

February 27, 2023

08391.00005.001

City of Mount Shasta Planning Department
305 N Mt. Shasta Boulevard
Mount Shasta, CA 96067

Subject: Mountain Townhomes Project Transportation Noise Analysis

Planning Department:

HELIX Environmental Planning, Inc. (HELIX) has performed an evaluation of transportation noise levels within the Mountain Townhomes Project (project) in the City of Mt. Shasta (City), California. Future exterior noise levels in the project's primary outdoor use spaces resulting from existing transportation sources in the area were evaluated. Based on exterior transportation noise calculated at the project building facades, an exterior-to-interior analysis was completed to determine required building exterior wall, window, and door noise attenuation to meet City interior noise standards.

NOISE METRICS AND TERMINOLOGY

All noise level or sound level values presented herein are expressed in terms of decibels (dB), with A-weighting (dBA) to approximate the hearing sensitivity of humans. Time-averaged noise levels are expressed by the symbol L_{EQ} , with a specified duration. The Day Night sound level (L_{DN}), is a 24-hour average with an added 10 dB weighting to sound levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. The Community Noise Equivalent Level (CNEL) is similar to the L_{DN} , but with an added 5 dB weighting during the evening hours of 7:00 p.m. to 10:00 p.m. Sound levels expressed in L_{DN} are always based on dBA. These metrics are used to express noise levels for both measurement and municipal regulations, for land use guidelines, and for enforcement of noise ordinances.

Sound Transmission Class (STC) is expressed as a single number, which approximates or best represents the sound reduction for a single unit area, in decibels, from one side of a common partition to the other.

PROJECT LOCATION AND DESCRIPTION

The project site is a 1.15-acre parcel located at 735 Chestnut Street, Mt. Shasta, California, along the northwestern edge of downtown City of Mt. Shasta and within south-central Siskiyou County, California. See Figure 1, *Vicinity Map*, and Figure 2, *Noise Measurement Locations*, attached to this letter.

The project would include the construction of 24 affordable dwelling units in three buildings, a community building, a manager's unit, ancillary structures, and parking areas. See Figure 3, *Site Plan*, attached to this letter.

Buildings

The project would construct five total buildings, labeled A through E. Each building is described below.

Building A

Building A would be 7,583 square feet (sf) and would be two stories. The total height of the building would be approximately 30 feet. Building A would be a multi-family residential building and would include seven dwelling units. Each unit would include a laundry hookup, heating, cooling, a full kitchen, and a full bathroom.

Building B

Building B would be 7,116 sf and would be two stories. The total height of the building would be approximately 30 feet. Building B would be a multi-family residential building and would include seven dwelling units. Each unit would include a laundry hookup, heating, cooling, a full kitchen, and a full bathroom.

Building C

Building C would be 9,906-sf and would be two stories. The total height of the building would be approximately 30 feet. Building C would be a multi-family residential building and would include ten dwelling units. Each unit would include a laundry hookup, heating, cooling, a full kitchen, and a full bathroom.

Building D

Building D, the Community Building, would be 1,804 sf and would be one story. The total height of the building would be 17 feet and 9 inches. Building D would include indoor amenities such as a multipurpose common room, a kitchen, a laundry room, a fitness room, a restroom, and a manager's office. Building D would also include two large, uncovered patios and one covered patio.

Building E

Building E would be 1,437 sf and would be one story. The total height of the building would be 17 feet and 4 inches. Building E would be the manager's residence and would include one residential unit. The unit would include a laundry hookup, heating, cooling, a full kitchen, and a full bathroom.

ENVIRONMENTAL SETTING

The 1.15-acre project site is currently undeveloped, and the project area is characterized by residential and commercial development. The project is bounded by Alder Alley right-of-way (ROW) to the northeast, Field Street ROW to the northwest, Chestnut Street to the west/southwest, and Ivy Street to the east/southeast. Alder Alley is a 20-foot-wide public ROW and is currently undeveloped with gravel

and vegetation. Field Street is made up of an approximately 12-foot-wide graveled driveway within an 80-foot-wide ROW. The driveway accesses a single residential dwelling. Chestnut Street is an approximately 25-foot-wide existing asphalt roadway. Ivy Street is an approximately 40-foot-wide asphalt roadway.

The significant transportation noise sources in the project vicinity are: North Mt. Shasta Boulevard, approximately 205 to 320 feet southwest of the project site; Interstate 5 (I-5), approximately 1,850 feet southwest of the project site; and the Union Pacific Railroad Tracks (UPRR), approximately 360 to 460 feet southwest of the project site.

Noise Survey

A noise survey was on conducted at the site on November 29, 2022, which included two short-term (10 to 20 minute) ambient noise measurements. A Larson Davis SoundTrack LxT Sound Level Meter was used to measure existing noise levels. The sound-level meter was field-calibrated using a Larson Davis model CAL250 Calibrator immediately prior to the noise measurements to ensure accuracy. The sound-level meter was mounted on a tripod approximately 5 feet above the ground during the measurements. Measurement M1 was conducted on the project site, mid-block on Chestnut Street, approximately 30 feet from the street centerline. Measurement M2 was conducted on the northeast side of the project site, approximately opposite from the Measurement M1, see Figure 2, *Noise Measurement Locations*. Traffic counts were conducted on Chestnut Street during both measurement. Train noise, including train horns, was noted during both measurements. The measured noise levels are shown on Table 1, *Noise Measurement Results*. The noise measurement survey notes are included in Attachment A to this letter. The measured noise levels are shown on Table 1, Noise Measurement Results.

Table 1
NOISE MEASUREMENT RESULTS

M1	
Date	November 29, 2022
Time	11:25 a.m. – 11:37 a.m.
Location	On the Project site, mid-block near Chestnut Street.
Noise Level	60.9 dBA L_{EQ}
Notes	Noise from traffic, 1 train (with train horn), and a street sweeper. Traffic count Chestnut Street: 15 cars
M2	
Date	November 29, 2022
Time	11:38 a.m. – 11:57 a.m.
Location	On the Project site, mid-block near opposite Chestnut Street.
Noise Level	55.5 dBA L_{EQ}
Notes	Noise from traffic, 1 train. Traffic count Chestnut Street: 15 cars, 1 medium truck.

REGULATORY SETTING

Federal

If the project applicant or the City were to seek any U.S. Department of Housing and Urban Development (HUD) program assistance for the project, the project would have to meet the noise standards as specified in 24 CFR Part 51: acceptable exterior noise levels not exceeding 65 dBA L_{DN} , normally unacceptable exterior noise levels above 65 dBA L_{DN} but not exceeding 75 dBA L_{DN} , and unacceptable exterior noise levels above exceeding 75 dBA L_{DN} .

State

The California Building Code (CBC; Title 24, Part 2) includes noise insulation standards that apply to new construction of multi-family residential buildings. The CBC requires that interior noise levels attributable to exterior sources not exceed 45 dBA in any habitable room.

Local

City of Mt. Shasta General Plan Noise Element includes the following Goal, Policies, and Implementation Measures (IMs) that would apply to transportation noise received by the project (City 2007):

Goal NZ-1. Protect City residents from the harmful and annoying effects of exposure to excessive noise.

Policy NZ-1.1. Enforce standards for noise exposure from proposed and existing non-transportation noise sources.

Policy NZ-1.8. Monitor compliance with noise standards.

IM NZ-1.4 (a). Evaluate transportation noise sources of proposed projects according to the noise level standards shown in Table 7-6 [of the General Plan noise Element].

Table 7-6 from the City General Plan Noise Element, *Standards for New Uses Affected by Traffic and Railroad Noise*, contains outdoor activity area and indoor noise standards for new land uses. For residential uses, the outdoor activity area standard is 60 dBA L_{DN} or 65 dBA L_{DN} and the indoor standard is 45 dBA L_{DN} /Peak Hour L_{EQ} . The following table notes apply to residential land uses:

1. For traffic noise within the City, L_{DN} and peak-hour L_{EQ} values are estimated to be approximately similar. Interior noise level standards are applied within noise-sensitive areas of the various land uses, with windows and doors in the closed positions.
2. Outdoor activity areas for single-family residential uses are defined as back yards. For large parcels or residences with no clearly defined outdoor activity area, the standard shall be applicable within a 100-foot radius of the residence.
3. For multi-family residential uses, the exterior noise level standard shall be applied at the common outdoor recreation area, such as at pools, play areas or tennis courts.

4. Where it is not possible to reduce noise in outdoor activity areas to 60 L_{DN} or less using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 L_{DN} may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with Table 7-6.

Policy NZ-1.6. The City Development Code shall include procedures to ensure that required noise review and mitigation measures are implemented in the project review and building permit processes.

IM NZ-1.6(a). Proposed noise-sensitive land uses in areas exposed to existing or projected exterior noise levels, which exceed acceptable noise standards, shall require an acoustical analysis as part of the environmental review process so that noise mitigation may be included in the project design. When an acoustical analysis is required by the City to assess compliance with the City's Noise Element standards, the analysis shall follow the guidelines of Table 7-7.

