exterior walls versus glazing (windows and glass doors). At this time, Veneklasen has assumed that the exterior wall assembly consists of stucco or similar exterior finish on plywood sheathing and 2x wood studs, with 1 layer of 5/8" gypsum board on the interior and batt insulation in the cavity. Minimum glazing STC performance has been indicated for three representative façade glazing area percentages — 25, 50, and 75 percent.

Veneklasen utilized the glazing ratings (glass, frame and seals) shown in Appendix IV. Appendix IV shall comprise the acoustical specification requirements for the exterior windows and doors defined in this report.

4.2 Interior Average Noise Level (DNL) – Residential

Veneklasen calculated the interior level within the residential units given the predicted exterior noise environment and the exterior facade assumptions described above. Calculations are shown in Appendix II. Table 5 shows the predicted interior DNL noise levels based on the windows and doors with STC ratings as shown and glazing construction as described in Appendix IV.

Table 5 – Calculated Interior DNL Noise Levels

Location	Floor	Exterior Noise Level, DNL	Minimum Window/ Door Rating for Each of Three Representative Glazing Area Percentages ^a			Interior Noise Level, DNL
			25%	50%	75%	
Zone A	Levels 2 through 5	70-75	30	30	37	<45
Zone B	Levels 2 through 5	65-70	30	30	33	<45
Remaining Units	Levels 2 through 5	< 65	No STC requirement. Minimum STC 30 recommended.			
Notes:						
^a Final recommendations will be based on specific façade compositions obtained from relevant elevations.						

4.3 Mechanical Ventilation - Residential

It is recommended that the windows and doors be kept closed to meet the noise requirements and mechanical or other means of ventilation be used. 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.

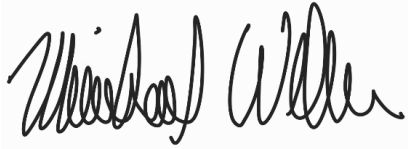
Residential

- The exterior framed wall assembly as detailed in Section 4.1 is acceptable.
- Windows and glass doors with minimum STC ratings as shown in Table 5 with Transmission Loss and STC rating specified in Appendix IV are required.
- Residential mechanical ventilation, or other means of natural ventilation, is recommended for all units.

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.



Michael Weber
Associate



Adam Thompson
Associate

APPENDIX I – PROJECT NOISE VALUES VIA HUD ONLINE DNL CALCULATOR AND EXPOSURE LOSS (BARRIER CALCULATOR)

Site ID	Soquel Mixed Affordable, NAL1		
Record Date	02/26/2024 📅		
User's Name	MW		
Road # 1 Name: 41st Ave			
Road #1			
Vehicle Type	Cars <input checked="" type="checkbox"/>	Medium Trucks <input checked="" type="checkbox"/>	Heavy Trucks <input checked="" type="checkbox"/>
Effective Distance	385	385	385
Distance to Stop Sign			
Average Speed	25	25	25
Average Daily Trips (ADT)	15548	676	676
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	50	46	58
Calculate Road #1 DNL	59	Reset	
Road # 2 Name: Soquel Dr.			
Road #2			
Vehicle Type	Cars <input checked="" type="checkbox"/>	Medium Trucks <input checked="" type="checkbox"/>	Heavy Trucks <input checked="" type="checkbox"/>
Effective Distance	60	60	60
Distance to Stop Sign			
Average Speed	35	35	35
Average Daily Trips (ADT)	22724	988	988
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	66	63	72
Calculate Road #2 DNL	73	Reset	

Site ID	<input type="text" value="Soquel Mixed Affordable, NAL2"/>		
Record Date	<input type="text" value="02/26/2024"/>		<input type="button" value="📅"/>
User's Name	<input type="text" value="MW"/>		
Road # 1 Name: <input style="width: 90%;" type="text" value="41st Ave"/>			
Road #1			
Vehicle Type	Cars <input checked="" type="checkbox"/>	Medium Trucks <input checked="" type="checkbox"/>	Heavy Trucks <input checked="" type="checkbox"/>
Effective Distance	<input type="text" value="180"/>	<input type="text" value="180"/>	<input type="text" value="180"/>
Distance to Stop Sign	<input type="text"/>	<input type="text"/>	<input type="text"/>
Average Speed	<input type="text" value="25"/>	<input type="text" value="25"/>	<input type="text" value="25"/>
Average Daily Trips (ADT)	<input type="text" value="15548"/>	<input type="text" value="676"/>	<input type="text" value="676"/>
Night Fraction of ADT	<input type="text" value="15"/>	<input type="text" value="15"/>	<input type="text" value="15"/>
Road Gradient (%)	<input type="text"/>	<input type="text"/>	<input type="text" value="0"/>
Vehicle DNL	<input type="text" value="54"/>	<input type="text" value="51"/>	<input type="text" value="63"/>
<input type="button" value="Calculate Road #1 DNL"/>	<input type="text" value="64"/>	<input type="button" value="Reset"/>	
Road # 2 Name: <input style="width: 90%;" type="text" value="Soquel Dr."/>			
Road #2			
Vehicle Type	Cars <input checked="" type="checkbox"/>	Medium Trucks <input checked="" type="checkbox"/>	Heavy Trucks <input checked="" type="checkbox"/>
Effective Distance	<input type="text" value="100"/>	<input type="text" value="100"/>	<input type="text" value="100"/>
Distance to Stop Sign	<input type="text"/>	<input type="text"/>	<input type="text"/>
Average Speed	<input type="text" value="35"/>	<input type="text" value="35"/>	<input type="text" value="35"/>
Average Daily Trips (ADT)	<input type="text" value="22724"/>	<input type="text" value="988"/>	<input type="text" value="988"/>
Night Fraction of ADT	<input type="text" value="15"/>	<input type="text" value="15"/>	<input type="text" value="15"/>
Road Gradient (%)	<input type="text"/>	<input type="text"/>	<input type="text" value="0"/>
Vehicle DNL	<input type="text" value="63"/>	<input type="text" value="59"/>	<input type="text" value="68"/>
<input type="button" value="Calculate Road #2 DNL"/>	<input type="text" value="70"/>	<input type="button" value="Reset"/>	

Site ID	Soquel Mixed Affordable, NAL3
Record Date	02/26/2024 📅
User's Name	MW

Road # 1 Name: 41st Ave


Road #1

Vehicle Type	Cars <input checked="" type="checkbox"/>	Medium Trucks <input checked="" type="checkbox"/>	Heavy Trucks <input checked="" type="checkbox"/>
Effective Distance	85	85	85
Distance to Stop Sign			
Average Speed	25	25	25
Average Daily Trips (ADT)	15548	676	676
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	59	56	68
Calculate Road #1 DNL	69	<input type="button" value="Reset"/>	

Road # 2 Name: Soquel Dr.

Road #2

Vehicle Type	Cars <input checked="" type="checkbox"/>	Medium Trucks <input checked="" type="checkbox"/>	Heavy Trucks <input checked="" type="checkbox"/>
Effective Distance	270	270	270
Distance to Stop Sign			
Average Speed	35	35	35
Average Daily Trips (ADT)	22724	988	988
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	56	53	62
Calculate Road #2 DNL	63	<input type="button" value="Reset"/>	

Site ID	Soquel Mixed Affordable, NAL4	
Record Date	02/26/2024	
User's Name	MW	

Road # 1 Name:	41st Ave
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Road #1

Vehicle Type	Cars <input checked="" type="checkbox"/>	Medium Trucks <input checked="" type="checkbox"/>	Heavy Trucks <input checked="" type="checkbox"/>
Effective Distance	85	85	85
Distance to Stop Sign			
Average Speed	25	25	25
Average Daily Trips (ADT)	15548	676	676
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	59	56	68
Calculate Road #1 DNL	69	Reset	

Road # 2 Name:	Soquel Dr.
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Road #2

Vehicle Type	Cars <input checked="" type="checkbox"/>	Medium Trucks <input checked="" type="checkbox"/>	Heavy Trucks <input checked="" type="checkbox"/>
Effective Distance	385	385	385
Distance to Stop Sign			
Average Speed	35	35	35
Average Daily Trips (ADT)	22724	988	988
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	54	50	59
Calculate Road #2 DNL	61	Reset	

Site ID	Soquel Mixed Affordable, NAL5
Record Date	02/26/2024 📅
User's Name	MW

Road # 1 Name:	41st Ave
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Road #1

Vehicle Type	Cars <input checked="" type="checkbox"/>	Medium Trucks <input checked="" type="checkbox"/>	Heavy Trucks <input checked="" type="checkbox"/>
Effective Distance	250	250	250
Distance to Stop Sign			
Average Speed	25	25	25
Average Daily Trips (ADT)	15548	676	676
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	52	49	61
Calculate Road #1 DNL	61	<input type="button" value="Reset"/>	

Road # 2 Name:	Soquel Dr.
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Road #2

Vehicle Type	Cars <input checked="" type="checkbox"/>	Medium Trucks <input checked="" type="checkbox"/>	Heavy Trucks <input checked="" type="checkbox"/>
Effective Distance	295	295	295
Distance to Stop Sign			
Average Speed	35	35	35
Average Daily Trips (ADT)	22724	988	988
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	56	52	61
Calculate Road #2 DNL	63	<input type="button" value="Reset"/>	

Site ID	Soquel Mixed Affordable, NAL6		
Record Date	02/26/2024 		
User's Name	MW		
Road # 1 Name:	Soquel Dr.		
Road #1			
Vehicle Type	Cars <input checked="" type="checkbox"/>	Medium Trucks <input checked="" type="checkbox"/>	Heavy Trucks <input checked="" type="checkbox"/>
Effective Distance	220	220	220
Distance to Stop Sign			
Average Speed	35	35	35
Average Daily Trips (ADT)	22724	988	988
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	58	54	63
Calculate Road #1 DNL	65	Reset	

APPENDIX II – SOUND TRANSMISSION CALCULATIONS VIA HUD’S STRACAT ONLINE CALCULATOR

Sound Transmission Classification Assessment Tool (STraCAT)

Part I - Description

Project Soquel Mixed Affordable	Sponsor/Developer Inlc Housing	
Location Soquel, CA: NAL 1 (glazing across 25% of facade)	Prepared by MW	
Noise Level 73	Date 2/26/2024	Primary Source(s) Traffic

Part II - Wall Components

Wall Construction Detail	Area	STC
7/8" stucco, 2x4" W.S., batt insulation, 1 layer!	255	48
<input type="button" value="Add new wall"/>		
255 Sq. Feet		48

Window Construction Detail	Quantity	Sq Ft/Unit	STC
1" monolithic	1	85	30
<input type="button" value="Add new window"/>			

Door Construction Detail	Quantity	Sq Ft/Unit	STC
<input type="button" value="Add new door"/>			

Part III - Results

Wall Statistics	
Stat	Value
Area:	255 ft ²
Wall STC:	48

Aperture Statistics			
Aperture	Count	Area	% of wall
Windows:	1	85 ft ²	33.33%
Doors:	0	0 ft ²	0%

Evaluation Criteria	
Criteria	Value
Noise source sound level (dB):	73
Combined STC for wall assembly:	34.64
Required STC rating:	31
Does wall assembly meet requirements?	Yes

Part I - Description			
Project	Sponsor/Developer		
Soquel Mixed Affordable	Innc Housing		
Location	Prepared by		
Soquel, CA: NAL 1 (glazing across 50% of facade)	MW		
Noise Level	Date	Primary Source(s)	
73	2/26/2024	Traffic	

Part II - Wall Components			
Wall Construction Detail	Area	STC	
7/8" stucco, 2x4" W.S., batt insulation, 1 layer !	170	48	
Add new wall			
170 Sq. Feet		48	
Window Construction Detail	Quantity	Sq Ft/Unit	STC
1" monolithic	1	170	33
Add new window			
Door Construction Detail	Quantity	Sq Ft/Unit	STC
Add new door			

Part III - Results			
Wall Statistics			
Stat	Value		
Area:	170 ft ²		
Wall STC:	48		
Aperture Statistics			
Aperture	Count	Area	% of wall
Windows:	1	170 ft ²	100%
Doors:	0	0 ft ²	0%
Evaluation Criteria			
Criteria	Value		
Noise source sound level (dB):	73		
Combined STC for wall assembly:	33		
Required STC rating:	31		
Does wall assembly meet requirements?	Yes		

