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NOISE ASSESSMENT STUDY

"WINCHESTER ASSISTED LIVING"

15860 WINCHESTER BOULEVARD, LOS GATOS

Prepared for

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Project No. 53-014

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I. Executive Summary

This report presents the results of a noise assessment study, in compliance with the California Environmental Quality Act, for a planned senior assisted living project at 15860 Winchester Boulevard in Los Gatos, as shown on the Site Plan, Ref. (a). This study includes an analysis of traffic noise impacts to the proposed development site, evaluations of the noise exposures against the standards of the Town of Los Gatos Noise Element, Ref. (b), and the State of California Code of Regulations, Title 24, Ref. (c). This study also includes analyses of the project-generated construction noise and vibration impacts the adjacent residential neighbors. This report does not include analyses and evaluations of project-generated traffic noise or mechanical equipment noise as the data necessary for those analyses are not yet available.

The following report includes background information on acoustics, noise standards applicable to the project, existing and future noise exposure impacts to the project, project construction noise impacts and mitigation measures for noise impacted receptor locations. The results of this study reveal that the noise exposures at the site (common exterior areas) from Winchester Boulevard traffic will be within the limits of the Town of Los Gatos General Plan Noise Element for residential land use compatibility. The interior noise exposures in certain dwelling units will exceed the interior noise exposure limits of the Noise Element and Title 24 standards. Noise mitigation measures for the noise impacted dwelling units will be required.

Construction of the project will generate significant levels of noise and possibly vibration over the short-term and at times will exceed the limits of the standards. These impacts will be temporary and noise and vibration reduction measures to minimize these impacts are recommended.

Note: Due to COVID-19, traffic volumes are lower than normal. Therefore, throughout this report, the term "current" is used for the COVID-19 condition, "existing" is used for the pre-COVID-19 normal condition and "future" is used for the future General Plan buildout condition.

In terms of the CEQA compliance checklist, the project results in the following:

a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	No Impact
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	Less Than Significant With Mitigation
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	Less Than Significant
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	Less Than Significant With Mitigation
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	No impact
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	No impact

II. Background Information on Acoustics

Noise is defined as unwanted sound. Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. Sound levels are usually measured and expressed in decibels (dB) with 0 dB corresponding roughly to the threshold of hearing.

Most of the sounds which we hear in our normal environment do not consist of a single frequency, but rather a broad range of frequencies. As humans do not have perfect hearing, environmental sound measuring instruments have an electrical filter built in so that the instrument's detector replicates human hearing. This filter is called the "A-weighting" network and filters out low and very high frequencies. All environmental noise is reported in terms of A-weighted decibels, notated as “dBA”. All sound levels used in this report are A-weighted unless otherwise noted. Table I, below, shows the typical human response and noise sources for A-weighted noise levels.

TABLE I

The A-Weighted Decibel Scale, Human Response, and Common Noise Sources

Noise Level, dBA	Human Response	Noise Source
120-150+	Painfully Loud	Sonic Boom (140 dBA)
100-120	Physical Discomfort	Discotheque (115 dBA) Motorcycle at 20 ft. (110 dBA) Power Mower (100 dBA)
70-100	Annoying	Diesel Pump at 100 ft. (95 dBA) Freight Train at 50 ft. (90 dBA) Food Blender (90 dBA) Jet Plane at 1000 ft. (85 dBA) Freeway at 50 ft. (80 dBA) Alarm Clock (80 dBA)
50-70	Intrusive	Average Traffic at 100 ft. (70 dBA) Vacuum Cleaner (70 dBA) Typewriter (65 dBA) Loud Conversation (60 dBA)
0-50	Quiet	Normal Conversation (50 dBA) Light Traffic at 100 ft. (45 dBA) Refrigerator (45 dBA) Desktop Computer (40 dBA) Whispering (35 dBA) Leaves Rustling (10 dBA) Threshold of Hearing (0 dBA)

Although the A-weighted noise level may adequately indicate the level of noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a mixture of noise from distant sources that create a relatively steady background noise from which no particular source is identifiable. To describe the time-varying character of environmental noise, the statistical noise descriptors, L_1, L_{10}, L_{50} and L_{90} are commonly used. They are the A-weighted noise levels exceeded for 1%, 10%, 50% and 90% of a stated time period. The continuous equivalent-energy level (L_{eq}) is that level of a steady state noise which has the same sound energy as a time-varying noise. It is often considered the average noise level and is used to calculate the Day-Night Levels (DNL) and the Community Noise Equivalent Level (CNEL) described below.

In determining the daily level of environmental noise, it is important to account for the difference in response of people to daytime and nighttime noises. During the nighttime, exterior background noises are generally lower than the daytime levels. However, most household noise also decreases at night and exterior noise becomes very noticeable. Further, most people sleep at night and are very sensitive to noise intrusion. To account for human sensitivity to nighttime noise levels, the Day-Night Level (DNL) noise descriptor was developed. The DNL is also called the L_{dn}. Either is acceptable, however, DNL is more popular worldwide. The DNL divides the 24-hour day into the daytime period of 7:00 a.m. to 10:00 p.m. and the nighttime period of 10:00 p.m. to 7:00 a.m. The nighttime noise levels are penalized by 10 dB to account for the greater sensitivity to noise at night. The Community Noise Equivalent Level (CNEL) is another 24-hour average which includes a 5 dB evening (7:00 p.m. - 10:00 p.m.) penalty and a 10 dB nighttime penalty. Both the DNL and the CNEL average the daytime, evening and nighttime noise levels over a 24-hour period to attain a single digit *noise exposure*. The proper notations for the Day-Night Level and the Community Noise Equivalent Level are <u>dB DNL</u> and <u>dB CNEL</u>, respectively, as they can only be calculated using A-weighted decibels. It is, therefore, considered redundant to notate <u>dB(A) DNL</u> or <u>dB(A) CNEL</u>. Noise exposures are always rounded to the nearest whole number.

The effects of noise on people can be listed in three general categories:

- subjective effects of annoyance, nuisance, dissatisfaction;
- interference with activities such as speech, sleep, learning, relaxing;
- physiological effects such as startling, hearing loss.

The levels associated with environmental noise, in almost every case, produce effects only in the first two categories. Workers in industrial plants, airports, etc., can experience noise in the last category. Unfortunately, there is, as yet, no completely satisfactory way to measure the subjective effects of noise, or of the corresponding reactions of annoyance and dissatisfaction. This is primarily due to the wide variation in individual thresholds of annoyance and differing individual past experiences with noise.

An important way to determine a person's subjective reaction to a new noise is to compare it to the existing environment to which one has adapted, i.e., the "ambient". In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by the receptors.