METHODOLOGY AND ASSUMPTIONS

Modeling of the exterior noise environment for this report was accomplished using the Computer Aided Noise Abatement (CadnaA) model version 2021. Traffic noise was evaluated within CadnaA using the U.S. Department of Transportation Federal Highway Administration (FHWA) Traffic Noise Model (TNM) version 2.5 (USDOT 2004). Railroad noise was evaluated within CadnaA using data for locomotives, rail cars, and train horns from Federal Railroad Administration (FRA). The noise models used in this analysis were developed from the site plan provided by the project architect and aerial images of the area. The noise model included terrain, project buildings, and intervening existing buildings between the project site and the UPRR tracks.

Exterior-to-interior noise was calculated using planning methods documented by The American Institute of Physics for the Acoustical Society of America in Acoustical Design in Architecture (Knudsen 1980).

Traffic Noise

The noise model included an approximately 4,850 feet (0.92 mile) section of I-5 extending north from the West Lake Street interchange. Traffic noise from North Mt. Shasta Boulevard was evaluated using the 2019 peak hour traffic count from the Caltrans Traffic Census Program—3,050 vehicles (Caltrans 2023). Traffic on I-5 was assumed to be traveling at the posted speed limit of 65 mph for cars and light trucks and 55 mph for medium and heavy trucks. The modeled percentage of trucks was estimated to be 2 percent medium trucks and 1 percent heavy trucks based on the Caltrans Traffic Census Program 2019 truck traffic data (Caltrans 2023).

The noise model included an approximately 2,200 foot (0.44 mile) section of North Mt. Shasta Boulevard from East Hinckley Street to East Alma Street. Traffic noise from North Mt. Shasta Boulevard was evaluated using the 2026 average daily traffic (ADT) projections from the City General Plan Update Draft Environmental Impact Report (DEIR), Table 4.3-1. The table lists this segment as carrying 6,140 ADT (City 2006). For typical urban and suburban roads, the peak hour traffic is approximately 10 percent of the ADT—approximately 614 peak hour vehicles on North Mt. Shasta Boulevard near the project site. Traffic on North Mount Shasta Boulevard was assumed to be traveling at the posted speed limit of 35 miles per hour (mph) from Ivy Street to East Hinckley Street and 25 mph from Ivy Street to East Alma Street.

North Mt. Shasta Boulevard was assumed to carry the same mix of trucks as I-5: 2 percent medium trucks and 1 percent heavy trucks.

Railroad Noise

The UPRR tracks southwest of the project site carry both freight trains and Amtrak passenger trains through the city. The noise model included an approximately 1.2-mile section of the UPRR tracks from just north of Nixon Road to just south of West Lake Street. Passenger train volume was estimated from the Amtrak schedule for the Coast Starlight train. For winter 2023, one daily northbound train at approximately 5:15 a.m., and one daily southbound train at approximately 12:30 a.m. are scheduled to pass through the city (Amtrak 2023).

Although some rail freight traffic in the U.S. occurs on a regular schedule, for security reasons, neither the railroad companies, nor the FRA publish schedules or data on freight train movements. However, as part of their safety program, the FRA requires railroad companies to file inventory reports of all at grade highway-rail crossings (level crossings). On the crossing inventory form, the railroad company owning the track reports the estimated number of daily train movements at the crossing. There are three level crossings in the modeled segment of the UPRR tracks: Nixon Road, East Alma Street, and West Lake Street. For the three crossings, the UPRR reported: six train movements from 6 a.m. to 6 p.m. and five train movements from 6 p.m. to 6 a.m.; a typical speed range for train movements of 17 to 35 mph; and a track segment speed limit of 40 mph (FRA 2021).

A typical train composition for the Amtrak Coast Starlight is two locomotives and ten passenger cars. Freight train composition can vary greatly. A recent report for the U.S. Government Accounting Office (GAO) on rail safety reported that the average freight train operated by Class I railroads (including UPRR) contained 73 cars (GAO 2019). A typical rule of thumb for freight train operating on mostly level track is one locomotive for every 25 cars. Because of the track grades in the area, an extra locomotive was assumed, and all freight trains were modeled with 4 locomotives and 73 cars. All train were assumed to be traveling at the 35-mph upper end of the typical speed reported by UPRR in the level crossing inventory reports (FRA 2021). The average train data used in the noise modeling is summarized in Table 2, *Average Train Data*.

Table 2
AVERAGE TRAIN DATA

Type	Day Volume (7 a.m. to 10 p.m.)	Night Volume (10 p.m. to 7 a.m.)	Locomotives per Train	Railcars per Train	Speed (mph)
Passenger	0	2	2	10	35
Freight	7	4	4	73	35

Source: FRA 2021; Amtrak 2023

Trains approaching a level crossing are required to sound their warning horns 15 to 20 seconds before reaching the crossing, but not more than 1,320 feet (0.25 mile) before the crossing. In addition, the at-grade crossings in the City are equipped with an audible warning device when the roadway barriers are lowered. Train horns were modeled in CadnaA using default FRA data for train warning horns.

Train noise was analyzed in CadnaA for the average daytime (7 a.m. to 10 p.m.) hour and average nighttime (10 p.m. to 7 a.m.) hour. The resulting L_{DN} was calculated by adding the 10 dBA nighttime

penalty to the nighttime results, converting daytime and nighttime results in dBA to sound pressure level in Pascals (Pa), averaging all of the hourly sound pressure levels in Pa, then converting the average sound pressure in Pa back to dBA. A printout of the L_{DN} calculation sheet is included in Attachment B to this letter.

EXTERIOR NOISE ANALYSIS

Seven receivers were placed in the model in the outdoor activity areas identified in the site plan: one receiver in the playground northwest of Building D; 4 receivers in the outdoor seating area northwest and northeast of Building D; and two receivers in the outdoor lawn/seating area northeast of Building B, see Figure 3 for the outdoor activity area locations. Receivers were placed 5 feet above ground level, representing the typical ear height of a standing adult. The results of the modeling for the outdoor activity area receivers is compared to the City multi-family residential standard in Table 3, *Outdoor Activity Area Noise Transportation Levels*. The complete modeling input and output is included in Attachment B to this letter.

Table 3
OUTDOOR ACTIVITY AREA NOISE TRANSPORTATION LEVELS

Receiver	Exterior Transportation Noise (dBA L_{DN})	City Exterior Standard (dBA L_{DN})	Exceed Standard?
Building D Outdoor Playground	52.5	60	No
Building D Outdoor Seating Area 1	52.9	60	No
Building D Outdoor Seating Area 2	51.8	60	No
Building D Outdoor Seating Area 3	50.2	60	No
Building D Outdoor Seating Area 4	44.0	60	No
Building B Outdoor Lawn Area 1	51.5	60	No
Building B Outdoor Lawn Area 2	43.8	60	No

Source: CadnaA; Standard – City General Plan Noise Element Table 7-6

As shown in Table 3, transportation noise levels from combined traffic and railroad noise would not exceed the City standard of 60 dBA L_{DN} for multi-family residential outdoor activity areas. No measures to reduce exterior noise on the project site would be required.

EXTERIOR-TO-INTERIOR NOISE ANALYSIS

The highest project habitable space interior noise levels would be at the northwest and southwest corners of buildings A, B and C where two walls of an exterior room would face towards the modeled freeway, street, and railroad noise sources. Table 4, *Building Facade Exterior Transportation Noise Levels*, shows the calculated exertion noise levels for receiver placed 5 feet above floor level for the first and second floors. The complete modeling input and output is included in Attachment B to this letter.