Part I - Description			
Project	Sponsor/Developer		
Soquel Mixed Affordable	linc Housing		
Location	Prepared by		
Soquel, CA: NAL 1 (glazing across 75% of facade)	MW		
Noise Level	Date	Primary Source(s)	
73	2/26/2024	Traffic	

Part II - Wall Components			
Wall Construction Detail	Area	STC	
7/8" stucco, 2x4" W.S., batt insulation, 1 layer!	85	48	
Add new wall			
85 Sq. Feet		48	
Window Construction Detail	Quantity	Sq Ft/Unit	STC
1" monolithic	1	255	37
Add new window			
Door Construction Detail	Quantity	Sq Ft/Unit	STC
Add new door			

Part III - Results			
Wall Statistics			
Stat	Value		
Area:	85 ft ²		
Wall STC:	48		
Aperture Statistics			
Aperture	Count	Area	% of wall
Windows:	1	255 ft ²	300%
Doors:	0	0 ft ²	0%
Evaluation Criteria			
Criteria	Value		
Noise source sound level (dB):	73		
Combined STC for wall assembly:	32.47		
Required STC rating:	31		
Does wall assembly meet requirements?	Yes		

Part I - Description			
Project	Sponsor/Developer		
Soquel Mixed Affordable	linc Housing		
Location	Prepared by		
Soquel, CA: NAL 2 (glazing across 25% of facade)	MW		
Noise Level	Date	Primary Source(s)	
70	2/26/2024	Traffic	


Part II - Wall Components			
Wall Construction Detail	Area	STC	
7/8" stucco, 2x4" W.S., batt insulation, 1 layer!	255	48	
Add new wall			
255 Sq. Feet		48	
Window Construction Detail	Quantity	Sq Ft/Unit	STC
1" monolithic	1	85	30
Add new window			
Door Construction Detail	Quantity	Sq Ft/Unit	STC
Add new door			

Part III - Results			
Wall Statistics			
Stat	Value		
Area:	255 ft ²		
Wall STC:	48		
Aperture Statistics			
Aperture	Count	Area	% of wall
Windows:	1	85 ft ²	33.33%
Doors:	0	0 ft ²	0%
Evaluation Criteria			
Criteria	Value		
Noise source sound level (dB):	70		
Combined STC for wall assembly:	34.64		
Required STC rating:	28		
Does wall assembly meet requirements?	Yes		

Part I - Description			
Project	Sponsor/Developer		
Soquel Mixed Affordable	linc Housing		
Location	Prepared by		
Soquel, CA: NAL 2 (glazing across 50% of facade)	MW		
Noise Level	Date	Primary Source(s)	
70	2/26/2024	Traffic	

Part II - Wall Components			
Wall Construction Detail		Area	STC
7/8" stucco, 2x4" W.S., batt insulation, 1 layer!		170	48
Add new wall			
170 Sq. Feet		48	
Window Construction Detail		Quantity	Sq Ft/Unit
1" monolithic		1	170
Add new window			
Door Construction Detail		Quantity	Sq Ft/Unit
Add new door			

Part III - Results			
Wall Statistics			
Stat	Value		
Area:	170 ft ²		
Wall STC:	48		
Aperture Statistics			
Aperture	Count	Area	% of wall
Windows:	1	170 ft ²	100%
Doors:	0	0 ft ²	0%
Evaluation Criteria			
Criteria	Value		
Noise source sound level (dB):	70		
Combined STC for wall assembly:	30		
Required STC rating:	28		
Does wall assembly meet requirements?	Yes		

Part I - Description			
Project	Soquel Mixed Affordable		Sponsor/Developer
			Inlc Housing
Location	Soquel, CA: NAL 2 (glazing across 75% of facade)		Prepared by
			MW
Noise Level	Date		Primary Source(s)
70	2/26/2024		Traffic

Part II - Wall Components				
Wall Construction Detail		Area	STC	
7/8" stucco, 2x4" W.S., batt insulation, 1 layer!		85	48	
Add new wall				
		85 Sq. Feet	48	
Window Construction Detail		Quantity	Sq Ft/Unit	STC
1" monolithic		1	255	33
Add new window				
Door Construction Detail		Quantity	Sq Ft/Unit	STC
Add new door				

Part III - Results			
Wall Statistics			
Stat	Value		
Area:	85 ft ²		
Wall STC:	48		
Aperture Statistics			
Aperture	Count	Area	% of wall
Windows:	1	255 ft ²	300%
Doors:	0	0 ft ²	0%
Evaluation Criteria			
Criteria	Value		
Noise source sound level (dB):	70		
Combined STC for wall assembly:	28.32		
Required STC rating:	28		
Does wall assembly meet requirements?	Yes		

APPENDIX III – Supporting Information

Vehicle Type Distributions

Road Type	Autos		MTs		HTs	
	Urban	Rural	Urban	Rural	Urban	Rural
Interstate highways, freeways, and expressways	89%	80%	2%	3%	9%	17%
Major and minor arterials	92%	87%	4%	4%	4%	9%
Collectors	92%	95%	4%	1%	4%	4%
Local roads and streets	98%	99%	1%	0.4%	1%	0.6%

Source: G. Foerst, HUD, Memorandum, 12/3/79, "Using the Noise Assessment Guidelines"

Traffic Volume Growth Rates

Referenced Project: Santa Cruz Nissan Project Document: Transportation Impact Analysis				AM												PM												Leg Totals					
Scenario	Stated/ Inferred Year	Exhibit	Int. No	Roadways		NB			SB			EB			WB			NB			SB			EB			WB			AM+PM			
				NS	EW	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R	N	S	E	W			
Existing	2017	Figure 4	3	41st Ave (* Driveway)	Soquel Dr	609	5	86	0	9	3	1	339	372	135	543	5	366	18	153	3	17	5	4	740	504	81	234	5	75	2355	2324	3720
Cumulative Plus Project	2035	Figure 16	3	41st Ave (* Driveway)	Soquel Dr	691	6	95	0	10	3	1	390	429	158	624	6	418	20	171	3	19	6	5	851	587	94	270	6	85	2698	2668	4275

Absolute: 10 343 344 555
 Proportional: 13% 15% 15% 15%
 Corresp. Linear Annual Growth Rate: 0.7% 0.8% 0.8% 0.8%

Δ years: 18

Future ADTs by Vehicle Type

Date	Area	Roadway	Segment		ADT	Target Future Year	Projected Future ADT	Road Type	Land Use Type	Autos	MTs	HTs	Check Sum
			Begin	End									
2015-02	CO	41ST AVE	SHWY 1	.11 N OF SHWY 1	14,551	2035	16900	Major and minor arterials	Urban	15548	676	676	16900
2022-10	CO	SOQUEL DR	RODEO GULCH	41 ST AVE	22,387	2035	24700	Major and minor arterials	Urban	22724	988	988	24700

Santa Cruz County Regional
 Source: Transportation Commission
 for Base (SCCRTC), Santa Cruz
 Year: County Weekday Average
 ADTs: Daily Traffic Counts 2014-2022
 [Data set].

Exposure Loss Adjustments and Resultant Adjusted Overall DNLs by NAL

NAL	Roadway	Segment	θ (exp)	Exposure Loss	DNL		NAL	DNL
					HUD Calculator Results	Adjusted Exp.		
1	41st Ave	S: Soquel Dr	11	-12	59	47	3	69
1	Soquel Dr	W: 41st Ave	180	0	73	73	4	69
2	41st Ave	S: Soquel Dr	73	-4	64	60	5	57
2	Soquel Dr	W: 41st Ave	170	0	70	70	6	66
3	41st Ave	S: Soquel Dr	164	0	69	69		
3	Soquel Dr	W: 41st Ave	107	-2	63	61		
4	41st Ave	S: Soquel Dr	176	0	69	69		
4	Soquel Dr	W: 41st Ave	79	-4	61	57		
5	41st Ave	S: Soquel Dr	61	-5	61	56		
5	Soquel Dr	W: 41st Ave	11	-12	63	51		
6	Soquel Dr	W: 41st Ave	86	-3	65	62		
6	Soquel Dr	W: 41st Ave	59	-5	65	60		
6	Soquel Dr	W: 41st Ave	52	-5	66	61		

Source Data: ADT Counts

Santa Cruz County Weekday Average Daily Traffic Counts 2014-2022

For more state highway counts see Caltrans Average Daily Traffic Census webpage

Areas: C=Capitola, CO=Unincorporated county, SC=Santa Cruz city, SV=Scotts Valley, W=Watsonville

Area	Location	From	To	Latest Count	Month/Year Counted
C	41ST AVE	CLARES	SHWY 1	35,597	10/2022
C	41ST AVE.	CAPITOLA RD	BROMMER ST	21,810	4/2017
C	42ND AVE	CAPITOLA RD	CLARES ST	1,480	2/2015
C	47TH AVE.	PORTOLA DR	CAPITOLA DR	1,804	11/2020
C	49TH AVE	CAPITOLA RD	WHARF RD	5,336	2/2015
C	BAY AVE	MONTEREY AVE	SHWY 1	11,749	10/2016
C	BROMMER ST	BULB AVE	41ST AVE	5,635	10/2022
C	CAPITOLA AVE	BAY AVE	SHWY 1	3,534	2/2015
C	CAPITOLA RD	45TH AVE	WHARF RD	10,526	2/2015
C	CAPITOLA RD	41ST AVE	45TH AVE	11,024	2/2015
C	CAPITOLA RD	30TH AVE	41ST AVE	13,534	10/2022
C	CLARES ST	41ST AVE	WHARF RD	5,348	2/2015
C	CLARES ST.	CAPITOLA RD	41ST AVE	15,978	2/2015
C	PARK AVE	MONTEREY AVE	SHWY 1	8,381	7/2015
C	PORTER ST.	HWY 1	SOQUEL-WHARF RD	14,959	11/2022
C	SOQUEL DR	MAIN ST	CAPITOLA AVE	20,349	10/2016
C	STOCKTON AVE.	WARF RD	CAPITOLA AVE	12,873	10/2022
C	TOPAZ ST	45 TH AVE	49 TH AVE	1,086	2/2015
C	WHARF RD	CLIFF DR	CAPITOLA RD	4,672	2/2015
C	WHARF RD	CAPITOLA RD	SHWY 1	5,934	2/2015
CO	17TH AVE.	CAPITOLA RD	BROMMER ST	11,692	10/2016
CO	17TH AVE.	FELT ST	BROMMER ST	12,436	10/2022
CO	30TH AVE.	PORTOLA DR	BROMMER ST	4,244	11/2020
CO	38TH AVE.	PORTOLA DR	BROMMER ST	5,468	11/2020
CO	41ST AVE	SHWY 1	.11 N OF SHWY 1	14,551	2/2015
CO	41ST AVE	PORTOLA DR	RR TRACKS	12,160	8/2016
CO	7TH AVE.	BROMMER ST	EATON ST	11,154	10/2016
CO	7TH AVE.	RODRIGUEZ ST	SOQUEL DR	10,268	4/2017
CO	7TH AVE.	EATON ST	BROMMER ST	10,969	7/2015
CO	AIRPORT BLVD.	HOLM RD	LOMA PRIETA AVE	17,365	11/2022
CO	ALBA RD.	EMPIRE GRADE	WESTERN WY	253	4/2017
CO	AMESTI RD.	BROWNS VALLEY RD	POPPY HILL RD	474	4/2017
CO	BONITA DR.	FREEDOM BLVD	VISTA DEL MAR	2,886	4/2017
CO	BROMMER ST.	7TH AVE	17TH AVE	9,814	10/2022
CO	BUENA VISTA DR.	LANDFILL	HARKINS SLOUGH RD	3,577	4/2017
CO	CABRILLO COLLEGE DR.	PARK AVE	SOQUEL DR	8,702	10/2016
CO	CAPITOLA RD	SOQUEL AVE	7TH AVE	13,864	1/2014
CO	CAPITOLA RD	7TH AVE.	17TH AVE	15,349	5/2018
CO	CAPITOLA RD.	CHANTICLEER AVE	30TH AVE	11,609	4/2017
CO	CARLTON RD	COWARD RD	SHWY 129	2,207	4/2017
CO	CENTER AVE.	STATE PARK DR	SEACLIFF DR	5,036	10/2016
CO	CHANTICLEER AVE	RODRIGUEZ ST	CAPITOLA RD	4,875	8/2015
CO	CLUB HOUSE DR.	LOCKE DR	LA HONDA DR	4,985	4/2017
CO	CORRALITOS RD.	MERK RD	VARNI RD	5,739	4/2017
CO	EAST CLIFF DR.	7TH AVE	17TH AVE	14,055	5/2018
CO	FELTON EMPIRE RD	2301 EMPIRE GRADE	URL .03 NW/KRAZY ACRE LN	2,420	4/2017
CO	FREEDOM BLVD	VALENCIA RD	MARINER WAY	15,226	10/2016
CO	FREEDOM BLVD.	CORRALITOS RD	SCURICH LN	18,093	4/2017
CO	FREEDOM BLVD.	SCURICH LN	BUENA VISTA DR	9,352	11/2022

Source Data: ADT Counts (cont.)