With regard to increases in A-weighted noise level, the Environmental Protection Agency has determined the following relationships that will be helpful in understanding this report.

- Except in carefully controlled laboratory experiments, a change of 1 dB cannot be perceived.
- Outside of the laboratory, a 3 dB change is considered a just-perceptible difference.
- A change in level of at least 5 dB is required before any noticeable change in community response would be expected.
- A 10 dB change is subjectively heard as approximately a doubling in loudness, and would almost certainly cause an adverse change in community response.

The adding or subtracting of sound levels is not simple arithmetic. The sound levels, in decibels, must be converted to Bels, the anti-log's of which are then calculated. The manipulation is then performed (arithmetic addition or subtraction), the logarithm of the sum or difference is calculated. The final number is then multiplied by 10 to convert Bels to decibels. The formula for adding decibels is as follows:

$$\text{Sum} = 10\log(10^{SL/10} + 10^{SL/10})$$ where, SL is the Sound Level in decibels.

For example, 60 dB + 60 dB = 63 dB, and 60 dB + 50 dB = 60 dB. Two sound sources of the same level are barely noisier than just one of the sources by itself. When one source is 10 dB higher than the other, the less noisy source does not add to the noisier source.

III. Noise Standards, Goals & Policies

A. Town of Los Gatos

The noise assessment results presented in the findings were evaluated against the Town of Los Gatos Noise Element of the General Plan standards, which uses the Day-Night Level (DNL) 24-hour noise descriptor to define acceptable noise exposures for various land-uses. The acceptable limit for residential use is 55 decibels (dB) DNL. The DNL is defined further in Appendix B. The Town's Noise Element (Policy NOI-3) states that these noise limits represent the "long range community aspirations" and acknowledges that such goals may not be attainable at this time.

Achieving 55 dB DNL in the small, limited use balconies will not be feasible. Therefore, the noise exposures in the balconies are not evaluated in this study. The noise exposure impacts to the exterior common areas are identified as the exterior living areas of the project and are evaluated for noise impacts.

The Noise Element specifies a limit of 45 dB DNL for residential interiors.

Construction Equipment Noise Limits; Sec. 16.20.035. - Construction.

Notwithstanding any other provision of this chapter, between the hours of 8:00 a.m. to 8:00 p.m., weekdays and 9:00 a.m. to 7:00 p.m. weekends and holidays, construction, alteration or repair activities which are authorized by a valid Town permit or as otherwise allowed by Town permit, shall be allowed if they meet at least one of the following noise limitations: (1)

No individual piece of equipment shall produce a noise level exceeding eighty-five (85) dBA at twenty-five (25) feet. If the device is located within a structure on the property, the measurement shall be made at distances as close to twenty-five (25) feet from the device as possible. (2)

The noise level at any point outside of the property plane shall not exceed eighty-five (85) dBA.

(Ord. No. 1852, § II(11.30.035), 5-20-91)

B. <u>California Environmental Quality Act (CEQA)</u>

The project-generated noise exposures were evaluated against the guidelines of the California Environmental Quality Act (CEQA). CEQA does not limit noise levels or noise exposures nor does it quantify noise exposure or noise level increases over the ambient to define noise impacts. CEQA evaluates a project as a significant noise impact if it "...caused a substantial increases in the ambient noise levels...". The quantification of the threshold of significance is left up to the local jurisdiction. The Town of Los Gatos, however, does not provide a threshold of significance in the General Plan. Therefore, for the purposes of this study, thresholds of significance used by many other local jurisdictions are recommended for adoption for this project. The thresholds of significance shall be applied at the existing residential area to the east and north of the site.

These thresholds are:

(a) causing the DNL in existing residential areas to increase by 5 dB or more and remain below 60 dB DNL;

(b) causing the DNL in existing residential areas to increase by 3 dB or more and, thereby, exceed 60 dB DNL;

(c) causing the DNL in existing residential areas to increase by 1 dB or more if the current noise exposure exceeds 60 dB DNL.

If the project causes any of the above three criteria to occur, the project will be considered a significant noise impact to the areas where it occurs and mitigation measures will be required.

C. State of California Code of Regulations, Title 24

The State of California Code of Regulations, Title 24 (CBC) standards use the DNL descriptor (to be consistent with local standards) and specify an interior noise exposure limit in living spaces of multi-family housing to 45 dB DNL from exterior noise sources. This standard is the same as the Town of Los Gatos Noise Element standard described above.

The Title 24 standards also specify minimum sound insulation ratings for common partitions separating different dwelling units and dwelling units from interior common spaces. The standards specify that common walls must have a design Sound Transmission Class (STC) rating of 50 or higher. Common floor/ceiling assemblies must have design STC ratings of 50 or higher and Impact Insulation Class (IIC) ratings of 50 or higher. As the design details of the common interior partitions were not available at the time of this study, an evaluation of the interior partitions has not been performed.

The noise exposures shown in this study are without the application of mitigation measures and represent the noise environment for current, existing and future project site conditions.

IV. Acoustical Setting

A. Site and Traffic Descriptions

The planned development site is an approximate 1.30 acre parcel located at 15860 Winchester Boulevard at Shelburn Way in Los Gatos. The site slopes down to the east from Winchester Boulevard. The site currently contains five two residential structures with additional ancillary structures. Surrounding land uses include single-family residential across Shelburn Way to the north, the Los Gatos Dog & Cat Hospital adjacent to the east, the Los Gatos Oaks multi-family residential adjacent to the south and single-family residential across Winchester Boulevard to the west.

The on-site noise environment is controlled primarily by traffic sources on Winchester Boulevard, which carries a current (COVID-19) Average Daily Traffic (ADT) volume of approximately 10,046 vehicles, as determined by manual traffic counts made during the PM peak hour. The existing (2016) traffic volume, which is the most recent traffic data available, indicates that the normal (non-COVID -19) volume would be 11,280 vehicles, as reported in the Valley Oaks Partners Traffic Impact Study, Ref. (d), that was prepared for a previous development application for the site. The difference in the noise levels between the current condition and the normal condition is 0.5 decibels.

B. Project Description

The planned project includes the construction of a three to four story senior assisted living care facility with 135 residential rooms. There will be three courtyard areas at the center of the building. The ground floor at the back of the building where the site slopes down will contain residential rooms, the library, the theater and building services. The first floor, which will be at-grade with Winchester Boulevard, will contain residential rooms, the dining room, activity room, kitchen and the lounge. The second and third floors will be mostly residential rooms. The Site Plan is shown in Figure 2 on page 11.