Table 4
BUILDING FACADE EXTERIOR TRANSPORTATION NOISE LEVELS

Receiver	Exterior Transportation Noise (dBA L _{DN})
Building C, NW Corner, SW Facade, 1st floor	57.1
Building C, NW Corner, NW Facade, 1st floor	56.5
Building C, NW Corner, SW Facade, 2nd floor	56.8
Building C, NW Corner, NW Facade, 2nd floor	55.9
Building C, SW Corner, SW Facade, 1st floor	56.7
Building C, SW Corner, SE Facade, 1st floor	51.4
Building C, SW Corner, SW Facade, 2nd floor	56.1
Building C, SW Corner, SE Facade, 2nd floor	51.3
Building B, NW Corner, SW Facade, 1st floor	55.8
Building B, NW Corner, NW Facade, 1st floor	54.5
Building B, NW Corner, SW Facade, 2nd floor	55.1
Building B, NW Corner, NW Facade, 2nd floor	53.8
Building B, SW Corner, SW Facade, 1st floor	55.8
Building B, SW Corner, SE Facade, 1st floor	53.1
Building B, SW Corner, SW Facade, 2nd floor	55.1
Building B, SW Corner, SE Facade, 2nd floor	53.3
Building A, NW Corner, SW Facade, 1st floor	56.5
Building A, NW Corner, NW Facade, 1st floor	54.0
Building A, NW Corner, SW Facade, 2nd floor	55.8
Building A, NW Corner, NW Facade, 2nd floor	51.0
Building A, SW Corner, SW Facade, 1st floor	57.0
Building A, SW Corner, SE Facade, 1st floor	54.9
Building A, SW Corner, SW Facade, 2nd floor	56.0
Building A, SW Corner, SE Facade, 2nd floor	55.0

Source: CadnaA

As shown in Table 4, exterior noise levels measured at the project buildings first and second floor facades would range from 51 to 57.1 dBA L_{DN}. These calculated 24-hour noise levels are consistent with the 55.5 and 60.9 dBA L_{EQ} results from the short-term noise measurements presented in Table 1. Because noise levels at the exterior of project buildings would not exceed 60 dBA L_{DN}, an acoustical analysis of interior noise levels would not be required in accordance with the City General Plan Noise Element Table 7-6, Note 4. To ensure that project interior noise levels would not exceed the City's to 45 dBA L_{DN} residential interior standard (with windows closed), sample exterior-to-interior noise calculations were done for the project rooms with the highest transportation noise received at the building exterior facade: Building C, northwest corner first floor living room and Building C, northwest corner second floor bedroom. Because project wall construction, window schedules, and door schedules were not available, calculations were completed using conservative assumptions: exterior walls were assumed to include wood siding, batt insulation, and wallboard with a total wall sound transmissions class rating (STC) 35; exterior windows were assumed to be 0.5 inch dual pane insulating with a rating of STC 28; and exterior doors were assumed to be aluminum with a dual pane window and a rating of STC 33. Interior surfaces were conservatively assumed to be reflective (hard surfaces and few soft furnishings). The results of the exterior-to-interior calculations are compared to the City residential

interior standard in Table 5, *Exterior-to-Interior Analysis Results*. A printout of the exterior-to interior calculation sheets is included as Attachment C to this letter.

Table 5
EXTERIOR-TO-INTERIOR ANALYSIS RESULTS

Analyzed Room	Interior Noise (dBA L _{DN})	City Interior Standard (dBA L _{DN})	Exceed Standard?
Building C, Northwest End Unit 1 st floor Kitchen/Dining/Living Room	36.0	45	No
Building C, Northwest End Unit 2 nd floor Bedroom	36.8	45	No

As shown in Table 5, interior noise levels for the analyzed rooms would not exceed the City's interior residential standard of 45 dBA L_{DN} with windows closed and assuming typical walls, windows, and doors. Because the exterior noise levels for other project units would be lower than the analyzed unit, all project interior habitable rooms would have noise levels lower than the City residential interior noise standard. No measures to reduce project habitable space interior noise would be required.

CONCLUSION

Transportation noise levels on the project site would not exceed the City's multi-family residential exterior noise standard of 60 dBA LDN for outdoor activity areas. Assuming typical building wall, window, and door noise attenuation, interior noise in the project's residential habitable rooms would not exceed the City's residential standard of 45 dBA L_{DN} with windows closed.

Sincerely,



Martin Rolph
Acoustic Analyst



Jason Runyan
Acoustic Analyst, Quality Assurance Reviewer

Attachments:

- Figure 1: Vicinity Map
- Figure 2: Noise Measurement Locations
- Figure 3: Site Plan
- A: Noise Survey Sheets
- B: Noise Modeling Input/Output
- C: Exterior-to-Interior Calculation Sheets

REFERENCES

Amtrak. 2023. Schedules: Dunsmuir, California (DUN) to Klamath Falls (KFS), Oregon. Available at: <https://www.amtrak.com/tickets/departure.html>. Accessed January 23, 2022.

California Department of Transportation (Caltrans). 2023. 2019 Traffic Volumes: Annual Average Daily Traffic (AADT) For ALL vehicles on California State Highways. Available at: <https://dot.ca.gov/programs/traffic-operations/census>. Accessed January 23, 2022.

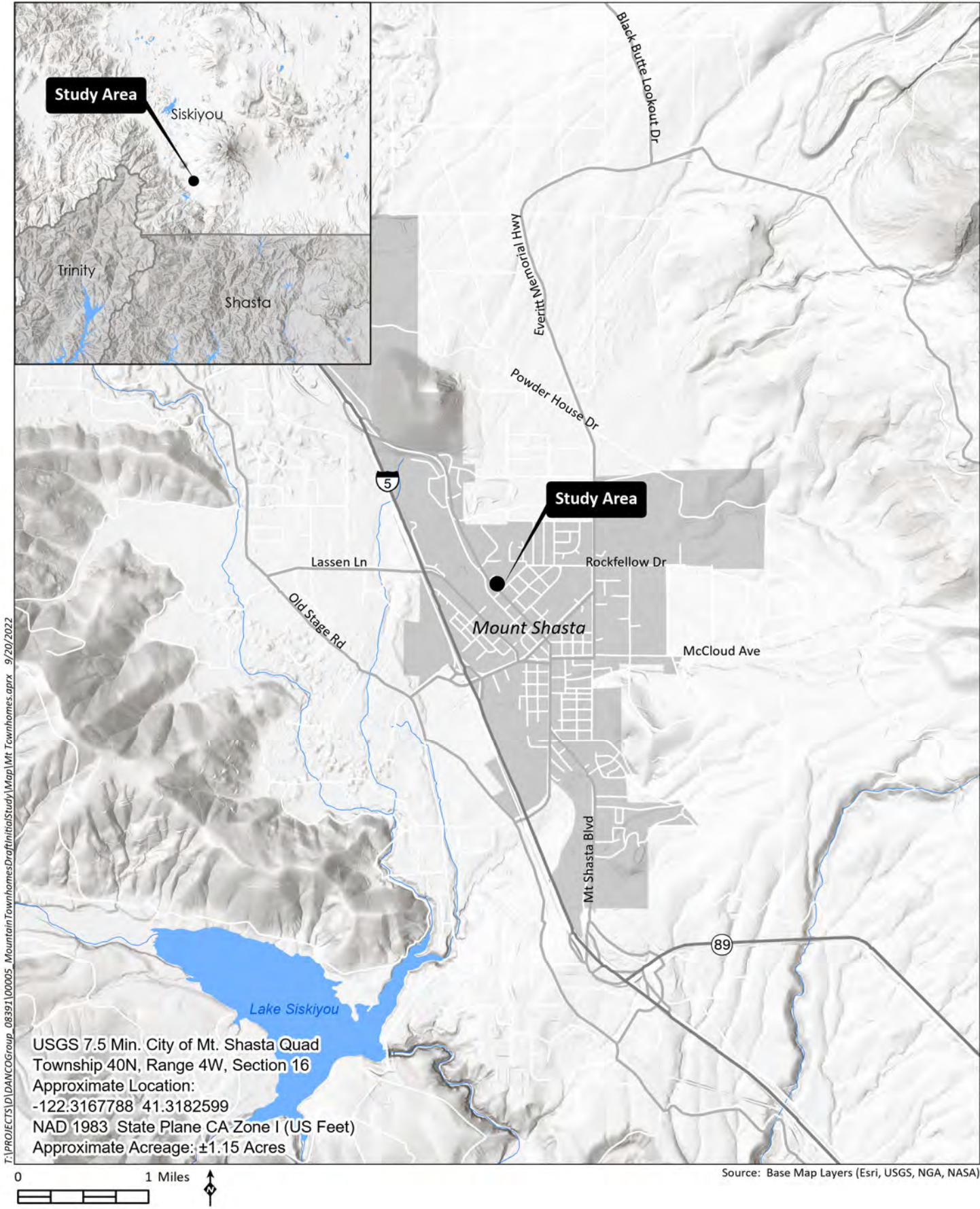
Federal Railroad Administration (FRA). 2020. Crossing Inventory Forms: 748865Y, Lake Street; 74886F, East Alma Street; and 748867M, Nixon Road. Available at: <https://railroads.dot.gov/safety-data/crossing-and-inventory-data/crossing-inventory-lookup>.

Knudsen, Vern O; Harris, Cyril M. 1980. Acoustical Designing in Architecture.

Mount Shasta, City of. 2007. 2007 General Plan Noise Element. Available at: <https://mtshastaca.gov/wp-content/uploads/2016/01/7Noise.pdf>.