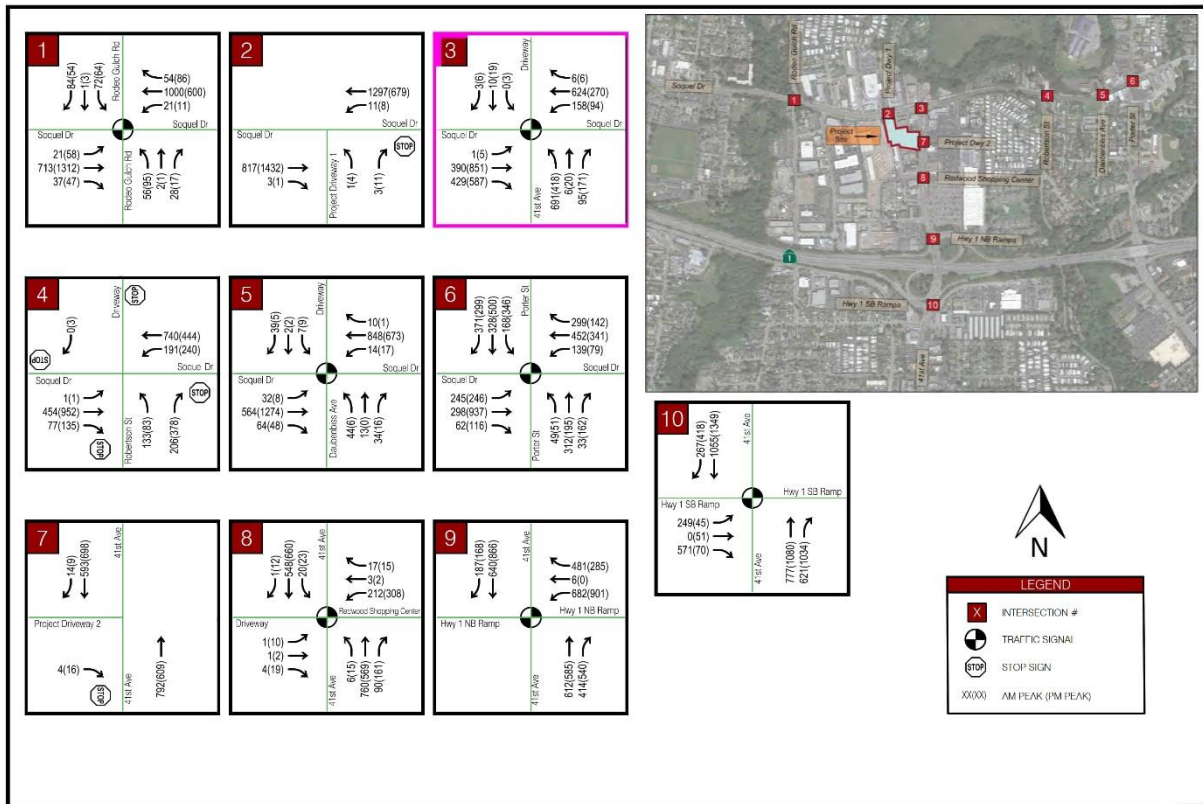
Area	Location	From	To	Latest Count	Month/Year Counted
CO	FREEDOM BLVD.	MARINER WAY	SOQUEL DR	14,451	11/2022
CO	GLEN HAVEN RD.	CHERRYVALE AVE	URL 1.35 M N/PRESCOT	635	4/2017
CO	GRAHAM HILL RD	SHWY 9	MT HERMON RD	24,600	11/2022
CO	GRAHAM HILL RD.	MT HERMON RD	CONFERENCE DR	16,046	4/2017
CO	GRAHAM HILL RD.	SIMS RD	LOCKWOOD LN	11,887	11/2022
CO	GRANITE CREEK RD	SHWY 17	LIONS FIELD DR	938	2/2015
CO	HARKINS SLOUGH RD	LEE RD	HWY 1	10,558	4/2017
CO	HWY 129	THOMSON ROAD	CARLTON ROAD	10,395	11/2022
CO	HWY 9	TWO BAR ROAD	KINGS CREEK ROAD	3,240	11/2022
CO	HWY 9	BOULDER CREEK SOUTH JCT. RTE. 236	BEAR CREEK ROAD	8,970	11/2022
CO	HWY 9	BROOKDALE ALAMEDA AVENUE	BOULDER CREEK RIVER ST FELTON SAN LORENZO	10,503	11/2022
CO	HWY 9	FELTON GLENGARRY RD	AVENUE	4,390	11/2022
CO	HWY 9	FELTON SAN LORENZO AVENUE	FELTON LAUREL ROAD	7,425	11/2022
CO	HWY 9	FELTON LAUREL ROAD	FELTON GRAHAM HILL ROAD	8,656	11/2022
CO	HWY 9	BOULDER CREEK RIVER ST	BOULDER CREEK SOUTH JCT. RTE. 236	8,912	11/2022
CO	MAIN ST	AUTO CENTER DR	RODRIGUEZ ST	26,408	11/2022
CO	MAPLE AVE	MAIN ST	LINCOLN ST	4,764	8/2016
CO	MAR VISTA DR	POPLAR ST	MCGREGOR DR	1,997	11/2020
CO	MCGREGOR DR	MAR VISTA DR	SEARIDGE RD	3,986	10/2016
CO	MCGREGOR DR	PARK AVE	MAR VISTA DR	7,576	10/2016
CO	PARK AVE.	SOQUEL DR	S/HWY 1	14,980	11/2022
CO	PORTER ST	SOQUEL-WHARF RD	SOQUEL DR	10,830	8/2016
CO	PORTOLA DR	21ST AVE	CORCORAN AVE	10,743	7/2015
CO	PORTOLA DR.	41ST AVE	LAUREL AVE	6,388	7/2015
CO	PORTOLA DR.	38TH AVE	41ST AVE	13,231	10/2022
CO	PORTOLA DR.	CORCORAN AVE	26TH AVE	14,554	10/2022
CO	RIO DEL MAR BLVD	SUMNER AVE	CLUB HOUSE DR	17,900	10/2016
CO	SAN ANDREAS RD.	SEASCAPE BL	HWY 1	9,102	11/2022
CO	SCOTTS VALLEY DR.	ERBA LN	CARBONERO WAY	20,440	10/2018
CO	SEARIDGE RD.	MCGREGOR DR	STATE PARK DR	5,650	11/2022
CO	SOQUEL AVE.	S RODEO GULCH RD	GROSS RD	6,932	10/2016
CO	SOQUEL AVE.	SEABRIGHT AVE	MORRISSEY BL	17,513	5/2018
CO	SOQUEL AVE.	SOQUEL DR	17TH AVE	18,802	5/2018
CO	SOQUEL DR	W LEDYARD WAY	STATE PARK DR	17,369	11/2022
CO	SOQUEL DR	LOWER PERIMETER RD	CABRILLO COLLEGE DR	11,547	7/2015
CO	SOQUEL DR	RODEO GULCH	41 ST AVE	22,387	10/2022
CO	SOQUEL DR.	MAIN ST	WALNUT ST	11,599	7/2015
CO	SOQUEL DR.	APTOS RANCH RD	SPRECKELS DR	16,332	7/2015
CO	SOQUEL DR.	APTOS ST	RIO DEL MAR BL	10,580	10/2016
CO	SOQUEL DR.	PARK AVE	MERRILL RD	20,066	10/2016
CO	SOQUEL DR.	STATE PARK DR	APTOS RANCHO RD	20,080	10/2016
CO	SOQUEL DR.	COMMERCIAL CROSSING	MISSION DR	22,642	10/2016
CO	SOQUEL DR.	THURBER LN	CHANTICLEER AVE	22,992	5/2018
CO	SOQUEL DR.	WINKLE AVE	RODEO GULCH RD	21,391	10/2022
CO	SOQUEL DR.	ROBERTSON ST	PORTER ST	21,443	11/2022
CO	STATE PARK DR.	SEA RIDGE RD	CENTER AVE	11,340	7/2015
CO	STATE PARK DR.	HWY 1	SOQUEL DR	18,678	11/2022

Source Data: Estimated (2017) and Predicted (2035) Peak Hour Volumes



Existing Peak Hour Turning Movement Volumes

Source Data: Estimated (2017) and Predicted (2035) Peak Hour Volumes (cont.)



Cumulative Plus Project Peak Hour Turning Movement Volumes

APPENDIX IV – GLAZING REQUIREMENTS

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

Table 6– Acoustical Glazing Requirements: Minimum Octave Band Transmission Loss and STC Rating

Nominal Thickness	Minimum Transmission Loss Octave Band Center Frequency (Hz)						Min. STC Rating
	125	250	500	1000	2000	4000	
1" dual	21	19	28	34	37	33	30
1" dual	22	21	30	36	37	36	33
1" dual	24	27	35	39	40	42	37

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

1. Up to STC 35: nominal 1" insulated glazing unit
2. STC 37: nominal 1" laminated insulated glazing unit

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 6 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 V GLOSSARY OF ACOUSTICAL TERMS

<u>Term</u>	<u>Definition</u>
Absorption	A property of material referring to how much sound it absorbs (as opposed to reflecting). In the context of this report, absorption refers to the total quantity of absorption within the receiving space. Absorption is measure in sabins.
A-weighting (dBA)	The sound pressure level in decibels as measured in an A-weighting filter network. The A-weighting de-emphasizes the low frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Decibel (dB)	A unit describing the amplitude of sound equivalent to 20 times the logarithm, to the base 10, of the ratio of the pressure of the sound to the reference pressure of 20 μ Pa. Used to quantify sound pressure levels.
Equivalent Sound Level (Leq)	The time-weighted average noise level during the stated measurement period.
Sabin	A unit used to describe absorption within a space. One sabin is equal to the absorption of a one-square-foot open window.
Sound Pressure Level (SPL)	The amplitude of sound when compared to the reference sound pressure level of 20 μ Pa. SPL is measured in dB.
Sound Transmission Class (STC)	A single-number metric used to describe the transmission loss performance of a material or assembly across the frequency spectrum. It is intended for use primarily when speech is the noise source.
Transmission Loss (TL)	A measure of the reduction in sound level as a sound wave passes through a material. The higher the transmission loss, the better the material's sound insulating properties.

APPENDIX VI – ACOUSTICAL CALCULATION METHODS

Decibel Addition

Decibels are based on a logarithmic scale; defined as the logarithmic ratio between a measured sound pressure level and a reference sound pressure level. When decibels are added, they are not combined arithmetically, but logarithmically. Decibels are added according to the following equation.

$$SPL_{tot} = 10\log\left(10^{\left(\frac{SPL_1}{10}\right)}\right) + 10\log\left(10^{\left(\frac{SPL_2}{10}\right)}\right)$$

Where:

SPL_{tot} = Total Sound Pressure Level (dB or dBA)

SPL_1, SPL_2 = Sound Pressure Level 1, 2 (dB or dBA)

A-Weighting

A-weighting a spectrum is completed by applying standardized weighting factors to a frequency spectrum, either in octave bands or third-octave bands. These resultant A-weighted levels are summed using decibel addition to generate the overall A-weighted level, noted as dBA. In a report, spectral data is typically presented un-weighted, and the overall level is presented with A-weighting.

The octave band A-weighting correction factors are shown in the table below:

	Octave Band Center Frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
A-weighting Correction Factor (dB)	-26	-16	-9	-3	0	+1	+1	-1

Acoustical Shielding

The presence of adjacent buildings or facades, changes in terrain, parapets, and other similar barriers provide acoustical shielding, reducing the sound level incident on the exterior facades. Common locations where acoustical shielding occurs include, but are not limited to, the roof, the back, and sides of the building that are not directly facing the noise source.