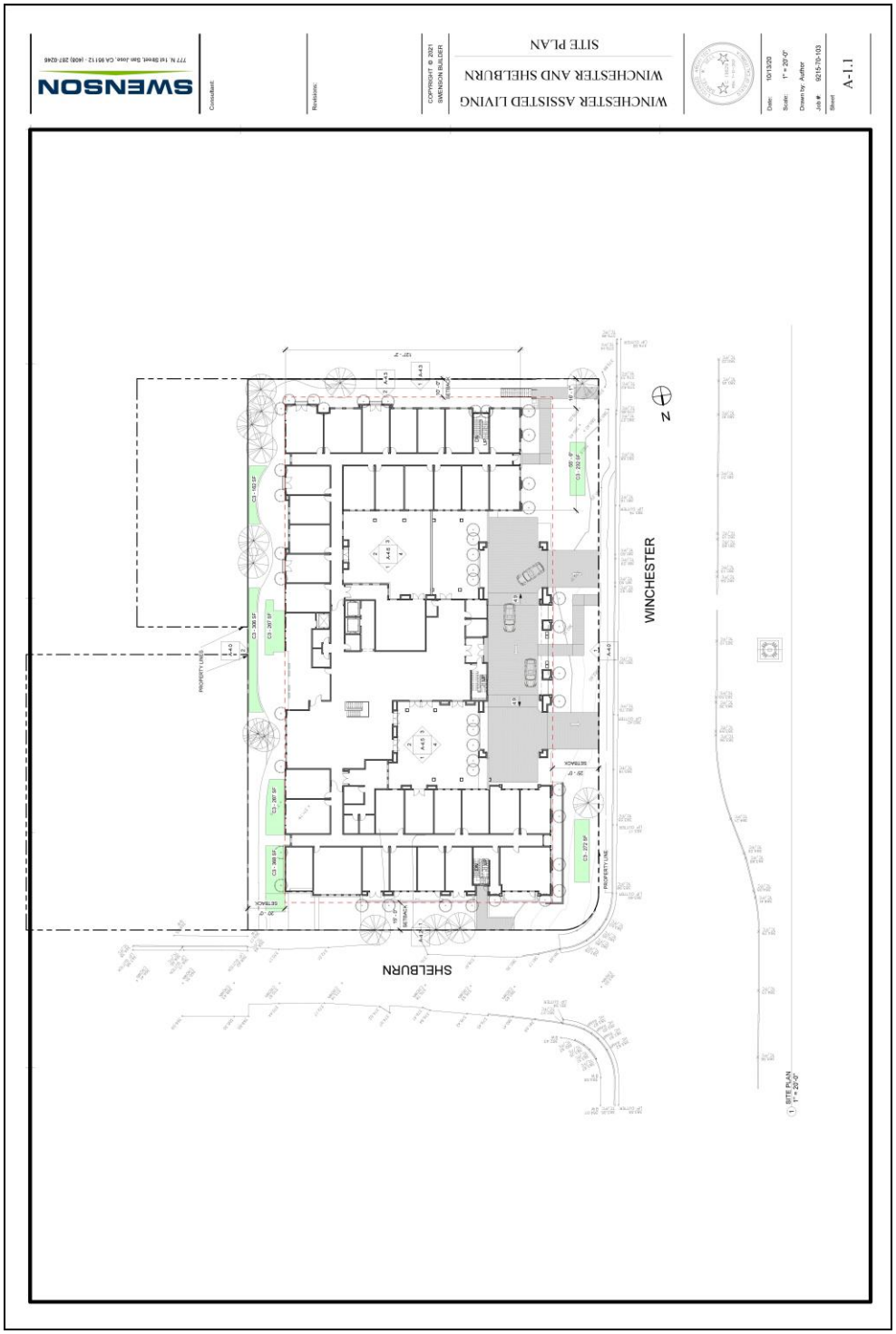

FIGURE 1 – Site Plan

V. Noise Impacts to the Project

A. Current and Existing Noise Levels

To determine the existing noise environment at the site, continuous recordings of the sound levels were made a location 25 ft. from the property line contiguous with Winchester Boulevard. This location corresponds to the planned minimum setback of the building from Winchester Boulevard. The noise measurement location is shown on Figure 2 on page 13. The measurements were made on March 24-25, 2021 for a continuous period of 24 hours and included representative hours during the daytime and nighttime periods of the DNL index. The noise level data were acquired using a Larson-Davis Model 831 Precision Integrating Sound Level Meter. The meter yields, by direct readout, a series of descriptors of the sound levels versus time, which are commonly used to describe community noise, as described in Appendix B. The measured descriptors include the L_1, L_{10}, L_{50}, and L_{90}, i.e., those levels exceeded 1%, 10%, 50% and 90% of the time. Also measured were the maximum and minimum levels and the continuous equivalent-energy levels (L_{eq}), which are used to calculate the DNL. The results of the measurements are shown in the data tables in Appendix C.

As shown in the data tables, the existing L_{eq}'s at the measurement location, 25 ft. from the property line contiguous with Winchester Boulevard (53 ft. from the acoustic centerline of Winchester Boulevard), ranged from 52.8 to 61.7 dBA during the daytime and from 40.8 to 55.2 dBA at night.

Traffic noise diminishes at the rate of 3 to 6 decibels for every doubling of the distance from the source to the receiver. Thus, locations on the project at greater distances from Winchester Boulevard will have lower noise levels. Additional acoustical shielding will provided by interposed buildings of the project.