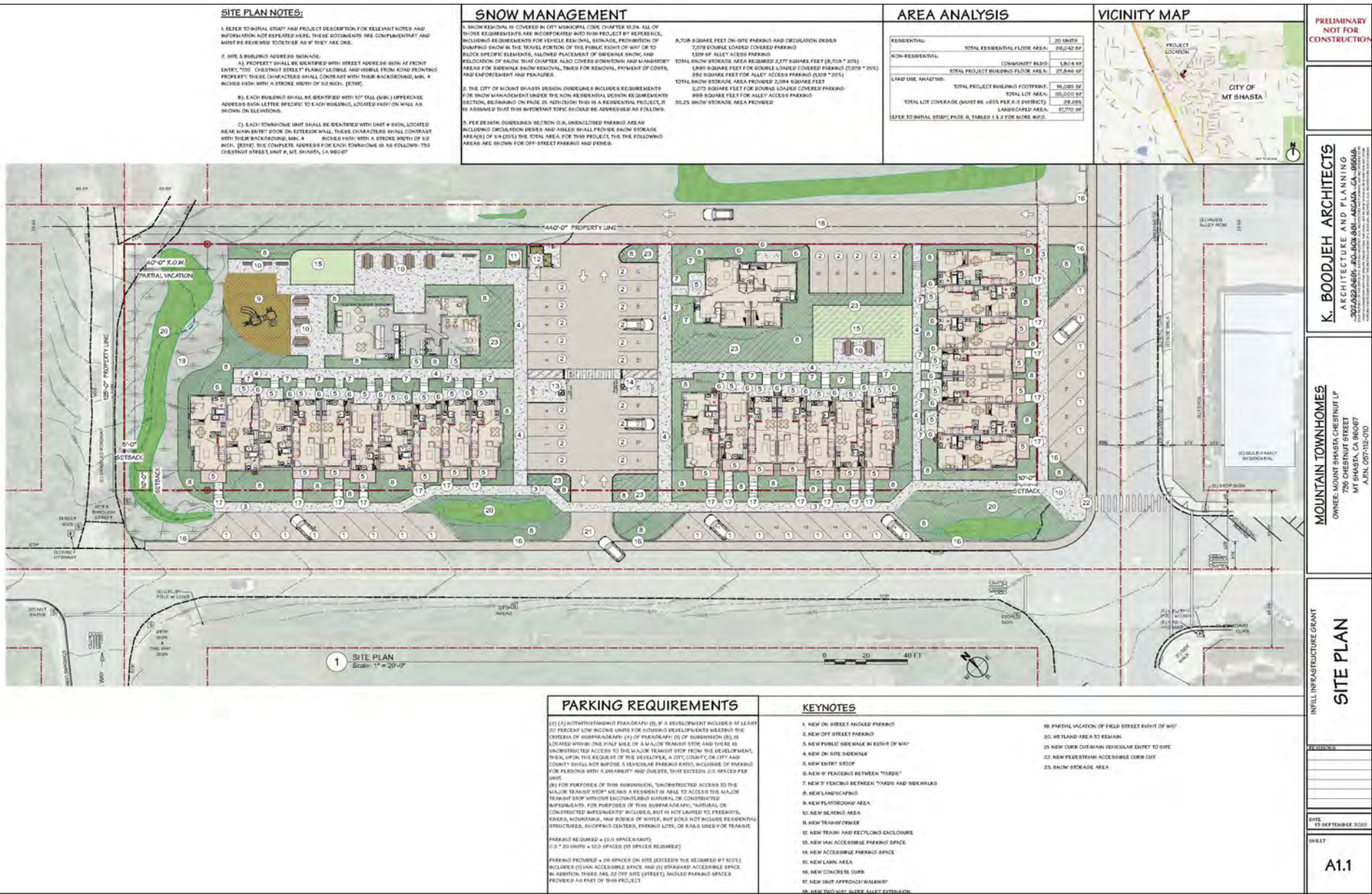
2006. Draft Environmental Impact Report for the City of Mt. Shasta General Plan Update Project, SCH NO. 2005082099. Available at: <https://mtshastaca.gov/wp-content/uploads/2015/11/Draft-MASTER-EIR.pdf>.

U.S. Government Accountability Office (GAO). 2019. Rail Safety: Freight Trains Are Getting Longer, and Additional Information Is Needed to Assess Their Impact. Available at: <https://www.gao.gov/products/gao-19-443>.





T:\PROJECTS\ID\ANCOGroup_08391\00005_MountainTownhomes\Draft\InitialStudy Docs\SitePlan.indd



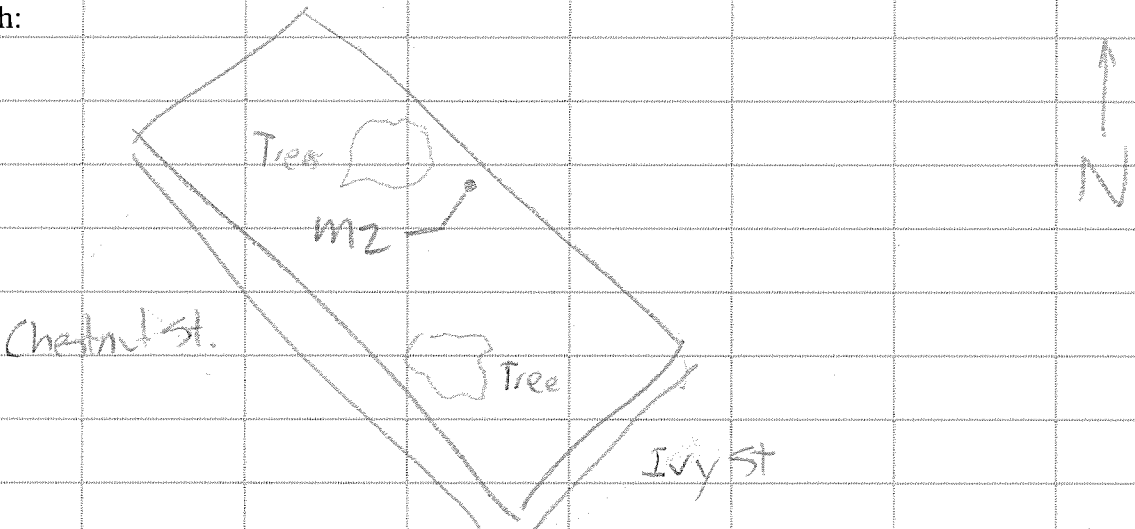
Attachment A

Noise Survey Sheets

MI

Site Survey			
Job #		Project Name: Mountain Townhomes	
Date: 11/29/22	Site #:		Engineer: Patrick Martin
Address:			
Meter: LxT1	Serial #: 1213	Calibrator: Cal ISO	Serial #: 5529
Notes: Street sweeper on Chestnut St., 1 Train (w horn)			
Sketch:			
Temp: 37°F	Wind Spd: 2 mph	mph	Humidity: 45 %
Start of Measurement: 11:25 a	End of Measurement: 11:37 a	60.9 dBA L _{EQ}	
Cars (tally per 5 cars)		Medium Trucks (MT)	Heavy Trucks (HT)
/// (15)		○ ○	
Noise Measurement for Information Only			
No Through Roadways			
No Calibration Analysis Will Be Provided			

M2

Site Survey			
Job #		Project Name: Mountain Townhomes	
Date: 11/29/22	Site #:		Engineer: Patrick Martin
Address:			
Meter: LxT1	Serial #: 1013	Calibrator: Cal 150	Serial #: 5529
Notes: 1 Train			
Sketch: 			
Temp: 37°F	Wind Spd: 2 mph	Humidity: 45 %	
Start of Measurement: 11:38a	End of Measurement: 11:57a	55.5 dBA L _{EQ}	
Cars (tally per 5 cars)	Medium Trucks (MT)	Heavy Trucks (HT)	
111	1	0	
(15)			
Noise Measurement for Information Only			
No Through Roadways			
No Calibration Analysis Will Be Provided			

Attachment B

Noise Modeling Input/Output

DANCO Mountain Townhomes Noise Modeling Railroad Data

FRA Crossing Inventory Reports

Crossing	Crossing #	Date	Railroad	Passenger	Freight Day (6 a.m. to 6 p.m.)	Freight Night (6 p.m. to 6 a.m.)	Max Speed (mph)	Typical Speed Range (mph)
Nixon Rd. South	748867M	11/22/2021	Union Pacific	2	6	5	40	17 to 35
E. Alma St.	748866F	11/22/2021	Union Pacific	2	6	5	40	17 to 35
Lake St.	748865Y	11/22/2021	Union Pacific	2	6	5	40	17 to 35

Modeled Train Data

Train Type	Day (7 a.m. to 10 p.m.)	Night (10 p.m. to 7 a.m.)	Locomotives per Train	Cars per Train	Speed (mph)	Speed (km/hr)
Passenger	0	2	2	10	35	56
Freight	7.25	3.75	4	73	35	56

CadnaA Input

Type	Day (per hour)	Night (per hour)	Speed (km/hr)	Throttle
Passenger Locomotive	0	1	56	5
Passenger Car	0	2	56	0
Freight Locomotive	2	2	56	5
Freight Car	35	30	30	0