Acoustical shielding due to building geometry can be separated into two categories: reduction due to reduced area of exposure (side of a building), and shielding from barriers (such as a parapet or sound wall).

Reduction as a result of reduced area of exposure is calculated according to the following equation:

$$\Delta SPL = 10 \log_{10} \left(\frac{\theta_{exp}}{180} \right)$$

Where:

ΔSPL = Change in Sound Pressure Level (dB)

θ_{exp} = Angle of exposure (degrees)

Acoustical Attenuation due to Distance

Sound pressure level reduction due to distance is calculated according to the following equation:

$$SPL_2 = SPL_1 + C_s \log \left(\frac{r_1}{r_2} \right)$$

Where:

SPL₁ = Sound Pressure Level at Location 1 (dB or dBA)

SPL₂ = Sound Pressure Level at Location 2 (dB or dBA)

C_s = Source Coefficient; 20 for point source, 10 for a line source

r₁ = Location 1 distance from source (ft.)

r₂ = Location 2 distance from source (ft.)

In some situations, the C_s value is between 10 and 20; selection of this number is an engineering judgment based on the relationship between the source and receiver as well as the type of source.

Interior Noise Calculation

The interior noise calculation takes into account the exterior noise level, the transmission loss of the glazing (including glass, frame, and seals), wall, and roof/ceiling systems, the finishes within the space, and noise exposure due to building geometry and acoustic shielding. The interior sound level is calculated using the equation:

$$SPL_I = SPL_E + 10 \log_{10}(A) - 10 \log_{10}(R) - TL + 6$$

Where:

SPL_I = the Interior Sound Pressure Level (dB or dBA)

SPL_E = Exterior Sound Pressure Level (dB or dBA)

A = Surface Area exposed to Exterior Noise (sq.ft.)

R = Room Absorption Coefficient (sabins)

TL = Sound Transmission Loss of Exterior Façade Assembly (dB)

This calculation is performed for each exposed façade individually. The total interior sound level is found by using decibel addition to sum the sound level from all exposed facades.

July 22, 2024

Linc Housing

3590 Elm Avenue
Long Beach, California 90807

Attention: Frances Sarmiento | Senior Project Manager

Subject: **Soquel Dr & 41st Ave**
Soquel, California
Exterior Noise and Exterior Façade Acoustical Analysis
Veneklasen Project No. 5125-010

Dear Frances:

Veneklasen Associates, Inc. (Veneklasen) has completed our review of the Soquel Affordable Multi-Family project located in Soquel, California. This report predicts the exterior noise level at the site using 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 exterior noise sources on the Soquel Affordable Multi-Family project in Soquel, 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 U.S. Department of Housing and Urban Development (HUD).

The project consists of a 6-story new construction development with 289 apartment units across Levels 2 through 5 and 240 parking stalls. The ground floor will have an on-grade podium parking garage and resident-serving amenity space. The project is bounded by Soquel Drive to the north, 41st Avenue to the east, existing commercial uses to the west and south, and an existing residential use at the center-eastern portion of the site.

2.0 NOISE CRITERIA

DNL (Day-Night Level) is the 24-hour equivalent (average) sound pressure level in which the nighttime (10 pm – 7 am) noise is weighted by adding 10 dB to the hourly level. Since this is a 24-hour metric, short-duration noise events (truck pass-by’s, buses, etc.) are not as prominent in the analysis.

2.1 HUD Standards

The Noise Regulation for HUD is defined in Title 24 Part 51 Subpart B – Noise Abatement and Control. Section 51.101(9) states that the interior noise level DNL shall not exceed 45.

Section 51.103 defines the site acceptability standards, and section 51.104(a) defines the noise attenuation requirements. These are summarized in Table 1 below. Standard construction is assumed to provide 20 dB of reduction, so that the interior standard will be met for noise levels up to DNL 65. Additional attenuation is required for exterior noise levels above 65 so that the interior noise level does not exceed DNL 45.

The HUD exterior noise goal for outdoors in residential areas is 65 DNL. This typically applies to shared common outdoor use areas.

Table 1 - HUD Site Acceptability Standards

Condition	Exterior Noise Level, DNL	Attenuation Requirements
Acceptable	≤ 65	None: standard construction provides attenuation of 20 dB
Normally Unacceptable	65 – 70	An additional 5 dB of attenuation (25 dB total) for noise sensitive uses
	71 – 75	An additional 10 dB of attenuation (30 dB total) for noise sensitive uses
Unacceptable	>75	Special Approval required

2.2 Interior Noise Levels - Residential

The State of California Building Code (Section 1206, “Sound Transmission”) and the County of Santa Cruz Noise Element state that interior DNL values for residential land uses are not to exceed 45 DNL in any habitable room.

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

3.0 EXTERIOR NOISE ENVIRONMENT

Figure 1 provides an aerial view of the project site.

Figure 1 – Aerial View of Project Site



3.1 Roadway Sources

Traffic on 41st Avenue and Soquel Drive is the primary source of noise affecting the site. Daily traffic count data for these roadways was obtained from the Santa Cruz County Regional Transportation Commission (SCRTC). A vehicle type breakdown was not available, so Veneklasen used the HUD defaults for arterial roads in urban areas, with medium and heavy trucks each comprising 4% of total traffic. Roadway-specific hourly traffic distributions were not available, so Veneklasen used the HUD default assumption that 15% of ADT occurs during nighttime hours.

HUD guidelines state that wherever possible, the noise environment should be predicted for at least 10 years beyond the predicted construction completion date. Roadway-segment-specific traffic growth rates were derived from baseline (2017) estimates and future cumulative (2035) predictions for peak hour traffic from the *Transportation Impact Analysis (Final Report)* for the Santa Cruz Nissan Project previously proposed on a portion of the current project site. Traffic information is summarized in Table 2, with supporting information in Appendix III.

Table 2 – Summary of Traffic Information

Roadway	ADT			Speed	% Growth/year ^b	Night %	Road Width	Calculated 2035 ^c		
	2015	2022	2035 ^b					Cars	Med. Trucks	Heavy Trucks
41st Ave.	14551	NA	16900	25 mph	0.8%	15%	62 to 79 ft	15548	676	676
Soquel Dr.	NA	22387	24700	35 mph	0.8%	15%	54 ft	22724	988	988

Notes:

^a ADT counts from Santa Cruz County Regional Transportation Commission (SCRTC), *Santa Cruz County Weekday Average Daily Traffic Counts 2014-2022*.

^b Predicted/derived based on peak hour traffic estimates and future predictions from *Santa Cruz Nissan Transportation Impact Analysis Final Report*, April 7, 2017, Kimley-Horn.

^c Vehicle type distributions based on distribution percentages from G. Foerst, HUD, Memorandum, 12/3/79, "Using the Noise Assessment Guidelines".

3.2 Railway and Airport Sources

No nearby railroads or airports were identified that could impact the project site.

Supporting information is shown in Appendix III.

3.3 Project Site Exterior Noise Levels

The DNL Calculator on the HUD website was used to predict future exterior noise levels using the information shown in Table 2 above and the locations shown in Figure 2. The calculated DNLs at these locations are summarized in Table 3. The calculations are attached in Appendix I.

Figure 2 – Noise Assessment Locations (NALs)



Table 3 – Exterior Noise Levels

Location	Façade Context (if applicable)	Noise Source	Effective Distance to Source (ft)	Source Noise Level, DNL	Combined Noise Level, DNL
NAL1	NW corner	41st Ave	400	58	74
		Soquel Dr	56	74	
NAL 2	NE corner	41st Ave	62	71	75
		Soquel Dr	56	74	
NAL 3	Eastern side	41st Ave	52	72	73
		Soquel Dr	210	65	
NAL 4	Southeastern side	41st Ave	112	67	67
		Soquel Dr	—	—	
NAL 5	Western side	41st Ave	—	—	67
		Soquel Dr	153	67	

3.4 Overall Exterior Exposure

Based on the calculated noise levels at façade locations represented by NALs, VA established noise level ranges for different horizontal segments of the project building façades. To simplify the presentation of the exterior noise levels, VA has separated the project façades into zones based on the sound exposure and required mitigation. The horizontal extent of each zone is depicted in Figure 3. The predicted sound level ranges for each zone are listed in Table 4 below.

Table 4 – Noise Zones

Location	Exterior Noise Level, DNL
Zone A	65-75
Remaining Units	< 65

Figure 3 – Noise Zones



4.0 INTERIOR NOISE CALCULATION

4.1 Exterior Façade Construction

Plans (schematic design sheets) currently available to Veneklasen do not specify exterior façade wall construction. At this time, Veneklasen has assumed that the exterior wall assembly consists of stucco or similar exterior finish on plywood sheathing and 2x wood studs, with 1 layer of 5/8" gypsum board on the interior and batt insulation in the cavity.

The sizing of glazing at the façade is currently in flux. Veneklasen understands that at most 48% of each room's façade will be composed of glazing.

Veneklasen utilized the glazing ratings (glass, frame and seals) shown in Appendix IV. Appendix IV shall comprise the acoustical specification requirements for the exterior windows and doors defined in this report.

4.2 Interior Average Noise Level (DNL) – Residential

Veneklasen calculated the interior level within the residential units given the predicted exterior noise environment and the exterior facade assumptions described above. Calculations are shown in Appendix II. Table 5 shows the predicted interior DNL noise levels based on the windows and doors with STC ratings as shown and glazing construction as described in Appendix IV.

Table 5 – Calculated Interior DNL Noise Levels

Location	Exterior Noise Level, DNL	Window/Door Glazing Rating, STC	Interior Noise Level, DNL
Zone A	75	30	<45
Remaining Units	< 65	No STC requirement. Minimum STC 30 recommended.	

4.3 Mechanical Ventilation - Residential

It is recommended that the windows and doors be kept closed to meet the noise requirements and mechanical or other means of ventilation be used. 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.

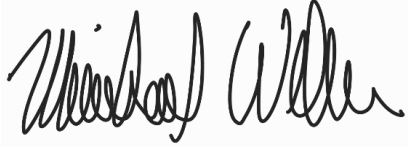
Residential

- The exterior framed wall assembly as detailed in Section 4.1 is acceptable.
- Windows and glass doors with minimum STC ratings as shown in Table 5 with Transmission Loss and STC rating specified in Appendix IV are required.
- Residential mechanical ventilation, or other means of natural ventilation, is recommended for all units.

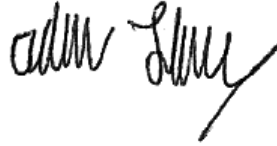
Various noise mitigation methods may be utilized to satisfy the noise criteria described in this report. Alteration of mitigation methods that deviate from requirements should be reviewed by the acoustical consultant.

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

Sincerely,
Veneklasen Associates, Inc.