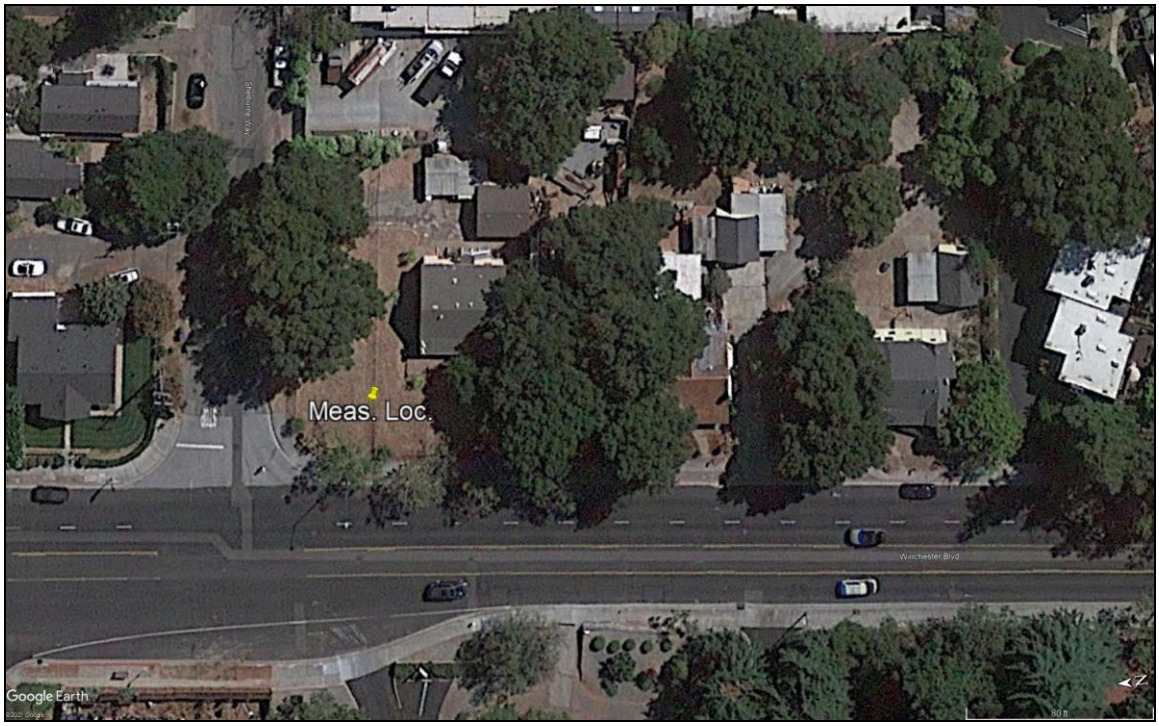

FIGURE 2 - Noise Level Measurement Location

B. <u>Future Noise Levels</u>

The future traffic volume for Winchester Boulevard was provided in the Valley Oaks Partners TIA. The reported worst-case scenario of the cumulative + project volume was 14,990 vehicles ADT. We are assuming, for the purposes of this study, that the project volumes for the Valley Oaks Partners project would have been similar to the project traffic volumes for the subject project.

The increase in the future traffic volume over the current condition yields a 2 dB increase in the traffic noise levels.

C. Exterior Noise Exposures

The DNL's for the survey location were calculated by decibel averaging of the L_{eq}'s as they apply to the daily time periods of the DNL index. The DNL is a 24-hour noise descriptor that uses the measured L_{eq} values to calculate a 24-hour time-weighted average noise exposure. The formula used to calculate the DNL is described in Appendix B. Adjustments were applied to the measured noise levels to account for the various setback distances from the measurement locations using methods established by the Highway Research Board, Ref. (e).

A four decibel noise reduction factor was applied to the courtyards as these areas are significantly shielded from traffic noise by the project building.

- The exterior noise exposures at the most noise impacted planned building setback, 25 ft. from the property line contiguous with Winchester Boulevard are 59, 59 and 61 dB DNL under current, existing and future traffic conditions, respectively.

- The exterior noise exposures in the most noise impacted planned AL Courtyard 198A, 93 ft. from the property line contiguous with Winchester Boulevard will be up to 50, 50 and 52 dB DNL under current, existing and future traffic conditions, respectively.

- The exterior noise exposures in the most noise impacted planned AL Courtyard 198B, 93 ft. from the property line contiguous with Winchester Boulevard will be up to 50, 50 and 52 dB DNL under current, existing and future traffic conditions, respectively.

- The exterior noise exposures in the most noise impacted planned Memory Care Courtyard 199, 111 ft. from the property line contiguous with Winchester Boulevard will be up to 49, 49 and 51 dB DNL under current, existing and future traffic conditions, respectively.

The noise exposures in the common exterior areas will be within the 55 dB DNL limit of the Town of Los Gatos Noise Element standard for residential use. Noise reduction measures for the exterior living areas of the project will not be required.

D. Interior Noise Exposures

To evaluate the interior noise exposures in the project living spaces, a 15 dB reduction was applied to the exterior noise exposure to represent the attenuation provided by the building shell under an annual-average condition. The annual average condition assumes that standard dual-pane thermal insulating windows are installed and are kept open up to 50% of the time for natural ventilation as full time ventilation is not required in multi-family dwellings.

- The interior noise exposures in the most noise impacted living spaces will be up to 44, 44 and 46 dB DNL under current, existing and future traffic conditions, respectively. The future noise exposure excesses will occur in units 101, 201, 301, 153, 253 and 353 at the northwesterly corner of the building. Thus, the noise exposures will exceed the limits of the Town of Los Gatos Noise Element and Title 24 standards under future conditions.

As the noise exposures will exceed the 45 dB DNL limit of the Town of Los Gatos Noise Element and Title 24 standards, noise reduction measures for the interior living spaces will be required. The recommended measures are provided in Section II, below.

VI. Project-Generated Noise Impacts

A. Project Traffic and Mechanical Equipment

Project-generated noise from this type of mixed-use development would be limited to project traffic and mechanical equipment. Project traffic is not included in this study as the data necessary to analyze and evaluate project traffic is not available.

Mechanical equipment specifications and designs are not available at the time of this study. Therefore, a detailed analysis of the mechanical equipment could not be performed.

B. Construction Phase Impacts

Short-term noise impacts may be created during demolition of the existing structures on the site and construction of the project. Demolition and construction equipment are typically similar, with the exception of paving equipment and pile drivers (impact hammers). However, pile driving is not expected on this project. The noise levels generated by the two phases will be similar over the course of entire process. With the exception of pile driving, blasting, vibratory compacting or rolling, construction equipment expected to be used on the site generates groundborne vibration level lower than 0.02 in/sec. peak particle velocity (ppv) at distances greater than 13 ft. The nearest structures are 73 ft. to the north, 5 ft. to the commercial building to the east, 27 ft. to the residences to the south and 135 ft. to the residence to the west.

A table from the EPA providing standard construction equipment noise levels at a distance of 50 ft. is provided in Figure 3 on page 17. From the information provided in the Table, demolition/construction equipment noise levels range from 74 to 102 dBA at a 25 ft. distance from the source with typical noise levels ranging from 82 to 100 dBA.