DANCO Mountain Townhomes
CadnaA Version 2021
Traffic Noise Road Source Table

Name	M.	ID	Lme	Count Data			exact Count Data						Speed Limit		SCS	Surface	Gradient	Mult. Reflection				
			Day	Evening	Night	DTV	Str.class.	M		p (%)				Auto	Truck	Dist.	Dstro	Type		Drefl	Hbuild	Dist.
			(dBA)	(dBA)	(dBA)			Day	Evening	Night	Day	Evening	Night	(km/h)	(km/h)		(dB)		(%)	(dB)	(m)	(m)
I-5 Northbound		ROAD	73	0	0			1525	0	0	31	0	0	105	89	w12.1	0	1	0	0		
I-5 Southbound		ROAD	73	0	0			1525	0	0	31	0	0	105	89	w12.1	0	1	0	0		
Mt. Sahsta Blvd (Ivy St to E Hinckly St)		ROAD	58.7	0	0			614	0	0	3	0	0	56		w12	0	1	0	0		
Mt. Sahsta Blvd (Alma St to Ivy St)		ROAD	55.1	0	0			614	0	0	3	0	0	40		w12	0	1	0	0		

DANCO Mountain Townhomes
CadnaA Version 2021
Traffic Noise Receiver Table

Name	M.	ID	Level Lr		Limit. Value		Land Use		Height		Coordinates			
			Day	Night	Day	Night	Type	Auto	Noise Type		X	Y	Z	
			(dBA)	(dBA)	(dBA)	(dBA)				(m)	(m)	(m)	(m)	
Building C, NW Corner, SW Facade, 1st floor			56.2	-72.2	0	0		x	Total	1.52	r	557133.85	4574342.68	1093.32
Building C, NW Corner, NW Facade, 1st floor			54.7	-73	0	0		x	Total	1.52	r	557132.95	4574345.59	1093.32
Building C, NW Corner, SW Facade, 2nd floor			55.7	-72.6	0	0		x	Total	4.57	r	557134.58	4574341.9	1096.37
Building C, NW Corner, NW Facade, 2nd floor			53.8	-73.4	0	0		x	Total	4.57	r	557133.56	4574346.23	1096.37
Building C, SW Corner, SW Facade, 1st floor			55.6	-74	0	0		x	Total	1.52	r	557161.79	4574313.17	1093.32
Building C, SW Corner, SE Facade, 1st floor			48.9	-78.5	0	0		x	Total	1.52	r	557165.41	4574312.56	1093.32
Building C, SW Corner, SW Facade, 2nd floor			54.6	-74.2	0	0		x	Total	4.57	r	557161.37	4574313.61	1096.37
Building C, SW Corner, SE Facade, 2nd floor			48	-78.6	0	0		x	Total	4.57	r	557165.88	4574313.05	1096.37
Building B, NW Corner, SW Facade, 1st floor			54	-74.8	0	0		x	Total	1.52	r	557175.73	4574299.33	1093.32
Building B, NW Corner, NW Facade, 1st floor			53.3	-75.6	0	0		x	Total	1.52	r	557175.46	4574302.29	1093.32
Building B, NW Corner, SW Facade, 2nd floor			52.7	-75	0	0		x	Total	4.57	r	557176.43	4574298.58	1096.37
Building B, NW Corner, NW Facade, 2nd floor			52.4	-76	0	0		x	Total	4.57	r	557176.16	4574303.01	1096.37
Building B, SW Corner, SW Facade, 1st floor			52.7	-75.5	0	0		x	Total	1.52	r	557195.14	4574278.83	1093.32
Building B, SW Corner, SE Facade, 1st floor			41.1	-78.8	0	0		x	Total	1.52	r	557196.84	4574278.66	1093.32
Building B, SW Corner, SW Facade, 2nd floor			51.3	-75.6	0	0		x	Total	4.57	r	557194.49	4574279.51	1096.37
Building B, SW Corner, SE Facade, 2nd floor			40.9	-79	0	0		x	Total	4.57	r	557197.44	4574279.28	1096.37
Building A, NW Corner, SW Facade, 1st floor			53.1	-75.7	0	0		x	Total	1.52	r	557200.6	4574272.17	1093.32
Building A, NW Corner, NW Facade, 1st floor			53	-76.9	0	0		x	Total	1.52	r	557200.4	4574274.2	1093.32
Building A, NW Corner, SW Facade, 2nd floor			51.2	-75.8	0	0		x	Total	4.57	r	557201.03	4574271.71	1096.37
Building A, NW Corner, NW Facade, 2nd floor			48.5	-77.7	0	0		x	Total	4.57	r	557201.06	4574274.88	1096.37
Building A, SW Corner, SW Facade, 1st floor			53	-75.7	0	0		x	Total	1.52	r	557206.88	4574265.54	1093.32
Building A, SW Corner, SE Facade, 1st floor			43.3	-78.1	0	0		x	Total	1.52	r	557208.5	4574265.73	1093.32
Building A, SW Corner, SW Facade, 2nd floor			50.2	-75.8	0	0		x	Total	4.57	r	557206.31	4574266.14	1096.37
Building A, SW Corner, SE Facade, 2nd floor			43.4	-78.1	0	0		x	Total	4.57	r	557209.12	4574266.37	1096.37
Outdoor Playground			49.7	-76.6	0	0		x	Total	1.52	r	557153.42	4574350.32	1093.32
Outdoor Seating Area 1			51.6	-75.5	0	0		x	Total	1.52	r	557162.05	4574360.86	1093.32
Outdoor Seating Area 2			48.4	-77.2	0	0		x	Total	1.52	r	557157.29	4574346.85	1093.32
Outdoor Seating Area 3			47.8	-77.6	0	0		x	Total	1.52	r	557178.38	4574344.2	1093.32
Outdoor Seating Area 4			21.9	-80.2	0	0		x	Total	1.52	r	557201.81	4574292.96	1093.32
Outdoor Lawn Area 1			49.5	-76.9	0	0		x	Total	1.52	r	557169.61	4574349.93	1093.32
Outdoor Lawn Area 2			32.8	-80	0	0		x	Total	1.52	r	557206.54	4574296.99	1093.32

DANCO Mountain Townhomes
CadnaA Version 2021
Railroad Noise Daytime Railway Source Table

Name	M.	ID	Lw'		Train Class	Correct.	Vmax
			Day	Night		Track	
			(dBA)	(dBA)		(dB)	(km(km/h))
UP Tracks		RAIL	55.1	-81	(local)	0	
Train Horn		Horn	66.6	-81	(local)	0	
Train Horn		Horn	66.6	-81	(local)	0	
Train Horn		Horn	66.6	-81	(local)	0	
Train Horn		Horn	66.6	-81	(local)	0	

DANCO Mountain Townhomes
CadnaA Version 2021
Railroad Noise Daytime Point Source Table

Name	M.	ID	Result. PWL			Lw / Li		Correction				Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Height	Coordinates			
			Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night	(dB)	(Hz)		(m)		X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(min)	(min)	(min)	(min)	(dB)	(Hz)		(m)	(m)	(m)	(m)
Crossiing Alarm		CRSA	94	94	94	Lw	94		0	0	0				3	0	0	0	1000	(none)	1.52	r	556738.52	4575024.25	1104.01
Crossiing Alarm		CRSA	94	94	94	Lw	94		0	0	0				3	0	0	0	1000	(none)	1.52	r	556731.24	4575007.31	1103.09
Crossiing Alarm		CRSA	94	94	94	Lw	94		0	0	0				3	0	0	0	1000	(none)	1.52	r	557308.11	4573946.78	1090.85
Crossiing Alarm		CRSA	94	94	94	Lw	94		0	0	0				3	0	0	0	1000	(none)	1.52	r	557309.53	4573913.82	1089.98
Crossiing Alarm		CRSA	94	94	94	Lw	94		0	0	0				3	0	0	0	1000	(none)	1.52	r	557404.57	4573631.57	1087.11
Crossiing Alarm		CRSA	94	94	94	Lw	94		0	0	0				3	0	0	0	1000	(none)	1.52	r	557394.57	4573590.06	1085.55

DANCO Mountain Townhomes
CadnaA Version 2021
Railroad Noise Daytime Receiver Table