Michael Weber
Associate



Adam Thompson
Associate

APPENDIX I – PROJECT NOISE VALUES VIA HUD ONLINE DNL CALCULATOR AND EXPOSURE LOSS (BARRIER CALCULATOR)

Site ID	Soquel Affordable, NAL 1		
Record Date	05/09/2024		
User's Name	Adam Thompson		
Road # 1 Name:	Soquel Dr.		
Road #1			
Vehicle Type	Cars <input checked="" type="checkbox"/>	Medium Trucks <input checked="" type="checkbox"/>	Heavy Trucks <input checked="" type="checkbox"/>
Effective Distance	56	56	56
Distance to Stop Sign			
Average Speed	35	35	35
Average Daily Trips (ADT)	22724	988	988
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	67	63	72
Calculate Road #1 DNL	74	Reset	
Road # 2 Name:	41st Ave.		
Road #2			
Vehicle Type	Cars <input checked="" type="checkbox"/>	Medium Trucks <input checked="" type="checkbox"/>	Heavy Trucks <input checked="" type="checkbox"/>
Effective Distance	400	400	400
Distance to Stop Sign			
Average Speed	25	25	25
Average Daily Trips (ADT)	15548	676	676
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	49	46	58
Calculate Road #2 DNL	58	Reset	
<input type="button" value="Add Road Source"/> <input type="button" value="Add Rail Source"/>			
Airport Noise Level			
Loud Impulse Sounds?	<input type="radio"/> Yes <input checked="" type="radio"/> No		
Combined DNL for all Road and Rail sources	74		

Site ID	Soquel Affordable, NAL 2		
Record Date	05/09/2024		
User's Name	Adam Thompson		
Road # 1 Name:	Soquel Dr.		
Road #1			
Vehicle Type	Cars <input checked="" type="checkbox"/>	Medium Trucks <input checked="" type="checkbox"/>	Heavy Trucks <input checked="" type="checkbox"/>
Effective Distance	56	56	56
Distance to Stop Sign			
Average Speed	35	35	35
Average Daily Trips (ADT)	22724	988	988
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	67	63	72
Calculate Road #1 DNL	74	Reset	
Road # 2 Name:	41st Ave.		
Road #2			
Vehicle Type	Cars <input checked="" type="checkbox"/>	Medium Trucks <input checked="" type="checkbox"/>	Heavy Trucks <input checked="" type="checkbox"/>
Effective Distance	62	62	62
Distance to Stop Sign			
Average Speed	25	25	25
Average Daily Trips (ADT)	15548	676	676
Night Fraction of ADT	15	15	15
Road Gradient (%)			0
Vehicle DNL	61	58	70
Calculate Road #2 DNL	71	Reset	
<input type="button" value="Add Road Source"/> <input type="button" value="Add Rail Source"/>			
Airport Noise Level			
Loud Impulse Sounds?	<input type="radio"/> Yes <input checked="" type="radio"/> No		
Combined DNL for all Road and Rail sources	75		

Site ID	Soquel Affordable, NAL 3
Record Date	05/09/2024 
User's Name	Adam Thompson

Road # 1 Name:

Road #1

Vehicle Type	Cars <input checked="" type="checkbox"/>	Medium Trucks <input checked="" type="checkbox"/>	Heavy Trucks <input checked="" type="checkbox"/>
Effective Distance	<input type="text" value="210"/>	<input type="text" value="210"/>	<input type="text" value="210"/>
Distance to Stop Sign	<input type="text"/>	<input type="text"/>	<input type="text"/>
Average Speed	<input type="text" value="35"/>	<input type="text" value="35"/>	<input type="text" value="35"/>
Average Daily Trips (ADT)	<input type="text" value="22724"/>	<input type="text" value="988"/>	<input type="text" value="988"/>
Night Fraction of ADT	<input type="text" value="15"/>	<input type="text" value="15"/>	<input type="text" value="15"/>
Road Gradient (%)	<input type="text"/>	<input type="text"/>	<input type="text" value="0"/>
Vehicle DNL	<input type="text" value="58"/>	<input type="text" value="54"/>	<input type="text" value="63"/>
Calculate Road #1 DNL	<input type="text" value="65"/>	<input type="button" value="Reset"/>	

Road # 2 Name:

Road #2

Vehicle Type	Cars <input checked="" type="checkbox"/>	Medium Trucks <input checked="" type="checkbox"/>	Heavy Trucks <input checked="" type="checkbox"/>
Effective Distance	<input type="text" value="52"/>	<input type="text" value="52"/>	<input type="text" value="52"/>
Distance to Stop Sign	<input type="text"/>	<input type="text"/>	<input type="text"/>
Average Speed	<input type="text" value="25"/>	<input type="text" value="25"/>	<input type="text" value="25"/>
Average Daily Trips (ADT)	<input type="text" value="15548"/>	<input type="text" value="676"/>	<input type="text" value="676"/>
Night Fraction of ADT	<input type="text" value="15"/>	<input type="text" value="15"/>	<input type="text" value="15"/>
Road Gradient (%)	<input type="text"/>	<input type="text"/>	<input type="text" value="0"/>
Vehicle DNL	<input type="text" value="63"/>	<input type="text" value="59"/>	<input type="text" value="71"/>
Calculate Road #2 DNL	<input type="text" value="72"/>	<input type="button" value="Reset"/>	

Airport Noise Level

Loud Impulse Sounds? Yes No

Combined DNL for all Road and Rail sources

Site ID	Soquel Affordable, NAL 4	
Record Date	05/09/2024	
User's Name	Adam Thompson	

Road # 1 Name:

Road #1

Vehicle Type	Cars <input checked="" type="checkbox"/>	Medium Trucks <input checked="" type="checkbox"/>	Heavy Trucks <input checked="" type="checkbox"/>
Effective Distance	<input type="text" value="112"/>	<input type="text" value="112"/>	<input type="text" value="112"/>
Distance to Stop Sign	<input type="text"/>	<input type="text"/>	<input type="text"/>
Average Speed	<input type="text" value="25"/>	<input type="text" value="25"/>	<input type="text" value="25"/>
Average Daily Trips (ADT)	<input type="text" value="15548"/>	<input type="text" value="676"/>	<input type="text" value="676"/>
Night Fraction of ADT	<input type="text" value="15"/>	<input type="text" value="15"/>	<input type="text" value="15"/>
Road Gradient (%)	<input type="text"/>	<input type="text"/>	<input type="text" value="0"/>
Vehicle DNL	<input type="text" value="58"/>	<input type="text" value="54"/>	<input type="text" value="66"/>
Calculate Road #1 DNL	<input type="text" value="67"/>	<input type="button" value="Reset"/>	

Airport Noise Level

Loud Impulse Sounds? Yes No

Combined DNL for all Road and Rail sources

Site ID	Soquel Affordable, NAL 5
Record Date	05/09/2024 
User's Name	Adam Thompson

Road # 1 Name:

Road #1

Vehicle Type	Cars <input checked="" type="checkbox"/>	Medium Trucks <input checked="" type="checkbox"/>	Heavy Trucks <input checked="" type="checkbox"/>
Effective Distance	<input type="text" value="153"/>	<input type="text" value="153"/>	<input type="text" value="153"/>
Distance to Stop Sign	<input type="text"/>	<input type="text"/>	<input type="text"/>
Average Speed	<input type="text" value="35"/>	<input type="text" value="35"/>	<input type="text" value="35"/>
Average Daily Trips (ADT)	<input type="text" value="22724"/>	<input type="text" value="988"/>	<input type="text" value="988"/>
Night Fraction of ADT	<input type="text" value="15"/>	<input type="text" value="15"/>	<input type="text" value="15"/>
Road Gradient (%)	<input type="text"/>	<input type="text"/>	<input type="text" value="0"/>
Vehicle DNL	<input type="text" value="60"/>	<input type="text" value="56"/>	<input type="text" value="65"/>
Calculate Road #1 DNL	<input type="text" value="67"/>	<input type="button" value="Reset"/>	

Airport Noise Level:

Loud Impulse Sounds? Yes No

Combined DNL for all Road and Rail sources:

APPENDIX II – SOUND TRANSMISSION CALCULATIONS VIA HUD’S STRACAT ONLINE CALCULATOR

Sound Transmission Classification Assessment Tool (STraCAT)

Part I - Description

Project Soquel Affordable	Sponsor/Developer Iinc Housing
Location Soquel, CA; NAL 1	Prepared by Adam Thompson
Noise Level 74	Date 7/19/2024
Primary Source(s) Traffic	

Part II - Wall Components

Wall Construction Detail	Area	STC
7/8" stucco; #15 building paper and	216	49
216 Sq. Feet 49		

Window Construction Detail	Quantity	Sq Ft/Unit	STC
1" Glazing Unit - STC 30	2	52	30


Door Construction Detail	Quantity	Sq Ft/Unit	STC
Add new door			

Part III - Results

Wall Statistics	
Stat	Value
Area:	216 ft ²
Wall STC:	49

Aperture Statistics			
Aperture	Count	Area	% of wall
Windows:	2	104 ft ²	48.15%
Doors:	0	0 ft ²	0%

Evaluation Criteria	
Criteria	Value
Noise source sound level (dB):	74
Combined STC for wall assembly:	33.12
Required STC rating:	32
Does wall assembly meet requirements?	Yes

 Print

Part I - Description			
Project	<input type="text" value="Soquel Affordable"/>		Sponsor/Developer
Location	<input type="text" value="Soquel, CA; NAL 2"/>		Prepared by
Noise Level	<input type="text" value="75"/>	Date	<input type="text" value="7/19/2024"/>
			Primary Source(s)
			<input type="text" value="Traffic"/>

Part II - Wall Components			
Wall Construction Detail		Area	STC
<input <="" td="" type="text" value="7/8\"/> <td><input type="text" value="216"/></td> <td><input type="text" value="49"/></td> <td></td>	<input type="text" value="216"/>	<input type="text" value="49"/>	
<input type="button" value="Add new wall"/>			
		216 Sq. Feet	49
Window Construction Detail		Quantity	Sq Ft/Unit
<input <="" td="" type="text" value="1\"/> <td><input type="text" value="2"/></td> <td><input type="text" value="52"/></td> <td><input type="text" value="30"/> </td>	<input type="text" value="2"/>	<input type="text" value="52"/>	<input type="text" value="30"/>
<input type="button" value="Add new window"/>			
Door Construction Detail		Quantity	Sq Ft/Unit
<input type="button" value="Add new door"/>			

Part III - Results			
Wall Statistics			
Stat	Value		
Area:	216 ft ²		
Wall STC:	49		
Aperture Statistics			
Aperture	Count	Area	% of wall
Windows:	2	104 ft ²	48.15%
Doors:	0	0 ft ²	0%
Evaluation Criteria			
Criteria	Value		
Noise source sound level (dB):	75		
Combined STC for wall assembly:	33.12		
Required STC rating:	33		
Does wall assembly meet requirements?	<input type="button" value="Yes"/>		
<input type="button" value="Print"/>			


Part I - Description			
Project		Sponsor/Developer	
<input type="text" value="Soquel Affordable"/>		<input type="text" value="Iinc Housing"/>	
Location		Prepared by	
<input type="text" value="Soquel, CA; NAL 3"/>		<input type="text" value="Adam Thompson"/>	
Noise Level	Date	Primary Source(s)	
<input type="text" value="72"/>	<input type="text" value="7/19/2024"/>	<input type="text" value="Traffic"/>	

Part II - Wall Components			
Wall Construction Detail		Area	STC
<input type="text" value="7/8\"/>	▼	<input type="text" value="216"/>	<input type="text" value="49"/>
216 Sq. Feet 49			
Window Construction Detail		Quantity	Sq Ft/Unit
<input type="text" value="1\"/>	▼	<input type="text" value="2"/>	<input type="text" value="52"/>
2 52			
Door Construction Detail		Quantity	STC
Add new door			

Part III - Results			
Wall Statistics			
Stat	Value		
Area:	216 ft ²		
Wall STC:	49		
Aperture Statistics			
Aperture	Count	Area	% of wall
Windows:	2	104 ft ²	48.15%
Doors:	0	0 ft ²	0%
Evaluation Criteria			
Criteria	Value		
Noise source sound level (dB):	72		
Combined STC for wall assembly:	33.12		
Required STC rating:	30		
Does wall assembly meet requirements?	Yes		
Print			

Part I - Description			
Project Soquel Affordable		Sponsor/Developer Inlc Housing	
Location Soquel, CA; NAL 4, 5		Prepared by Adam Thompson	
Noise Level 67	Date 7/19/2024	Primary Source(s) Traffic	

Part II - Wall Components			
Wall Construction Detail		Area	STC
7/8" stucco; #15 building paper and		216	49
216 Sq. Feet 49			
Window Construction Detail		Quantity	Sq Ft/Unit
1" Glazing Unit - STC 30		2	52
Door Construction Detail		Quantity	Sq Ft/Unit

Part III - Results			
Wall Statistics			
Stat	Value		
Area:	216 ft ²		
Wall STC:	49		
Aperture Statistics			
Aperture	Count	Area	% of wall
Windows:	2	104 ft ²	48.15%
Doors:	0	0 ft ²	0%
Evaluation Criteria			
Criteria	Value		
Noise source sound level (dB):	67		
Combined STC for wall assembly:	33.12		
Required STC rating:	25		
Does wall assembly meet requirements?	Yes		
 Print			

APPENDIX III – Supporting Information

Vehicle Type Distributions

Road Type	Autos		MTs		HTs	
	Urban	Rural	Urban	Rural	Urban	Rural
Interstate highways, freeways, and expressways	89%	80%	2%	3%	9%	17%
Major and minor arterials	92%	87%	4%	4%	4%	9%
Collectors	92%	95%	4%	1%	4%	4%
Local roads and streets	98%	99%	1%	0.4%	1%	0.6%