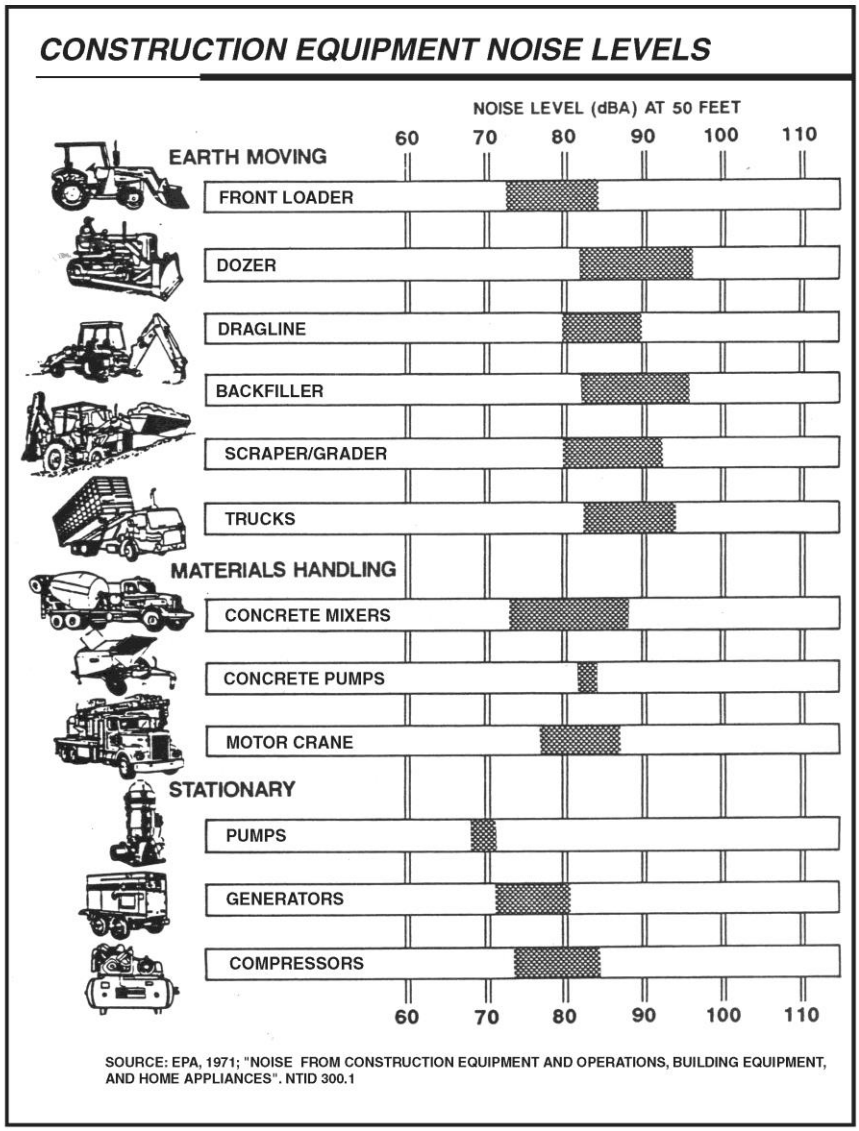

FIGURE 3 – Environmental Protection Agency Equipment Noise Levels

Table II, below, provides a list of construction equipment with their sound levels at a reference distance of 50 ft., their sound levels at a distance of 25 ft. and the distance at which the equipment reaches 85 dBA. The noise limit of the Town of Los Gatos Noise Ordinance will be exceeded at distances closer that those shown in the shaded column for that particular item of equipment, activity or operation.

TABLE II

Demolition and Construction Noise Levels, dBA

Equipment	Reference Level	Dist., ft.	Sound Level @ 25 ft.	Dist. To 85 dBA
Paving Machine	85	50	91	50
Water Truck	84	50	90	45
Compactive Rollers	85	50	91	50
Scrapers	85	50	91	50
Graders	85	50	91	50
Wheel Loader	80	50	86	28
Track Loader	85	50	91	50
Backhoe	80	50	86	28
Fork lifts	83	50	89	40
Bulldozer	85	50	91	50
Concrete Mixer	85	50	91	50
Haul Trucks	84	50	90	45
Crane	82	50	88	35
Jack Hammer	88	50	94	71
Excavator	85	50	91	50
Skid Steer	78	50	84	22
Wood Chipper	87	50	93	63
Chain Saw	85	50	91	50

Building Construction Noise Levels, dBA

Equipment	Reference Level	Dist., ft.	Sound Level @ 25 ft.	Dist. To 85 dBA
Air Compressor	80	50	86	28
Generator	82	50	88	35
Fork lifts	83	50	89	40
Nail guns	87	50	93	63
Power saws	76	50	82	18
Manual hammering	94	50	100	141
Pumps	77	50	83	20

Table III, below, provides the noise levels and noise exposures at the most impacted adjacent land uses under a worst-case scenario if equipment operates right up to the property lines.

TABLE III			
Construction Noise Levels			
Location	L_{max}	L_{eq}	DNL
North Residences	54-93 dBA	57-86 dBA	46-75 dB
East Commercial	62-116 dBA	65-109 dBA	54-98 dB
South Residences	53-101 dBA	56-94 dBA	45-83 dB
West Residences	53-87 dBA	56-80 dBA	45-69 dB

The construction noise levels will exceed the limits of the Town of Los Gatos Noise Ordinance limits for equipment noise levels.

Demolition and construction activities can produce varying amounts of ground-borne vibration, which depend on the type of equipment used and various methods. Vibration is produced by the equipment operation and the vibrational waves travel through the ground/soil that diminishes over distance. It is rare that construction vibration is intense enough to cause damage to existing structures. However, due to the close proximity of the neighbors to the west, a quantitative analysis of vibration is warranted.

Ground-borne vibration is typically reported in terms of “peak particle velocity” or PPV, and sometimes reported in terms of decibels of vibration, notated as VdB, which is a level of vibration (L_v). The use of PPV is more common for construction equipment and methods.

Table IV on the following page provides building damage criteria from construction vibration established by the Federal Transit Administration, Ref. (f).

TABLE IV		
Construction Vibration Damage Criteria		
Building Category	PPV (in/sec)	Approx. L_v (VdB)
I. Reinforced-concrete, steel or timber (no plaster)	0.50	102
II. Engineered concrete and masonry (no plaster)	0.30	98
III. Non-engineered timber and masonry buildings	0.20	94
IV. Buildings extremely susceptible to vibration damage	0.12	90
** RMS velocity in decibels (VdB) re: 1 micro-inch/second		

The adjacent residential and commercial buildings are lightweight, wood framed standard residential/commercial construction. The buildings to the north and south are wood sided. The building to the east and west are stucco/masonry. The foundation types are unknown. These structures fall into Building Category III where the vibration limit is 0.20 in/sec PPV. There are no buildings adjacent to or near the site that would fall under Categories I, II or IV.

The contractors used for the demolition of the site and construction of the project have not yet been selected, nor has a construction schedule and list of equipment been developed. Table V on page 21 provides a list of typical construction equipment, some of which will likely not be used on this project, such as pile driving, their vibration levels at 25 ft., the vibration levels at the building setback of the closest residence or commercial use to the north, east, south and west. Also shown are the distances each item of equipment must stay away from the respective adjacent structures to limit the vibration levels to no more than 0.20 in/sec at the buildings. As shown in Table V, the equipment expected to be used on this project could generate ground-borne vibration levels in excess of the 0.20 in/sec criterion, as shown by the **BOLD** text. **This is a potentially significant temporary impact.**

Noise mitigation measures are recommended to minimize potential noise and vibration impacts from construction associated with the project.