Name	M.	ID	Level Lr		Limit. Value		Land Use		Height		Coordinates			
			Day	Night	Day	Night	Type	Auto	Noise Type		X	Y	Z	
			(dBA)	(dBA)	(dBA)	(dBA)				(m)	(m)	(m)	(m)	
Building C, NW Corner, SW Facade, 1st floor			43.4	-79.9	0	0		x	Total	1.52	r	557133.85	4574342.68	1093.32
Building C, NW Corner, NW Facade, 1st floor			45.2	-80	0	0		x	Total	1.52	r	557132.95	4574345.59	1093.32
Building C, NW Corner, SW Facade, 2nd floor			43.9	-79.9	0	0		x	Total	4.57	r	557134.58	4574341.9	1096.37
Building C, NW Corner, NW Facade, 2nd floor			45.2	-80	0	0		x	Total	4.57	r	557133.56	4574346.23	1096.37
Building C, SW Corner, SW Facade, 1st floor			43.5	-79.9	0	0		x	Total	1.52	r	557161.79	4574313.17	1093.32
Building C, SW Corner, SE Facade, 1st floor			41.4	-80.1	0	0		x	Total	1.52	r	557165.41	4574312.56	1093.32
Building C, SW Corner, SW Facade, 2nd floor			44	-79.9	0	0		x	Total	4.57	r	557161.37	4574313.61	1096.37
Building C, SW Corner, SE Facade, 2nd floor			42	-80.1	0	0		x	Total	4.57	r	557165.88	4574313.05	1096.37
Building B, NW Corner, SW Facade, 1st floor			44.5	-80	0	0		x	Total	1.52	r	557175.73	4574299.33	1093.32
Building B, NW Corner, NW Facade, 1st floor			41.8	-80	0	0		x	Total	1.52	r	557175.46	4574302.29	1093.32
Building B, NW Corner, SW Facade, 2nd floor			44.8	-80	0	0		x	Total	4.57	r	557176.43	4574298.58	1096.37
Building B, NW Corner, NW Facade, 2nd floor			41.7	-80	0	0		x	Total	4.57	r	557176.16	4574303.01	1096.37
Building B, SW Corner, SW Facade, 1st floor			46.5	-80	0	0		x	Total	1.52	r	557195.14	4574278.83	1093.32
Building B, SW Corner, SE Facade, 1st floor			46.3	-80.1	0	0		x	Total	1.52	r	557196.84	4574278.66	1093.32
Building B, SW Corner, SW Facade, 2nd floor			46.2	-80	0	0		x	Total	4.57	r	557194.49	4574279.51	1096.37
Building B, SW Corner, SE Facade, 2nd floor			46.6	-80.1	0	0		x	Total	4.57	r	557197.44	4574279.28	1096.37
Building A, NW Corner, SW Facade, 1st floor			47.4	-80	0	0		x	Total	1.52	r	557200.6	4574272.17	1093.32
Building A, NW Corner, NW Facade, 1st floor			40.7	-80.1	0	0		x	Total	1.52	r	557200.4	4574274.2	1093.32
Building A, NW Corner, SW Facade, 2nd floor			47.5	-79.9	0	0		x	Total	4.57	r	557201.03	4574271.71	1096.37
Building A, NW Corner, NW Facade, 2nd floor			40.8	-80.1	0	0		x	Total	4.57	r	557201.06	4574274.88	1096.37
Building A, SW Corner, SW Facade, 1st floor			48.3	-79.9	0	0		x	Total	1.52	r	557206.88	4574265.54	1093.32
Building A, SW Corner, SE Facade, 1st floor			48.2	-80	0	0		x	Total	1.52	r	557208.5	4574265.73	1093.32
Building A, SW Corner, SW Facade, 2nd floor			48.2	-79.9	0	0		x	Total	4.57	r	557206.31	4574266.14	1096.37
Building A, SW Corner, SE Facade, 2nd floor			48.3	-80	0	0		x	Total	4.57	r	557209.12	4574266.37	1096.37
Outdoor Playground			42.8	-80.1	0	0		x	Total	1.52	r	557153.42	4574350.32	1093.32
Outdoor Seating Area 1			40.5	-80.1	0	0		x	Total	1.52	r	557162.05	4574360.86	1093.32
Outdoor Seating Area 2			42.7	-80.1	0	0		x	Total	1.52	r	557157.29	4574346.85	1093.32
Outdoor Seating Area 3			40.1	-80.1	0	0		x	Total	1.52	r	557178.38	4574344.2	1093.32
Outdoor Seating Area 4			37.5	-80.2	0	0		x	Total	1.52	r	557201.81	4574292.96	1093.32
Outdoor Lawn Area 1			40.7	-80.1	0	0		x	Total	1.52	r	557169.61	4574349.93	1093.32
Outdoor Lawn Area 2			36.9	-80.2	0	0		x	Total	1.52	r	557206.54	4574296.99	1093.32

DANCO Mountain Townhomes

CadnaA Version 2021

Railroad Noise Nighttime Railway Source Table

Name	M.	ID	Lw'		Train Class	Correct.	Vmax
			Day	Night		Track	
			(dBA)	(dBA)		(dB)	(km(km/h))
UP Tracks		RAIL	-81	55.1	(local)	0	
Train Horn		Horn	-81	66.6	(local)	0	
Train Horn		Horn	-81	66.6	(local)	0	
Train Horn		Horn	-81	66.6	(local)	0	
Train Horn		Horn	-81	66.6	(local)	0	

DANCO Mountain Townhomes
CadnaA Version 2021
Railroad Noise Nighttime Point Source Table

Name	M.	ID	Result. PWL			Lw / Li		Correction				Sound Reduction		Attenuation	Operating Time			K0	Freq.	Direct.	Height	Coordinates			
			Day	Evening	Night	Type	Value	norm.	Day	Evening	Night	R	Area		Day	Special	Night	(dB)	(Hz)		(m)		X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	dB(A)	dB(A)	dB(A)		(m²)		(min)	(min)	(min)	(min)	(min)		(m)		(m)	(m)	(m)
Crossiing Alarm		CRSA	94	94	94	Lw	94		0	0	0				3	0	0	0	1000	(none)	1.52	r	556738.52	4575024.25	1104.01
Crossiing Alarm		CRSA	94	94	94	Lw	94		0	0	0				3	0	0	0	1000	(none)	1.52	r	556731.24	4575007.31	1103.09
Crossiing Alarm		CRSA	94	94	94	Lw	94		0	0	0				3	0	0	0	1000	(none)	1.52	r	557308.11	4573946.78	1090.85
Crossiing Alarm		CRSA	94	94	94	Lw	94		0	0	0				3	0	0	0	1000	(none)	1.52	r	557309.53	4573913.82	1089.98
Crossiing Alarm		CRSA	94	94	94	Lw	94		0	0	0				3	0	0	0	1000	(none)	1.52	r	557404.57	4573631.57	1087.11
Crossiing Alarm		CRSA	94	94	94	Lw	94		0	0	0				3	0	0	0	1000	(none)	1.52	r	557394.57	4573590.06	1085.55

DANCO Mountain Townhomes
CadnaA Version 2021
Railroad Noise Nighttime Receiver Table

Name	M.	ID	Level	Lr	Limit.	Value	Land Use	Type	Auto	Height	Coordinates	X	Y	Z
			Day	Night	Day	Night								
			(dBA)	(dBA)	(dBA)	(dBA)				(m)		(m)	(m)	(m)
Building C, NW Corner, SW Facade, 1st floor			-79.9	43.7	0	0		x		Total	2 r	557133.85	4574343	1093.32
Building C, NW Corner, NW Facade, 1st floor			-80	45.3	0	0		x		Total	2 r	557132.95	4574346	1093.32
Building C, NW Corner, SW Facade, 2nd floor			-79.9	44.1	0	0		x		Total	5 r	557134.58	4574342	1096.37
Building C, NW Corner, NW Facade, 2nd floor			-80	45.3	0	0		x		Total	5 r	557133.56	4574346	1096.37
Building C, SW Corner, SW Facade, 1st floor			-79.9	43.7	0	0		x		Total	2 r	557161.79	4574313	1093.32
Building C, SW Corner, SE Facade, 1st floor			-80.1	41.5	0	0		x		Total	2 r	557165.41	4574313	1093.32
Building C, SW Corner, SW Facade, 2nd floor			-79.9	44.2	0	0		x		Total	5 r	557161.37	4574314	1096.37
Building C, SW Corner, SE Facade, 2nd floor			-80.1	42.1	0	0		x		Total	5 r	557165.88	4574313	1096.37
Building B, NW Corner, SW Facade, 1st floor			-80	44.7	0	0		x		Total	2 r	557175.73	4574299	1093.32
Building B, NW Corner, NW Facade, 1st floor			-80	42	0	0		x		Total	2 r	557175.46	4574302	1093.32
Building B, NW Corner, SW Facade, 2nd floor			-80	44.9	0	0		x		Total	5 r	557176.43	4574299	1096.37
Building B, NW Corner, NW Facade, 2nd floor			-80	42	0	0		x		Total	5 r	557176.16	4574303	1096.37
Building B, SW Corner, SW Facade, 1st floor			-80	46.5	0	0		x		Total	2 r	557195.14	4574279	1093.32
Building B, SW Corner, SE Facade, 1st floor			-80.1	46.4	0	0		x		Total	2 r	557196.84	4574279	1093.32
Building B, SW Corner, SW Facade, 2nd floor			-80	46.3	0	0		x		Total	5 r	557194.49	4574280	1096.37
Building B, SW Corner, SE Facade, 2nd floor			-80.1	46.6	0	0		x		Total	5 r	557197.44	4574279	1096.37
Building A, NW Corner, SW Facade, 1st floor			-80	47.5	0	0		x		Total	2 r	557200.6	4574272	1093.32
Building A, NW Corner, NW Facade, 1st floor			-80.1	40.9	0	0		x		Total	2 r	557200.4	4574274	1093.32
Building A, NW Corner, SW Facade, 2nd floor			-79.9	47.6	0	0		x		Total	5 r	557201.03	4574272	1096.37
Building A, NW Corner, NW Facade, 2nd floor			-80.1	41	0	0		x		Total	5 r	557201.06	4574275	1096.37
Building A, SW Corner, SW Facade, 1st floor			-79.9	48.4	0	0		x		Total	2 r	557206.88	4574266	1093.32
Building A, SW Corner, SE Facade, 1st floor			-80	48.2	0	0		x		Total	2 r	557208.5	4574266	1093.32
Building A, SW Corner, SW Facade, 2nd floor			-79.9	48.3	0	0		x		Total	5 r	557206.31	4574266	1096.37
Building A, SW Corner, SE Facade, 2nd floor			-80	48.3	0	0		x		Total	5 r	557209.12	4574266	1096.37
Outdoor Playground			-80.1	42.9	0	0		x		Total	2 r	557153.42	4574350	1093.32
Outdoor Seating Area 1			-80.1	40.6	0	0		x		Total	2 r	557162.05	4574361	1093.32
Outdoor Seating Area 2			-80.1	42.8	0	0		x		Total	2 r	557157.29	4574347	1093.32
Outdoor Seating Area 3			-80.1	40.2	0	0		x		Total	2 r	557178.38	4574344	1093.32
Outdoor Seating Area 4			-80.2	37.6	0	0		x		Total	2 r	557201.81	4574293	1093.32
Outdoor Lawn Area 1			-80.1	40.8	0	0		x		Total	2 r	557169.61	4574350	1093.32
Outdoor Lawn Area 2			-80.2	37	0	0		x		Total	2 r	557206.54	4574297	1093.32