Source: G. Foerst, HUD, Memorandum, 12/3/79, "Using the Noise Assessment Guidelines"

Traffic Volume Growth Rates

Referenced Project: Santa Cruz Nissan Project Document: Transportation Impact Analysis				AM												PM												Leg Totals					
Scenario	Stated/ Inferred Year	Exhibit	Int. No	Roadways		NB			SB			EB			WB			NB			SB			EB			WB			AM+PM			
				NS	EW	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R	N	S	E	W			
Existing	2017	Figure 4	3	41st Ave (* Driveway)	Soquel Dr	609	5	86	0	9	3	1	339	372	135	543	5	366	18	153	3	17	5	4	740	504	81	234	5	75	2355	2324	3720
Cumulative Plus Project	2035	Figure 16	3	41st Ave (* Driveway)	Soquel Dr	691	6	95	0	10	3	1	390	429	158	624	6	418	20	171	3	19	6	5	851	587	94	270	6	85	2698	2668	4275

Absolute: 10 343 344 555
 Proportional: 13% 15% 15% 15%
 Corresp. Linear Annual Growth Rate: 0.7% 0.8% 0.8% 0.8%

Δ years: 18

Future ADTs by Vehicle Type

Date	Area	Roadway	Segment		ADT	Target Future Year	Projected Future ADT	Road Type	Land Use Type	Autos	MTs	HTs	Check Sum
			Begin	End									
2015-02	CO	41ST AVE	SHWY 1	.11 N OF SHWY 1	14,551	2035	16900	Major and minor arterials	Urban	15548	676	676	16900
2022-10	CO	SOQUEL DR	RODEO GULCH	41 ST AVE	22,387	2035	24700	Major and minor arterials	Urban	22724	988	988	24700

Santa Cruz County Regional
 Source: Transportation Commission
 for Base (SCCRTC), Santa Cruz
 Year: County Weekday Average
 ADTs: Daily Traffic Counts 2014-2022
 [Data set].

Exposure Loss Adjustments and Resultant Adjusted Overall DNLs by NAL

NAL	Roadway	Segment	θ (exp)	Exposure Loss	DNL		NAL DNL
					HUD Calculator Results	Adjusted Exp.	
1	41st Ave	S: Soquel Dr	11	-12	59	47	4.9E+04
1	Soquel Dr	W: 41st Ave	180	0	73	73	2.0E+07
2	41st Ave	S: Soquel Dr	73	-4	64	60	1.0E+06
2	Soquel Dr	W: 41st Ave	170	0	70	70	9.4E+06
3	41st Ave	S: Soquel Dr	164	0	69	69	7.2E+06
3	Soquel Dr	W: 41st Ave	107	-2	63	61	1.2E+06
4	41st Ave	S: Soquel Dr	176	0	69	69	7.8E+06
4	Soquel Dr	W: 41st Ave	79	-4	61	57	5.5E+05
5	41st Ave	S: Soquel Dr	61	-5	61	56	4.3E+05
5	Soquel Dr	W: 41st Ave	11	-12	63	51	1.2E+05
6	Soquel Dr	W: 41st Ave	86	-3	65	62	1.5E+06
6	Soquel Dr	W: 41st Ave	59	-5	65	60	1.0E+06
6	Soquel Dr	W: 41st Ave	52	-5	66	61	1.2E+06

Source Data: ADT Counts

Santa Cruz County Weekday Average Daily Traffic Counts 2014-2022

For more state highway counts see Caltrans Average Daily Traffic Census webpage

Areas: C=Capitola, CO=Unincorporated county, SC=Santa Cruz city, SV=Scotts Valley, W=Watsonville

Area	Location	From	To	Latest Count	Month/Year Counted
C	41ST AVE	CLARES	SHWY 1	35,597	10/2022
C	41ST AVE.	CAPITOLA RD	BROMMER ST	21,810	4/2017
C	42ND AVE	CAPITOLA RD	CLARES ST	1,480	2/2015
C	47TH AVE.	PORTOLA DR	CAPITOLA DR	1,804	11/2020
C	49TH AVE	CAPITOLA RD	WHARF RD	5,336	2/2015
C	BAY AVE	MONTEREY AVE	SHWY 1	11,749	10/2016
C	BROMMER ST	BULB AVE	41ST AVE	5,635	10/2022
C	CAPITOLA AVE	BAY AVE	SHWY 1	3,534	2/2015
C	CAPITOLA RD	45TH AVE	WHARF RD	10,526	2/2015
C	CAPITOLA RD	41ST AVE	45TH AVE	11,024	2/2015
C	CAPITOLA RD	30TH AVE	41ST AVE	13,534	10/2022
C	CLARES ST	41ST AVE	WHARF RD	5,348	2/2015
C	CLARES ST.	CAPITOLA RD	41ST AVE	15,978	2/2015
C	PARK AVE	MONTEREY AVE	SHWY 1	8,381	7/2015
C	PORTER ST.	HWY 1	SOQUEL-WHARF RD	14,959	11/2022
C	SOQUEL DR	MAIN ST	CAPITOLA AVE	20,349	10/2016
C	STOCKTON AVE.	WARF RD	CAPITOLA AVE	12,873	10/2022
C	TOPAZ ST	45 TH AVE	49 TH AVE	1,086	2/2015
C	WHARF RD	CLIFF DR	CAPITOLA RD	4,672	2/2015
C	WHARF RD	CAPITOLA RD	SHWY 1	5,934	2/2015
CO	17TH AVE.	CAPITOLA RD	BROMMER ST	11,692	10/2016
CO	17TH AVE.	FELT ST	BROMMER ST	12,436	10/2022
CO	30TH AVE.	PORTOLA DR	BROMMER ST	4,244	11/2020
CO	38TH AVE.	PORTOLA DR	BROMMER ST	5,468	11/2020
CO	41ST AVE	SHWY 1	.11 N OF SHWY 1	14,551	2/2015
CO	41ST AVE	PORTOLA DR	RR TRACKS	12,160	8/2016
CO	7TH AVE.	BROMMER ST	EATON ST	11,154	10/2016
CO	7TH AVE.	RODRIGUEZ ST	SOQUEL DR	10,268	4/2017
CO	7TH AVE.	EATON ST	BROMMER ST	10,969	7/2015
CO	AIRPORT BLVD.	HOLM RD	LOMA PRIETA AVE	17,365	11/2022
CO	ALBA RD.	EMPIRE GRADE	WESTERN WY	253	4/2017
CO	AMESTI RD.	BROWNS VALLEY RD	POPPY HILL RD	474	4/2017
CO	BONITA DR.	FREEDOM BLVD	VISTA DEL MAR	2,886	4/2017
CO	BROMMER ST.	7TH AVE	17TH AVE	9,814	10/2022
CO	BUENA VISTA DR.	LANDFILL	HARKINS SLOUGH RD	3,577	4/2017
CO	CABRILLO COLLEGE DR.	PARK AVE	SOQUEL DR	8,702	10/2016
CO	CAPITOLA RD	SOQUEL AVE	7TH AVE	13,864	1/2014
CO	CAPITOLA RD	7TH AVE.	17TH AVE	15,349	5/2018
CO	CAPITOLA RD.	CHANTICLEER AVE	30TH AVE	11,609	4/2017
CO	CARLTON RD	COWARD RD	SHWY 129	2,207	4/2017
CO	CENTER AVE.	STATE PARK DR	SEACLIFF DR	5,036	10/2016
CO	CHANTICLEER AVE	RODRIGUEZ ST	CAPITOLA RD	4,875	8/2015
CO	CLUB HOUSE DR.	LOCKE DR	LA HONDA DR	4,985	4/2017
CO	CORRALITOS RD.	MERK RD	VARNI RD	5,739	4/2017
CO	EAST CLIFF DR.	7TH AVE	17TH AVE	14,055	5/2018
CO	FELTON EMPIRE RD	2301 EMPIRE GRADE	URL .03 NW/KRAZY ACRE LN	2,420	4/2017
CO	FREEDOM BLVD	VALENCIA RD	MARINER WAY	15,226	10/2016
CO	FREEDOM BLVD.	CORRALITOS RD	SCURICH LN	18,093	4/2017
CO	FREEDOM BLVD.	SCURICH LN	BUENA VISTA DR	9,352	11/2022

Source Data: ADT Counts (cont.)

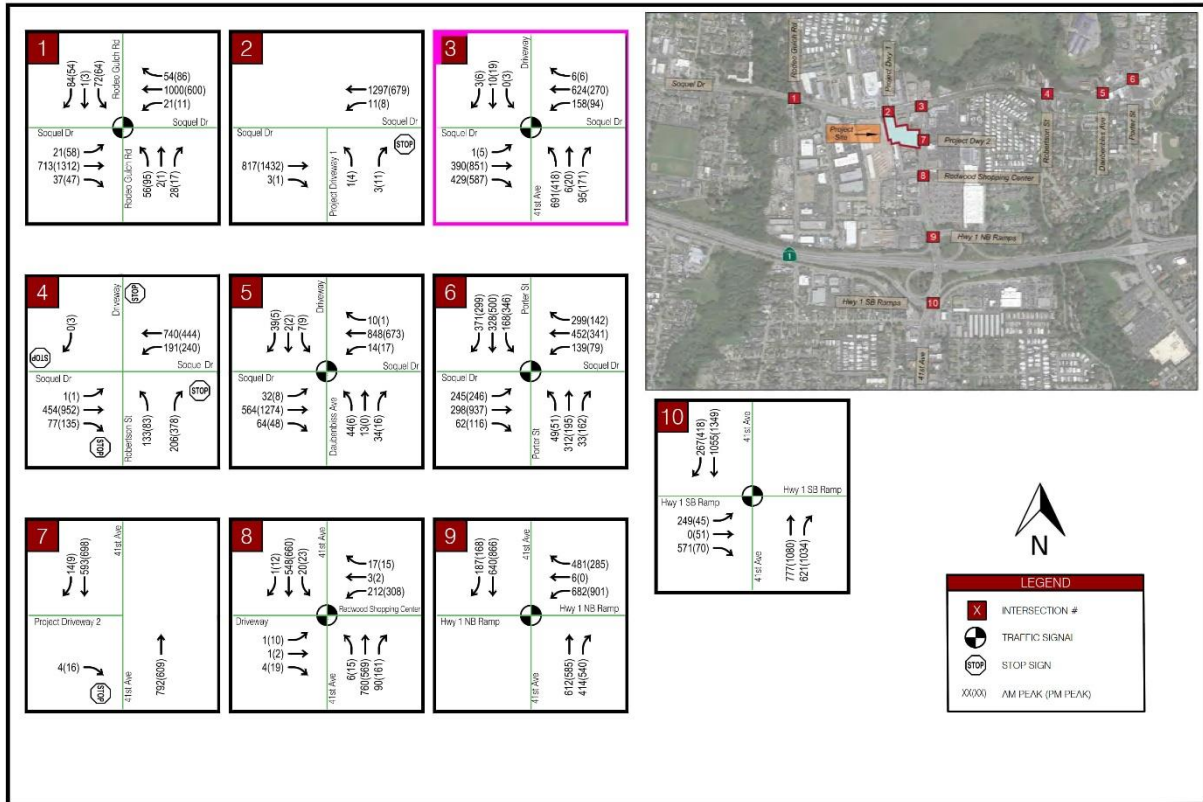
Area	Location	From	To	Latest Count	Month/Year Counted
CO	FREEDOM BLVD.	MARINER WAY	SOQUEL DR	14,451	11/2022
CO	GLEN HAVEN RD.	CHERRYVALE AVE	URL 1.35 M N/PRESCOT	635	4/2017
CO	GRAHAM HILL RD	SHWY 9	MT HERMON RD	24,600	11/2022
CO	GRAHAM HILL RD.	MT HERMON RD	CONFERENCE DR	16,046	4/2017
CO	GRAHAM HILL RD.	SIMS RD	LOCKWOOD LN	11,887	11/2022
CO	GRANITE CREEK RD	SHWY 17	LIONS FIELD DR	938	2/2015
CO	HARKINS SLOUGH RD	LEE RD	HWY 1	10,558	4/2017
CO	HWY 129	THOMSON ROAD	CARLTON ROAD	10,395	11/2022
CO	HWY 9	TWO BAR ROAD	KINGS CREEK ROAD	3,240	11/2022
CO	HWY 9	BOULDER CREEK SOUTH JCT. RTE. 236	BEAR CREEK ROAD	8,970	11/2022
CO	HWY 9	BROOKDALE ALAMEDA AVENUE	BOULDER CREEK RIVER ST FELTON SAN LORENZO	10,503	11/2022
CO	HWY 9	FELTON GLENGARRY RD	AVENUE	4,390	11/2022
CO	HWY 9	FELTON SAN LORENZO AVENUE	FELTON LAUREL ROAD	7,425	11/2022
CO	HWY 9	FELTON LAUREL ROAD	FELTON GRAHAM HILL ROAD	8,656	11/2022
CO	HWY 9	BOULDER CREEK RIVER ST	BOULDER CREEK SOUTH JCT. RTE. 236	8,912	11/2022
CO	MAIN ST	AUTO CENTER DR	RODRIGUEZ ST	26,408	11/2022
CO	MAPLE AVE	MAIN ST	LINCOLN ST	4,764	8/2016
CO	MAR VISTA DR	POPLAR ST	MCGREGOR DR	1,997	11/2020
CO	MCGREGOR DR	MAR VISTA DR	SEARIDGE RD	3,986	10/2016
CO	MCGREGOR DR	PARK AVE	MAR VISTA DR	7,576	10/2016
CO	PARK AVE.	SOQUEL DR	S/HWY 1	14,980	11/2022
CO	PORTER ST	SOQUEL-WHARF RD	SOQUEL DR	10,830	8/2016
CO	PORTOLA DR	21ST AVE	CORCORAN AVE	10,743	7/2015
CO	PORTOLA DR.	41ST AVE	LAUREL AVE	6,388	7/2015
CO	PORTOLA DR.	38TH AVE	41ST AVE	13,231	10/2022
CO	PORTOLA DR.	CORCORAN AVE	26TH AVE	14,554	10/2022
CO	RIO DEL MAR BLVD	SUMNER AVE	CLUB HOUSE DR	17,900	10/2016
CO	SAN ANDREAS RD.	SEASCAPE BL	HWY 1	9,102	11/2022
CO	SCOTT'S VALLEY DR.	ERBA LN	CARBONERO WAY	20,440	10/2018
CO	SEARIDGE RD.	MCGREGOR DR	STATE PARK DR	5,650	11/2022
CO	SOQUEL AVE.	S RODEO GULCH RD	GROSS RD	6,932	10/2016
CO	SOQUEL AVE.	SEABRIGHT AVE	MORRISSEY BL	17,513	5/2018
CO	SOQUEL AVE.	SOQUEL DR	17TH AVE	18,802	5/2018
CO	SOQUEL DR	W LEDYARD WAY	STATE PARK DR	17,369	11/2022
CO	SOQUEL DR	LOWER PERIMETER RD	CABRILLO COLLEGE DR	11,547	7/2015
CO	SOQUEL DR	RODEO GULCH	41 ST AVE	22,387	10/2022
CO	SOQUEL DR.	MAIN ST	WALNUT ST	11,599	7/2015
CO	SOQUEL DR.	APTOS RANCH RD	SPRECKELS DR	16,332	7/2015
CO	SOQUEL DR.	APTOS ST	RIO DEL MAR BL	10,580	10/2016
CO	SOQUEL DR.	PARK AVE	MERRILL RD	20,066	10/2016
CO	SOQUEL DR.	STATE PARK DR	APTOS RANCHO RD	20,080	10/2016
CO	SOQUEL DR.	COMMERCIAL CROSSING	MISSION DR	22,642	10/2016
CO	SOQUEL DR.	THURBER LN	CHANTICLEER AVE	22,992	5/2018
CO	SOQUEL DR.	WINKLE AVE	RODEO GULCH RD	21,391	10/2022
CO	SOQUEL DR.	ROBERTSON ST	PORTER ST	21,443	11/2022
CO	STATE PARK DR.	SEA RIDGE RD	CENTER AVE	11,340	7/2015
CO	STATE PARK DR.	HWY 1	SOQUEL DR	18,678	11/2022