TABLE IV

Construction Equipment Vibration Levels, in/sec PPV

Dist. to North, ft.	73
Dist to East, ft.	5
Dist to South	27
Dist to West	135

EQUIPMENT d =	Reference Vibration at d, ft. 25	Dist for 0.2 PPV limit	Vibration Level @ North Res.	Vibration Level @ East Comm.	Vibration Level @ South Res.	Vibration Level @ West Res.
Excavator	0.089	15	0.02	**1.00**	0.08	0.01
Vibratory Roller	0.210	26	0.04	**2.35**	0.19	0.02
Hoe Ram	0.089	15	0.02	**1.00**	0.08	0.01
Large Bulldozer	0.089	15	0.02	**1.00**	0.08	0.01
Loaded Trucks	0.076	13	0.02	**0.85**	0.07	0.01
Jackhammer	0.035	8	0.01	**0.39**	0.03	0.00
Small Bulldozer	0.003	2	0.00	**0.03**	0.00	0.00
Backhoe	0.088	14	0.02	**0.98**	0.08	0.01
Compactor	0.240	28	0.05	**2.68**	**0.21**	0.02
concrete Mixer	0.080	14	0.02	**0.89**	0.07	0.01
Concrete Pump	0.080	14	0.02	**0.89**	0.07	0.01
Crane	0.008	3	0.00	**0.09**	0.01	0.00
Dump Truck	0.080	14	0.02	**0.89**	0.07	0.01
Front End Loader	0.088	14	0.02	**0.98**	0.08	0.01
Grader	0.088	14	0.02	**0.98**	0.08	0.01
Hydra Break Ram*	0.040	9	0.01	**0.45**	0.04	0.00
Soil Sampling Rig	0.088	14	0.02	**0.98**	0.08	0.01
Paver	0.080	14	0.02	**0.89**	0.07	0.01
Pickup Truck	0.080	14	0.02	**0.89**	0.07	0.01
Slurry Trenching	0.016	5	0.00	0.18	0.01	0.00
Tractor	0.080	14	0.02	**0.89**	0.07	0.01
Vibratory Roller (lge)	0.477	45	0.10	**5.34**	**0.43**	0.04
Vibratory Roller (sm)	0.176	23	0.04	**1.97**	0.16	0.01
Clam Shovel*	0.208	26	0.04	**2.33**	0.19	0.02
Rock Drill	0.088	14	0.02	**0.98**	0.08	0.01

* Transient vibration levels

VII. Mitigation Measures

A. Traffic Noise Impacts to the Project - Interior

To achieve compliance with the 45 dB DNL limits of the Town of Los Gatos Noise Element and Title 24, the following window controls will be required. In addition, general building shell controls are also recommended, as described in Appendix B.

- Maintained closed at all times all windows and glass doors of living spaces within 35 ft. of the property line contiguous with Winchester Boulevard and with a direct or side view to Winchester Boulevard. Provide some type of mechanical ventilation for these spaces. Install windows and glass doors rated minimum Sound Transmission Class (STC) 28.

When windows and doors are maintained closed at all times for noise control, some type of mechanical ventilation must be provided. The mechanical ventilation system shall conform to the requirements of the California Mechanical Code, as described in Appendix C, and shall not compromise the acoustical integrity of the building shell.

The windows and glass doors specified above to be maintained closes shall be operable as the requirement does not imply a fixed or inoperable condition. All other windows of the development may be kept open as desired with the exception of bathrooms that are an integral part of a living space and not separated by a closeable door, such as those common in master bedroom suites.

In addition, the windows and doors shall be installed in an acoustically-effective manner. To achieve an acoustically-effective window and door construction, the operable window panels must form an air-tight seal when in the closed position and the window frames must be caulked to the wall opening around their entire perimeter with a non-hardening caulking compound to prevent sound infiltration. Do not use expandable foam products.

Please be aware that many dual-pane and triple-pane window assemblies have inherent noise reduction problems in the traffic noise frequency spectrum due to resonance that occurs within the air space between the window lites, and the noise reduction capabilities vary from manufacturer to manufacturer. Therefore, the acoustical test report of all sound rated windows should be reviewed by a qualified acoustician to ensure that the chosen windows will adequately reduce traffic noise to acceptable levels.

The implementation of the above recommended measures will reduce interior noise exposures to 45 dB DNL or lower.

B. Construction Phase Noise and Vibration Impacts

Reduction of the demolition/construction phase noise at the site can be accomplished by using quiet or "new technology" equipment. The greatest potential for noise abatement of current equipment should be the quieting of exhaust noises by use of improved mufflers. It is recommended that all internal combustion engines used at the project site be equipped with a type of muffler recommended by the vehicle manufacturer. In addition, all equipment should be in good mechanical condition so as to minimize noise created by faulty or poorly maintained engine, drive-train and other components. Demolition and construction noise can also be mitigated by the following:

OPERATIONAL AND SITUATIONAL CONTROLS

- All work on site should be restricted to 8:00 a.m. to 8:00 p.m. Weekdays, 9:00 AM to 7:00 PM, weekends and Holidays, per the requirements of the Town of Los Gatos Noise Ordinance.

- All construction noise control measures currently imposed on the project shall be maintained unless the measures outlined herein are more restrictive.

- All exterior stationary equipment shall be kept at least 100 ft. from neighboring property lines unless acoustically shielded.

- No material deliveries are allowed on Sundays or Federal Holidays.
- Cranes shall be located at least 100 ft. from any neighboring property line with the exception of cranes or lifts necessary to dismantle scaffolding.
- Minimize material movement along the east and south sides of the site.
- Locate stockpiles adjacent to neighbors as much as possible to help shield people from on-site noise generation.
- Music shall not be audible off site.
- Dirt berming and stockpiling materials whenever possible can also help reduce noise to sensitive receptor locations.
- Keep mobile equipment (haul trucks, concrete trucks, etc.) off of local streets near residences as much as possible.
- Keep vehicle paths graded smooth as rough roads and paths can cause significant noise and vibration from trucks (particularly empty trucks) rolling over rough surfaces. Loud bangs and ground-borne vibration can occur.

INTERIOR WORK

- For interior work, the windows of the interior spaces facing neighbors where work is being performed shall be kept closed while work is proceeding.
- Noise generating equipment indoors should be located within the building to utilize building elements as noise screens.

EQUIPMENT

- Earth Removal: Use scrapers as much as possible for earth removal, rather than the noisier loaders and hauling trucks.

- Backfilling: Use a backhoe for backfilling, as it is less costly and quieter than either dozers or loaders.