DANCO Mountain Townhomes Transportation LDN Calculation

Receiver	Train Day LEQ	Train Night LEQ	Train LDN	Traffic LDN	Total LDN
Building C, NW Corner, SW Facade, 1st floor	43.4	43.7	50.1	56.2	57.1
Building C, NW Corner, NW Facade, 1st floor	45.2	45.3	51.7	54.7	56.5
Building C, NW Corner, SW Facade, 2nd floor	43.9	44.1	50.5	55.7	56.8
Building C, NW Corner, NW Facade, 2nd floor	45.2	45.3	51.7	53.8	55.9
Building C, SW Corner, SW Facade, 1st floor	43.5	43.7	50.1	55.6	56.7
Building C, SW Corner, SE Facade, 1st floor	41.4	41.5	47.9	48.9	51.4
Building C, SW Corner, SW Facade, 2nd floor	44.0	44.2	50.6	54.6	56.1
Building C, SW Corner, SE Facade, 2nd floor	42.0	42.1	48.5	48.0	51.3
Building B, NW Corner, SW Facade, 1st floor	44.5	44.7	51.1	54.0	55.8
Building B, NW Corner, NW Facade, 1st floor	41.8	42.0	48.4	53.3	54.5
Building B, NW Corner, SW Facade, 2nd floor	44.8	44.9	51.3	52.7	55.1
Building B, NW Corner, NW Facade, 2nd floor	41.7	42.0	48.4	52.4	53.8
Building B, SW Corner, SW Facade, 1st floor	46.5	46.5	52.9	52.7	55.8
Building B, SW Corner, SE Facade, 1st floor	46.3	46.4	52.8	41.1	53.1
Building B, SW Corner, SW Facade, 2nd floor	46.2	46.3	52.7	51.3	55.1
Building B, SW Corner, SE Facade, 2nd floor	46.6	46.6	53.0	40.9	53.3
Building A, NW Corner, SW Facade, 1st floor	47.4	47.5	53.9	53.1	56.5
Building A, NW Corner, NW Facade, 1st floor	40.7	40.9	47.3	53.0	54.0
Building A, NW Corner, SW Facade, 2nd floor	47.5	47.6	54.0	51.2	55.8
Building A, NW Corner, NW Facade, 2nd floor	40.8	41.0	47.4	48.5	51.0
Building A, SW Corner, SW Facade, 1st floor	48.3	48.4	54.8	53.0	57.0
Building A, SW Corner, SE Facade, 1st floor	48.2	48.2	54.6	43.3	54.9
Building A, SW Corner, SW Facade, 2nd floor	48.2	48.3	54.7	50.2	56.0
Building A, SW Corner, SE Facade, 2nd floor	48.3	48.3	54.7	43.4	55.0
Outdoor Playground	42.8	42.9	49.3	49.7	52.5
Outdoor Seating Area 1	40.5	40.6	47.0	51.6	52.9
Outdoor Seating Area 2	42.7	42.8	49.2	48.4	51.8
Outdoor Seating Area 3	40.1	40.2	46.6	47.8	50.2
Outdoor Seating Area 4	37.5	37.6	44.0	21.9	44.0
Outdoor Lawn Area 1	40.7	40.8	47.2	49.5	51.5
Outdoor Lawn Area 2	36.9	37.0	43.4	32.8	43.8

Attachment C

Exterior-to-Interior Calculation Sheets

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: DANCO Mountain View Townhomes

Wall 1 of 2

Room Name: Bldg C, 1st Floor, Living Room (NW Corner)

Room Type : Hard						
	<u>125 Hz</u>	<u>250 Hz</u>	<u>500 Hz</u>	<u>1KHz</u>	<u>2KHz</u>	<u>4KHz</u>
Reverberation Time (sec) :	2.5	2.5	2.5	2.5	2.0	2.0 : Highly Reflective Room
Room Absorption (Sabins) :	38	38	38	38	48	48

	<u>Noise Level</u>		<u>125 Hz</u>	<u>250 Hz</u>	<u>500 Hz</u>	<u>1KHz</u>	<u>2KHz</u>	<u>4KHz</u>	
Source 1: Traffic	56.2	CNEL	39.5	45.0	47.5	51.5	51.5	45.5	: Traffic Spectrum
Source 2: Train	50.1	CNEL	43.5	37.0	43.4	43.6	42.8	39.6	: Train Spectrum
Source 3: <N/A>	0.0	CNEL	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4: <N/A>	0.0	CNEL	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:	57.2	CNEL	45.0	45.6	48.9	52.2	52.1	46.5	: Effective Noise Spectrum

<u>Assembly Type</u>	<u>Open</u>	<u>Width</u>	<u>Height</u>	<u>Qty</u>	<u>Total Area</u>	<u>125 Hz</u>	<u>250 Hz</u>	<u>500 Hz</u>	<u>1KHz</u>	<u>2KHz</u>	<u>4KHz</u>
STC 35 Wall with Wood Siding	N	15.5	8	1	117.5	15	26	34	38	36	40
STC 28 1/2-inch Dual Insulating Window	Y	1.8	3.6	1	6.5	23	23	22	32	43	37
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: **15.5** ft Overall Area: **124** ft²
Volume: **1922** ft³

Number of Impacted Walls: **2**

Windows Open		
Interior Noise Level:	43.6	CNEL
Windows Closed		
Interior Noise Level:	36.0	CNEL

<u>125 Hz</u>	<u>250 Hz</u>	<u>500 Hz</u>	<u>1KHz</u>	<u>2KHz</u>	<u>4KHz</u>	
45.0	45.6	48.9	52.2	52.1	46.5	: Exterior Wall Noise Exposure
12.5	15.4	15.7	15.8	15.8	15.8	: Transmission Loss
0.0	0.0	0.0	0.0	0.0	0.0	: Noise Reduction
15.8	15.8	15.8	15.8	16.8	16.8	: Absorption
29.1	29.8	33.1	36.3	35.2	29.7	: Noise Level
40.9	CNEL	WINDOWS OPEN				
<u>125 Hz</u>	<u>250 Hz</u>	<u>500 Hz</u>	<u>1KHz</u>	<u>2KHz</u>	<u>4KHz</u>	
45.0	45.6	48.9	52.2	52.1	46.5	: Exterior Wall Noise Exposure
15.2	25.8	31.5	37.4	36.2	39.8	: Transmission Loss
0.0	4.8	10.6	16.5	15.2	18.9	: Noise Reduction
15.8	15.8	15.8	15.8	16.8	16.8	: Absorption
29.1	25.0	22.5	19.8	20.0	10.8	: Noise Level
31.8	CNEL	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: DANCO Mountain View Townhomes

Wall 2 of 2

Room Name: Bldg C, 1st Floor, Living Room (NW Corner)