Source Data: Estimated (2017) and Predicted (2035) Peak Hour Volumes



Existing Peak Hour Turning Movement Volumes

Source Data: Estimated (2017) and Predicted (2035) Peak Hour Volumes (cont.)



Cumulative Plus Project Peak Hour Turning Movement Volumes

APPENDIX IV – GLAZING REQUIREMENTS

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

Table 6– Acoustical Glazing Requirements: Minimum Octave Band Transmission Loss and STC Rating

Nominal Thickness	Minimum Transmission Loss Octave Band Center Frequency (Hz)						Min. STC Rating
	125	250	500	1000	2000	4000	
1" dual	21	19	28	34	37	33	30

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

1. Up to STC 35: nominal 1" insulated glazing unit

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 6 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 V GLOSSARY OF ACOUSTICAL TERMS

<u>Term</u>	<u>Definition</u>
Absorption	A property of material referring to how much sound it absorbs (as opposed to reflecting). In the context of this report, absorption refers to the total quantity of absorption within the receiving space. Absorption is measure in sabins.
A-weighting (dBA)	The sound pressure level in decibels as measured in an A-weighting filter network. The A-weighting de-emphasizes the low frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Decibel (dB)	A unit describing the amplitude of sound equivalent to 20 times the logarithm, to the base 10, of the ratio of the pressure of the sound to the reference pressure of 20 μ Pa. Used to quantify sound pressure levels.
Equivalent Sound Level (Leq)	The time-weighted average noise level during the stated measurement period.
Sabin	A unit used to describe absorption within a space. One sabin is equal to the absorption of a one-square-foot open window.
Sound Pressure Level (SPL)	The amplitude of sound when compared to the reference sound pressure level of 20 μ Pa. SPL is measured in dB.
Sound Transmission Class (STC)	A single-number metric used to describe the transmission loss performance of a material or assembly across the frequency spectrum. It is intended for use primarily when speech is the noise source.
Transmission Loss (TL)	A measure of the reduction in sound level as a sound wave passes through a material. The higher the transmission loss, the better the material's sound insulating properties.

APPENDIX VI – ACOUSTICAL CALCULATION METHODS

Decibel Addition

Decibels are based on a logarithmic scale; defined as the logarithmic ratio between a measured sound pressure level and a reference sound pressure level. When decibels are added, they are not combined arithmetically, but logarithmically. Decibels are added according to the following equation.

$$SPL_{tot} = 10\log\left(10^{\left(\frac{SPL_1}{10}\right)}\right) + 10\log\left(10^{\left(\frac{SPL_2}{10}\right)}\right)$$

Where:

SPL_{tot} = Total Sound Pressure Level (dB or dBA)

SPL_1, SPL_2 = Sound Pressure Level 1, 2 (dB or dBA)

A-Weighting

A-weighting a spectrum is completed by applying standardized weighting factors to a frequency spectrum, either in octave bands or third-octave bands. These resultant A-weighted levels are summed using decibel addition to generate the overall A-weighted level, noted as dBA. In a report, spectral data is typically presented un-weighted, and the overall level is presented with A-weighting.

The octave band A-weighting correction factors are shown in the table below:

	Octave Band Center Frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
A-weighting Correction Factor (dB)	-26	-16	-9	-3	0	+1	+1	-1

Acoustical Shielding

The presence of adjacent buildings or facades, changes in terrain, parapets, and other similar barriers provide acoustical shielding, reducing the sound level incident on the exterior facades. Common locations where acoustical shielding occurs include, but are not limited to, the roof, the back, and sides of the building that are not directly facing the noise source.

Acoustical shielding due to building geometry can be separated into two categories: reduction due to reduced area of exposure (side of a building), and shielding from barriers (such as a parapet or sound wall).

Reduction as a result of reduced area of exposure is calculated according to the following equation:

$$\Delta SPL = 10 \log_{10} \left(\frac{\theta_{exp}}{180} \right)$$

Where:

ΔSPL = Change in Sound Pressure Level (dB)

θ_{exp} = Angle of exposure (degrees)

Acoustical Attenuation due to Distance

Sound pressure level reduction due to distance is calculated according to the following equation:

$$SPL_2 = SPL_1 + C_s \log \left(\frac{r_1}{r_2} \right)$$

Where:

SPL₁ = Sound Pressure Level at Location 1 (dB or dBA)

SPL₂ = Sound Pressure Level at Location 2 (dB or dBA)

C_s = Source Coefficient; 20 for point source, 10 for a line source

r₁ = Location 1 distance from source (ft.)

r₂ = Location 2 distance from source (ft.)

In some situations, the C_s value is between 10 and 20; selection of this number is an engineering judgment based on the relationship between the source and receiver as well as the type of source.

Interior Noise Calculation

The interior noise calculation takes into account the exterior noise level, the transmission loss of the glazing (including glass, frame, and seals), wall, and roof/ceiling systems, the finishes within the space, and noise exposure due to building geometry and acoustic shielding. The interior sound level is calculated using the equation:

$$SPL_I = SPL_E + 10 \log_{10}(A) - 10 \log_{10}(R) - TL + 6$$

Where:

SPL_I = the Interior Sound Pressure Level (dB or dBA)

SPL_E = Exterior Sound Pressure Level (dB or dBA)

A = Surface Area exposed to Exterior Noise (sq.ft.)

R = Room Absorption Coefficient (sabins)

TL = Sound Transmission Loss of Exterior Façade Assembly (dB)

This calculation is performed for each exposed façade individually. The total interior sound level is found by using decibel addition to sum the sound level from all exposed facades.

Chapter 13.15 NOISE PLANNING

Sections:

13.15.010 Purpose and intent.

13.15.020 Definitions.

13.15.030 Sound level assessment or measurement.

13.15.040 Exemptions.

13.15.050 General noise regulations and unlawful noise.

13.15.060 Special requirements for air conditioning/mechanical units in or near residential uses.

13.15.070 Noise generating land use.

13.15.080 Exterior noise standards.

13.15.090 Interior noise standards.

13.15.100 Acknowledgement of potential vibration from rail.

13.15.110 Administration and enforcement.

13.15.120 Severability.

13.15.010 Purpose and intent.

The purpose of this chapter is to recognize the relationship between noise and noise-sensitive land uses and the public health concerns associated with noise. The intent of the County is to reasonably regulate noise generation and noise exposures by applying standards through land use planning and permitting, incorporating mitigation into project design to prevent unhealthful conditions, and enforcement to address violation of permit conditions. [Ord. 5308 § 1, 2019].

13.15.020 Definitions.

The words and phrases defined in this chapter shall have the meanings respectively ascribed to them by this section.

(A) "Ambient noise level" means the all-encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding an alleged offensive noise, at the location and approximate time at which the comparison with the offensive noise is to be made. The ambient noise level constitutes the normal or existing level of environmental noise at a given location.

(B) "A-weighting" means applying a frequency filter to sound pressure level measurement to more closely correlate sound measurement with human hearing. A-weighting is a standard measurement for

environmental noise and is abbreviated “dBA.” If the frequency weighting method used is not stated, A-weighting shall apply.

- (C) “Construction” means any site preparation including grading, building, fabricating, assembly, substantial repair or similar action.
- (D) “Decibel (dB)” means a unit for measuring amplitude of a sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
- (E) “Emergency” means any occurrence or set of circumstances involving actual or imminent physical trauma or property damage which demands immediate action.
- (F) “Emergency generator” means a stationary combustion device, such as a reciprocating internal combustion engine or turbine that serves solely as a secondary source of mechanical or electrical power whenever the primary energy supply is disrupted or discontinued during power outages or natural disasters that are beyond the control of the owner or operator of a facility. An emergency generator operates only during emergency situations, for training of personnel under simulated emergency conditions, as part of emergency demand response procedures, or for standard performance testing procedures as required by law or by the generator’s manufacturer. A generator that serves as a back-up power source under conditions of load shedding, peak shaving, or power interruptions pursuant to an interruptible power service agreement, or scheduled facility maintenance shall not be considered an emergency generator.
- (G) “Emergency work” means work made necessary to restore property to a safe condition following a physical trauma or property damage caused by an emergency or work necessary to prevent or minimize damage from a potential emergency.
- (H) “Grading” means any excavating and/or filling of earth material to carry out any grading activities that require a permit under Chapter [16.20](#) SCCC.
- (I) “Ldn” means the A-weighted average sound level for a given area (measured in decibels) during a 24-hour period, with a 10 dB weighting applied to night time sound levels (10:00 p.m. to 7:00 a.m.).
- (J) “Minor maintenance and repair” means work required to keep property in good condition, with structures continuing to exist at the location, size and configuration as originally permitted and constructed.
- (K) “Noise” means any sound which unacceptably exceeds the appropriate actual or presumed ambient noise level, or which causes or tends to cause an adverse psychological or physiological effect on humans. Some noises may also be defined as intrusive noise, offensive noise and/or a noise disturbance.
- (L) “Noise source” means a disturbance-causing operation which originates from a noise-generating mechanism. An example of a noise source is the combination of a motor, pump and compressor.
- (M) “Noise sphere” (also known as a “noisiness zone”) means a geographic area within a community where ambient noise levels are generally similar, within a range of five dB, such that sites within the sphere are of comparable proximity to major noise sources. Noise contours generally define different noise spheres or noisiness zones.