- Ground Preparation: Use a motor grader rather than a bulldozer for final grading. Wheeled heavy equipment is less noisy than track equipment. Utilize wheeled equipment rather than track equipment whenever possible, with the exception of work within the vibration distances shown in Table IV. The soil conditions at the site indicate that wheeled equipment may generate higher levels of ground vibration than tracked equipment. Small, rubber tracked equipment, such as skid steers, would produce the lowest levels of noise and vibration

- Building Construction: Nail guns should be used where possible as they are less noisy than manual hammering.

- Generators and Compressors: Use generators, compressors and pumps that are housed in acoustical enclosures rather than weather enclosures or none at all.

- Utilize temporary power service from the utility company in lieu of generators wherever possible.

- All stationary equipment shall be rated no higher than 85 dBA @ 25 ft. under the equipment's most noisy condition.

- Circular saws, miter/chop saws and radial arm saws shall be used no closer than 50 ft. from any residential property line unless the saw is screened from view by any and all residences using an air-tight screen material of at least 2.0 lbs./sq. ft. surface weight, such as ¾" plywood.

- Use electrically powered tools rather than pneumatic tools whenever possible.

- Mitigation of the construction phase noise at the site can be accomplished by using quiet or "new technology" equipment.

- The greatest potential for noise abatement of current equipment should be the quieting of exhaust noises by use of improved mufflers.

- It is recommended that all internal combustion engines used at the project site be equipped with a type of muffler recommended by the vehicle manufacturer.

- All equipment should be in good mechanical condition so as to minimize noise created by faulty or poorly maintained engines, drive-trains and other components. Worn, loose or unbalanced parts or components shall be maintained or replaced to minimize noise and vibration.

- Utilize wheeled equipment rather than tracked equipment whenever possible.

- Use the lowest vibration inducing equipment when within the distance limits shown in Table IV. Small grading and earth moving equipment, such as "Bobcat" size equipment should be used.

NOISE COMPLAINT MANAGEMENT

- Designate a noise complaint officer. The officer shall be available at all times during construction hours via both telephone and email. Signs shall be posted at site entries. A sample is shown below.

NOISE COMPLAINTS

FOR CONCERNS REGARDING CONSTRUCTION NOISE PLEASE CONTACT:

"CONSTRUCTION OFFICER"
Conoff@jobsite.com
OPERATIONS MANAGEMENT ENGINEER
CALL CENTER: (111) 111-1111

- Notify, in writing, all residential and noise sensitive commercial neighbors within 300 ft. of the site of construction. The notification shall contain the name, phone number and email address of the noise complaint officer. A flyer may be placed at the doors of the residences.

- A log of all complaints shall be maintained. The logs shall contain the name and address of the complainant, the date and time of the complaint, the nature/description of the noise source, a description of the remediation attempt or the reason remediation could not be attempted.

VIII. Conclusions

In conclusion, traffic noise impacts to the project will be within the 55 dB DNL exterior noise standard of the Town of Los Gatos Noise Element in the common courtyards of the project. The interior noise exposures in certain residential rooms will exceed the limits of the Town of Los Gatos and Title 24 standards. Noise reduction measures for these spaces will be required. Construction of the project will generate temporary noise and vibration impacts to nearby neighbors. Construction noise and vibration reduction measures are provided in this study to minimize the temporary impacts.

This report presents the results of a noise assessment study for the planned "Winchester Assisted Living " development at 15860 Winchester Boulevard in Los Gatos. The study findings for existing conditions are based on field measurements and other data and are correct to the best of our knowledge. Future noise projections are based on information provided by others. However, significant deviations in the predicted traffic volumes, site planning, noise regulations or other future changes beyond our control may produce long-range noise results different from our estimates.

Report Prepared By:

EDWARD L. PACK ASSOC., INC.

Jeffrey K. Pack
President

APPENDIX A

References

(a) The Town of Los Gatos General Plan 2009, Health and Safety Element, Chapter 9, "Noise", January 2009

(b) California Code of Regulations, Title 24, Volume 1, Part 2, Section 1206 "Sound Transmission", Subsection 1206.4 (Allowable Interior Noise Levels), Revised 2019

(c) Site Plan, Winchester Assisted Living, by Barry Swenson Builder, October 13, 2020

(d) "Winchester Boulevard Office Development" Transportation Impact Analysis (TIA), Prepared for: Valley Oak Partners, LLC, by Hexagon Transportation Consultants, Inc., September 13, 2016

(e) Highway Research Board, "Highway Noise – A Design Guide for Highway Engineers", Report, 117, 1971

(f) United States Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, Federal Transit Administration, Report No. 0123, by John A. Volpe National Transportation Systems Center, September 2018

APPENDIX B

Noise Standards, Terminology, Instrumentation and General Building Shell Controls,

1. Noise Standards

Town of Los Gatos General Plan 2020 Noise Element Standards

The Noise Element of the General Plan of the Town of Los Gatos, adopted July, 2000, specifies noise limits for various land uses.

Land Use	dB DNL	dBA $L_{eq(24)}$
Residential	55	
Commercial		70
Industrial		70
Open Space		
Intensive (developed park)		55
Passive (natural park)		50
Hospital		55
Educational		55

Interior noise exposures for single-family developments are specified to be the same as multi-family developments. This statement asserts coincidence with the standard of the State of California Code of Regulations, Title 24 noise limit of 45 dB DNL for all new housing.

B. Title 24 Noise Standards

2019 California Building Code, Volume 1, Part 2
SECTION 1206 – SOUND TRANSMISSION

1206.1 Scope. This section shall apply to common interior walls, partitions and floor/ceiling assemblies between adjacent dwelling units and sleeping units or between dwelling units and sleeping units and adjacent public areas such as halls, corridors, stairways or service areas.

1206.2 Air-borne sound. Walls, partitions and floor/ceiling assemblies separating dwelling units and sleeping units from each other or from public or service areas shall have a sound transmission class of not less than 50, or not less than 45 if field tested, for air-borne noise when tested in accordance to ASTM E-90. Alternatively, the sound transmission class of walls, partitions and floor-ceiling assemblies shall be established by engineering analysis based on a comparison of walls, partitions and floor-ceiling assemblies having sound transmission class ratings as determined by the test procedures in ASTM E90. Penetrations or openings in construction assemblies for piping; electrical devices; recessed cabinets; bathtubs; soffits; or heating, ventilating or exhaust ducts shall be sealed lined, insulated or otherwise treated to maintain the required ratings. The requirement shall not apply to entrance doors; however, such doors shall be tight fitting to the frame and sill.

1206.3 Structure-borne sound. Floor/ceiling assemblies between dwelling units and sleeping units or between a dwelling unit or sleeping unit and a public or service area with the structure shall have an impact insulation class rating of not less than 50, or not less than 45 if field tested, when tested in accordance with ASTM E-492. Alternatively, the impact insulation class of floor-ceiling assemblies shall be established by engineering analysis based on a comparison of floor-ceiling assemblies having impact insulation class ratings as determined by the test procedures in ASTM E492.