		<u>Noise Level</u>	<u>125 Hz</u>	<u>250 Hz</u>	<u>500 Hz</u>	<u>1KHz</u>	<u>2KHz</u>	<u>4KHz</u>	
Source 1:	Traffic	54.7 CNEL	38.0	43.5	46.0	50.0	50.0	44.0	: Traffic Spectrum
Source 2:	Train	51.7 CNEL	45.1	38.6	45.0	45.2	44.4	41.2	: Train Spectrum
Source 3:	<N/A>	0.0 CNEL	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	<N/A>	0.0 CNEL	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		56.5 CNEL	45.9	44.7	48.5	51.3	51.1	45.8	: Effective Noise Spectrum

<u>Assembly Type</u>	<u>Open</u>	<u>Width</u>	<u>Height</u>	<u>Qty</u>	<u>Total Area</u>	<u>125 Hz</u>	<u>250 Hz</u>	<u>500 Hz</u>	<u>1KHz</u>	<u>2KHz</u>	<u>4KHz</u>
STC 35 Wall with Wood Siding	N	22.5	8	1	112.8	15	26	34	38	36	40
STC 33 Aluminum Door with Window	Y	3	6.8	1	20.4	26	30	30	29	34	38
STC 28 1/2-inch Dual Insulating Window	Y	5.8	5.4	1	31.3	23	23	22	32	43	37
STC 28 1/2-inch Dual Insulating Window	Y	3.6	4.3	1	15.5	23	23	22	32	43	37
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
Overall Area:					180	ft²					

<u>125 Hz</u>	<u>250 Hz</u>	<u>500 Hz</u>	<u>1KHz</u>	<u>2KHz</u>	<u>4KHz</u>	
45.9	44.7	48.5	51.3	51.1	45.8	: Exterior Wall Noise Exposure
6.8	7.2	7.3	7.3	7.3	7.3	: Transmission Loss
0.0	0.0	0.0	0.0	0.0	0.0	: Noise Reduction
15.8	15.8	15.8	15.8	16.8	16.8	: Absorption
30.0	28.9	32.7	35.4	34.2	29.0	: Noise Level
40.2	CNEL	WINDOWS OPEN				
<u>125 Hz</u>	<u>250 Hz</u>	<u>500 Hz</u>	<u>1KHz</u>	<u>2KHz</u>	<u>4KHz</u>	
45.9	44.7	48.5	51.3	51.1	45.8	: Exterior Wall Noise Exposure
16.7	25.2	27.1	34.0	36.6	38.9	: Transmission Loss
0.0	2.6	4.5	11.5	14.1	16.3	: Noise Reduction
15.8	15.8	15.8	15.8	16.8	16.8	: Absorption
30.0	26.2	28.2	23.9	20.2	12.7	: Noise Level
33.9	CNEL	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: DANCO Mountain View Townhomes

Wall 1 of 2

Room Name: Bldg C, 2nd Floor, Bedroom (NW Corner)

Room Type : Hard						
	<u>125 Hz</u>	<u>250 Hz</u>	<u>500 Hz</u>	<u>1KHz</u>	<u>2KHz</u>	<u>4KHz</u>
Reverberation Time (sec) :	2.5	2.5	2.5	2.5	2.0	2.0 : Highly Reflective Room
Room Absorption (Sabins) :	24	24	24	24	29	29

	<u>Noise Level</u>	<u>125 Hz</u>	<u>250 Hz</u>	<u>500 Hz</u>	<u>1KHz</u>	<u>2KHz</u>	<u>4KHz</u>	
Source 1: Traffic	56.2 CNEL	39.5	45.0	47.5	51.5	51.5	45.5	: Traffic Spectrum
Source 2: Train	50.1 CNEL	43.5	37.0	43.4	43.6	42.8	39.6	: Train Spectrum
Source 3: <N/A>	0.0 CNEL	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4: <N/A>	0.0 CNEL	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:	57.2 CNEL	45.0	45.6	48.9	52.2	52.1	46.5	: Effective Noise Spectrum

<u>Assembly Type</u>
STC 35 Wall with Wood Siding
STC 28 1/2-inch Dual Insulating Window
<N/A>
<N/A>
<N/A>
<N/A>
<N/A>
<N/A>
<N/A>
<N/A>
<N/A>
<N/A>

<u>Open</u>	<u>Width</u>	<u>Height</u>	<u>Qty</u>	<u>Total Area</u>	<u>125 Hz</u>	<u>250 Hz</u>	<u>500 Hz</u>	<u>1KHz</u>	<u>2KHz</u>	<u>4KHz</u>
N	9.5	8	1	69.5	15	26	34	38	36	40
Y	1.8	3.6	1	6.5	23	23	22	32	43	37
N	0	0	0	0.0	0	0	0	0	0	0
N	0	0	0	0.0	0	0	0	0	0	0
N	0	0	0	0.0	0	0	0	0	0	0
N	0	0	0	0.0	0	0	0	0	0	0
N	0	0	0	0.0	0	0	0	0	0	0
N	0	0	0	0.0	0	0	0	0	0	0
N	0	0	0	0.0	0	0	0	0	0	0
N	0	0	0	0.0	0	0	0	0	0	0
N	0	0	0	0.0	0	0	0	0	0	0

Room Depth: 15.5 ft Overall Area: 76 ft²
Volume: 1178 ft³

Number of Impacted Walls: 2

Windows Open		
Interior Noise Level:	45.7	CNEL
Windows Closed		
Interior Noise Level:	36.8	CNEL

<u>125 Hz</u>	<u>250 Hz</u>	<u>500 Hz</u>	<u>1KHz</u>	<u>2KHz</u>	<u>4KHz</u>	
45.0	45.6	48.9	52.2	52.1	46.5	: Exterior Wall Noise Exposure
11.4	13.5	13.6	13.7	13.7	13.7	: Transmission Loss
0.0	0.0	0.0	0.0	0.0	0.0	: Noise Reduction
13.7	13.7	13.7	13.7	14.7	14.7	: Absorption
31.2	31.9	35.2	38.4	37.4	31.8	: Noise Level
43.0	CNEL	WINDOWS OPEN				
<u>125 Hz</u>	<u>250 Hz</u>	<u>500 Hz</u>	<u>1KHz</u>	<u>2KHz</u>	<u>4KHz</u>	
45.0	45.6	48.9	52.2	52.1	46.5	: Exterior Wall Noise Exposure
15.3	25.6	30.5	37.1	36.3	39.7	: Transmission Loss
0.0	6.8	11.7	18.3	17.5	20.9	: Noise Reduction
13.7	13.7	13.7	13.7	14.7	14.7	: Absorption
31.2	25.1	23.5	20.1	19.9	10.9	: Noise Level
33.2	CNEL	WINDOWS CLOSED				

EXTERIOR TO INTERIOR NOISE REDUCTION ANALYSIS

Project Name: DANCO Mountain View Townhomes

Wall 2 of 2

Room Name: Bldg C, 2nd Floor, Bedroom (NW Corner)

		Noise Level	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
Source 1:	Traffic	54.7 CNEL	38.0	43.5	46.0	50.0	50.0	44.0	: Traffic Spectrum
Source 2:	Train	51.7 CNEL	45.1	38.6	45.0	45.2	44.4	41.2	: Train Spectrum
Source 3:	<N/A>	0.0 CNEL	0.0	0.0	0.0	0.0	0.0	0.0	
Source 4:	<N/A>	0.0 CNEL	0.0	0.0	0.0	0.0	0.0	0.0	
Overall:		56.5 CNEL	45.9	44.7	48.5	51.3	51.1	45.8	: Effective Noise Spectrum

Assembly Type	Open	Width	Height	Qty	Total Area	125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz
STC 35 Wall with Wood Siding	N	11.2	8	1	68.7	15	26	34	38	36	40
STC 28 1/2-inch Dual Insulating Window	Y	3.6	5.8	1	20.9	23	23	22	32	43	37
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
<N/A>	N	0	0	0	0.0	0	0	0	0	0	0
Overall Area:					89.6	ft²					

125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
45.9	44.7	48.5	51.3	51.1	45.8	: Exterior Wall Noise Exposure
8.5	9.2	9.3	9.3	9.3	9.3	: Transmission Loss
0.0	0.0	0.0	0.0	0.0	0.0	: Noise Reduction
13.7	13.7	13.7	13.7	14.7	14.7	: Absorption
32.2	31.0	34.8	37.5	36.4	31.1	: Noise Level
42.4	CNEL	WINDOWS OPEN				
125 Hz	250 Hz	500 Hz	1KHz	2KHz	4KHz	
45.9	44.7	48.5	51.3	51.1	45.8	: Exterior Wall Noise Exposure
15.9	25.0	27.6	35.9	36.9	39.2	: Transmission Loss
0.0	5.5	8.1	16.4	17.3	19.7	: Noise Reduction
13.7	13.7	13.7	13.7	14.7	14.7	: Absorption
32.2	25.5	26.8	21.2	19.0	11.5	: Noise Level
34.3	CNEL	WINDOWS CLOSED				