(N) "Sound" means an oscillation in air pressure. The description of sound may include any characteristic of such sound, including duration, intensity and frequency.

(O) "Sound level" means the weighted sound pressure level obtained by the use of a sound level meter and frequency weighing network, such as A, B or C, as specified in American National Standards Institute specifications for sound level meter ANSI/ASA S1.4-2014 or the latest approved revision thereof. If the frequency weighing method used is not stated, the A-weighing shall apply.

(P) "Sound level meter" means an instrument, including a microphone, an amplifier, an output meter, and frequency weighing networks for the measurement of sound levels which satisfies the requirements for Class I or Class II meters in American National Standards Institute specifications for sound level meters, ANSI/ASA S1.4-2014, or the most recent revision thereof, or an instrument that provides equivalent data.

(Q) "Sound pressure" means the instantaneous difference between the actual pressure and the average or barometric pressure at a given point in space, as produced by sound energy.

(R) "Sound pressure level" in decibels means 20 times the logarithm to the base 10 of the ratio of the pressure of this sound to the reference pressure, which reference pressure shall be explicitly stated.

Definitions of technical terms not defined herein shall be obtained from the American National Standard, "Acoustical Terminology" S1.1-2013 or the latest revision thereof. [Ord. 5308 § 1, 2019].

13.15.030 Sound level assessment or measurement.

(A) Sound or noise level assessments or measurements made to administer and enforce this chapter shall be conducted at the position or positions along the property line of the receiving land use closest to the noise source or where the noise level is highest. If practical, the ambient noise level shall be assessed or measured at the same location along the property line with the project noise source inoperative, or the ambient noise may be estimated by performing an assessment or measurement in the same noise sphere or general area of the source but at a sufficient distance that the project noise is inaudible.

(B) When determining the effectiveness of noise mitigation measures, the standards may be applied on the receptor side of the noise barriers or other property line noise mitigation measures. [Ord. 5308 § 1, 2019].

13.15.040 Exemptions.

(A) Noise sources normally and reasonably associated with construction, repair, remodeling, or grading of any real property, provided a permit has been obtained from the County as required, and provided said activities take place between the hours of 8:00 a.m. and 5:00 p.m. on weekdays unless the Building Official has in advance authorized said activities to start at 7:00 a.m. and/or continue no later than 7:00 p.m. Such activities shall not take place on Saturdays unless the Building Official has in advance authorized said activities, and provided said activities take place between 9:00 a.m. and 5:00 p.m. and no more than three Saturdays per month. Such activities shall not take place on Sunday or a federal holiday unless the Building Official has in advance authorized such work on a Sunday or federal holiday, or during earlier morning or later evening hours of a weekday or Saturday.

(B) Emergency Work. The provisions of this chapter shall not apply to the emission of sound for the purpose of alerting persons to the existence of an emergency or in the performance of emergency work.

- (C) Entertainment or Special Events. The provisions of this chapter shall not apply to those reasonable sounds emanating from authorized school bands, school athletic and school entertainment events, and occasional noncommercial private outdoor or indoor gatherings and community events, conducted between the hours of 8:00 a.m. and 10:00 p.m. or the applicable permitted timeframe, in compliance with Chapter [8.30](#) SCCC, Noise, (governing offensive noise) and as long as any applicable requirements for special event permits or temporary use permits are met.
- (D) Federal or State Preempted Activities. The provisions of this chapter shall not apply to any other activity the noise level of which is regulated by State or Federal law.
- (E) Minor Maintenance and Repairs to Residential Property. The provisions of this chapter shall not apply to noise sources associated with minor maintenance and repairs to property used for residential purposes, provided the activities take place between 8:00 a.m. and 5:00 p.m. and said activities are otherwise in compliance with Chapter [8.30](#) SCCC, Noise.
- (F) Right-of-Way Construction. The provisions of this chapter shall not apply to any work performed in right-of-ways when, in the opinion of the Public Works Director or their designee, such work will address traffic congestion and/or hazardous or unsafe conditions.
- (G) Public Health, Welfare and Safety Activities. The provisions of this chapter shall not apply to construction, maintenance and repair operations conducted by public agencies and/or utility companies or their contractors which are deemed necessary to serve the best interests of the public and to protect the public health, welfare and safety, including but not limited to trash collection, street sweeping, debris and limb removal, removal of downed wires, restoring electrical service, repairing traffic signals, unplugging sewers, vacuuming catch basins, repairing of damaged poles, removal of abandoned vehicles, repairing of water hydrants and mains, gas lines, oil lines, sewers, storm drains, roads, sidewalks, etc.
- (H) Agricultural and Farming Activities. Noise caused by normal and customary farming operations that are carried out on lands designated by the General Plan and zoned for commercial agricultural (CA) use.
- (I) Special Noise Regulations for Specific Types of Activities. The provisions of this chapter shall not apply to any noise from any specific type of activity for which special noise regulations are provided by any other provision of the County Code. [Ord. 5308 § 1, 2019].

13.15.050 General noise regulations and unlawful noise.

- (A) No use, except a temporary construction operation, shall be permitted which creates noise which is found by the Planning Commission not to conform to the noise parameters established by Table 9-2 and Table 9-3 of the Santa Cruz County General Plan beyond the boundaries of the project site at standard atmospheric pressure.
- (B) Backup emergency generators shall only be operated during power outages and for other temporary purposes. If the generator is located within 100 feet of a residential dwelling unit, noise attenuation measures shall be included to reduce noise levels to an A-weighted maximum exterior noise level of 60 dB at the property line and a maximum interior noise level of 45 dB within nearby residences.
- (C) The Santa Cruz County Code in general provides protections from the impacts of noise exposure. Specific noise standards for the specific uses identified below are found in the following sections of the SCCC:

Chapter [9.52](#) SCCC, Off-road motor vehicles.

SCCC [13.10.637](#)(B)(5), Wineries.

SCCC [13.10.658](#)(A)(2)(i), Recycling facilities.

SCCC [13.10.663](#)(B)(11), Wireless communication facilities.

SCCC [13.10.694](#)(H), Vacation rentals.

SCCC [16.54.050](#)(C)(1), Mining operations. [Ord. 5308 § 1, 2019].

13.15.060 Special requirements for air conditioning/mechanical units in or near residential uses.

Where the intruding noise source is a residential air-conditioning unit, or a commercial air-conditioning or other mechanical unit located within 100 feet of any building or place regularly used for sleeping purposes, that operates more or less continually and/or during most hours, the A-weighted exterior noise level when measured at any neighboring property line shall not exceed 60 dB for units installed before, and 55 dB for units installed after, the effective date of this chapter, and a maximum interior noise level of 45 dB within nearby residences. In permitting or designing buildings with air conditioning or mechanical units, such units shall be located away from rooms used for sleeping purposes and shall incorporate sound-attenuating measures if feasible, and/or shall provide mitigation for such rooms, such as sound-rated windows or other measures as approved by the Building Official. [Ord. 5308 § 1, 2019].

13.15.070 Noise generating land use.

(A) New commercial and industrial development that would increase noise levels above the normally acceptable range in Table 9-2 or the levels in Table 9-3 of the Santa Cruz County General Plan Noise Element shall require acoustic studies to determine the noise reduction requirements to be included as conditions of approval. Noise levels shall not exceed the standards in Table 9-3, and require, as conditions of approval, site design and sound reducing measures if the project would:

- (1) Increase the noise level at existing noise-sensitive receptors or areas by five dB Ldn or more, where the post-project Ldn would remain equal to or below 60 dB.
- (2) Increase the noise level at existing noise-sensitive receptors or areas by three dB Ldn or more, where the post-project Ldn would exceed 60 dB.

(B) The standards in this section shall not limit the ability of the County to impose conditions of approval on projects that increase noise levels at existing noise-sensitive receptors or areas by any amount. [Ord. 5308 § 1, 2019].

13.15.080 Exterior noise standards.

New development shall not be exposed to noise levels that exceed the normally acceptable levels in Table 9-2 of the Santa Cruz County General Plan Noise Element, which establishes acceptable through unacceptable ranges of noise exposure by land use. [Ord. 5308 § 1, 2019].

13.15.090 Interior noise standards.

(A) Noise insulation of new structures developed within the County of Santa Cruz shall comply with applicable requirements of Title 24 of the California Health and Safety Code, as may be amended from time to time and as adopted by the County of Santa Cruz within Chapter [12.10](#) SCCC, Building Regulations. Interior noise levels shall not exceed 45 dB Ldn in any habitable room in a residential structure or 50 dB Ldn in any nonresidential structure. To meet this standard, special sound insulating construction is required for the following types of projects:

- (1) New development activities located within the highway and local roadway future noise contour of 60 to 65 dB Ldn or higher in Figures 9-2a and 9-2b of the General Plan Noise Element.
- (2) New development activities located within the future noise contour band of 60 to 65 dB Ldn or higher for the Watsonville Municipal Airport in Figure 9-4 of the General Plan Noise Element.
- (3) As a condition of approval for all discretionary applications for new development in other areas where noise exposures are known to, or are determined to, exceed the standards in Table 9-2 and 9-3 of the General Plan Noise Element. Acoustical studies may be required to determine existing exterior noise levels and the level of sound insulation required. [Ord. 5308 § 1, 2019].

13.15.100 Acknowledgement of potential vibration from rail.

Prior to the issuance of any building permit for the expansion of any structure or the creation of any new structures within 200 feet of the Santa Cruz Branch Rail Line corridor or the Santa Cruz Big Trees and Pacific Rail corridor, the owner shall record a statement on the deed for the parcel acknowledging the property is located within an area subject to vibrations and noise from railway operations and, as a result, residents may experience inconvenience, annoyance, or discomfort arising from the vibrations and noise of such operations. [Ord. 5308 § 1, 2019].

13.15.110 Administration and enforcement.

(A) This chapter shall be administered by the Planning Department and land use decisionmakers as related to land use planning and issuance of development permits. Enforcement related to violations of land use development permits shall be primarily the responsibility of the Planning Department, with assistance from the County of Santa Cruz Sheriff's Office, particularly during non-standard office hours.

(B) It shall be unlawful for any person to exercise a development permit which authorized noise generating land use without complying with all of the conditions of such permit.

(C) A violation related to noise generation that is not allowed by a land use permit issued for a use or development may be grounds for the County to review, amend or revoke such permit as provided by the Zoning Ordinance in Chapter [13.10](#) SCCC and by SCCC Titles [18](#) and [19](#). [Ord. 5308 § 1, 2019].

13.15.120 Severability.

If any section, subsection, sentence, clause or phrase in this title is for any reason held to be invalid or unconstitutional by decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this title which shall remain in full force and effect. The Board of Supervisors hereby declares that it would have passed this title and each section, subsection, clause or phrase thereof irrespective of the fact that any one or more other sections, subsections, clauses or phrases may be declared invalid or unconstitutional. [Ord. 5308 § 1, 2019].

The Santa Cruz County Code is current through Ordinance 5375, passed August 24, 2021.

The Santa Cruz County Codes are provided here as a public service. This online version of the County Code should not be relied upon for legal determination. Official Santa Cruz County Codes are on file in the Office of the Clerk of the Board. The County of Santa Cruz is not liable for any omissions or inaccuracies and is not liable for any reliance on these codes by the reader. It is recommended that you consult official Santa Cruz County Codes in the Office of the Clerk of the Board.

County Website: <http://www.co.santa-cruz.ca.us/>

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