Exception: *Impact sound insulation is not required for floor/ceiling assemblies over non-habitable rooms or spaces not designed to be occupied, such as garages, mechanical rooms or storage areas.*

1206.4 Allowable interior noise levels. *Interior noise levels attributable to exterior sources shall not exceed 45 dB in any habitable room. The noise metric shall be either the day-night average sound level (Ldn) or the community noise equivalent level (CNEL), consistent with the noise element of the local general plan.*

1206.5 Acoustical control. [BSC-CG] *See California Green Building Standards code, Chapter 5, Division 5.5 for additional sound transmission requirements.*

2. Terminology

A. Statistical Noise Levels

Due to the fluctuating character of urban traffic noise, statistical procedures are needed to provide an adequate description of the environment. A series of statistical descriptors have been developed which represent the noise levels exceeded a given percentage of the time. These descriptors are obtained by direct readout of the sound measuring instruments. Some of the statistical levels used to describe community noise are defined as follows:

L_1 - A noise level exceeded for 1% of the time.

L_{10} - A noise level exceeded for 10% of the time, considered to be an "intrusive" level.

L_{50} - The noise level exceeded 50% of the time representing an "average" sound level.

L_{90} - The noise level exceeded 90 % of the time, designated as a "background" noise level.

L_{eq} - The continuous equivalent-energy level is that level of a steady noise having the same sound energy as a given time-varying noise. The L_{eq} represents the decibel level of the time-averaged value of sound energy or sound pressure squared and is the descriptor used to calculate the DNL and CNEL.

B. Day-Night Level (DNL)

Noise levels utilized in the standards are described in terms of the Day-Night Level (DNL). The DNL rating is determined by the cumulative noise exposures occurring over a 24-hour day in terms of A-Weighted sound energy. The 24-hour day is divided into two subperiods for the DNL index, i.e., the daytime period from 7:00 a.m. to 10:00 p.m., and the nighttime period from 10:00 p.m. to 7:00 a.m. A 10 dB weighting factor is applied (added) to the noise levels occurring during the nighttime period to account for the greater sensitivity of people to noise during these hours. The DNL is calculated from the measured L_{eq} in accordance with the following mathematical formula:

$$DNL = \left[[(10\log_{10}(10^{\Sigma Leq(7\text{-}10)})) \times 15] + [((10\log_{10}(10^{\Sigma Leq(10\text{-}7))})+10) \times 9]\right]/24$$

C. A-Weighted Sound Level

The decibel measure of the sound level utilizing the "A" weighted network of a sound level meter is referred to as "dBA". The "A" weighting is the accepted standard weighting system used when noise is measured and recorded for the purpose of determining total noise levels and conducting statistical analyses of the environment so that the output correlates well with the response of the human ear.

3. Instrumentation

The on-site field measurement data were acquired by the use of one or more of the precision acoustical instruments shown below. The acoustical instrumentation provides a direct readout of the L exceedance statistical levels including the equivalent-energy level (L_{eq}). Input to the meters was provided by a microphone extended to a height of 5 ft. above the ground. The meter conforms to ANSI S1.4 for Type 1 instruments. The "A" weighting network and the "Fast" response setting of the meter were used in conformance with the applicable ISO and IEC standards. All instrumentation was acoustically calibrated before and after field tests to assure accuracy.

Bruel & Kjaer 2231 Precision Integrating Sound Level Meter
Larson Davis LDL 812 Precision Integrating Sound Level Meter
Larson Davis 2900 Real Time Analyzer
Larson Davis 831 Precision Integrating Sound Level Meter

4. Mechanical Ventilation Requirements

California Mechanical Code Chapter 4- Ventilation Air

402.3 Mechanical Ventilation

Where natural ventilation is not permitted by this section or the building code, mechanical ventilation systems shall be designed, constructed, and installed to provide a method of supply air and exhaust air. Mechanical ventilation systems shall include controls, manual or automatic, that enable the fan system to operate wherever the spaces served are occupied. The system shall be designed to maintain minimum outdoor airflow as required by Section 403.0 under any load conditions.

5. Building Shell Controls

The following additional precautionary measures are required to assure the greatest potential for exterior-to-interior noise attenuation by the recommended mitigation measures. These measures apply at those units where closed windows are required:

- Unshielded entry doors having a direct or side orientation toward the primary noise source must be 1-5/8" or 1-3/4" thick, insulated metal or solid-core wood construction with effective weather seals around the full perimeter.

- If any penetrations in the building shell are required for vents, piping, conduit, etc., sound leakage around these penetrations can be controlled by sealing all cracks and clearance spaces with a non-hardening caulking compound.

- Ventilation openings shall not compromise the acoustical integrity of the building shell.

- Spray-in or expandable foams are not acceptable for use as an acoustical sealant or as an insulation material for sound absorption within a wall or floor/ceiling cavity.

APPENDIX C

Noise Measurement Data and Calculation Tables

DNL CALCULATIONS

CLIENT: BARRY SWENSON BUILDER
FILE: 53-014
PROJECT: WINCHESTER ASSISTED LIVING
DATE: 3/24-25/2021
SOURCE: WINCHESTER BLVD.

LOCATION 1	Winchester Blvd.			
Dist. To Source	53 ft.			
TIME	Leq	10^Leq/10		
7:00 AM	58.6	724436.0		
8:00 AM	61.7	1479108.4		
9:00 AM	60.0	1000000.0		
10:00 AM	60.2	1047128.5		
11:00 AM	59.8	954992.6		
12:00 PM	59.6	912010.8		
1:00 PM	58.8	758577.6		
2:00 PM	57.8	602559.6		
3:00 PM	58.7	741310.2		
4:00 PM	59.0	794328.2		
5:00 PM	59.1	812830.5		
6:00 PM	58.1	645654.2		
7:00 PM	57.5	562341.3		
8:00 PM	55.7	371535.2		
9:00 PM	52.8	190546.1	SUM=	11597359.3
10:00 PM	50.7	117489.8	Ld=	70.6
11:00 PM	46.5	44668.4		
12:00 AM	43.2	20893.0		
1:00 AM	42.9	19498.4		
2:00 AM	41.3	13489.6		
3:00 AM	40.8	12022.6		
4:00 AM	43.0	19952.6		
5:00 AM	51.5	141253.8		
6:00 AM	55.2	331131.1	SUM=	720399.3
			Ln=	58.6
	Daytime Level=	70.6		
	Nighttime Level=	68.6		
	DNL=	**59**		
	24-Hour Leq=	57.1		