



EDWARD L. PACK ASSOCIATES. INC.

1975 HAMILTON AVENUE
SUITE 26
SAN JOSE, CA 95125

Acoustical Consultants

TEL: 408-371-1195
FAX: 408-371-1196
www.packassociates.com

November 9, 2015
Project No. 47-079

Mr. David Egan
EAH, Inc.
2169 Francisco Boulevard
Suite B
San Rafael, CA 94901

Subject: Noise Assessment Study for the Planned “Belle Salici” Multi-Family Development, Monterey Road, Morgan Hill

Dear Mr. Egan:

This report presents the results of a noise assessment study for the planned “Belle Salici” multi-family development along Monterey Road in Morgan Hill, as shown on the Conceptual Site Plan, Ref. (a). The noise exposures at the site were evaluated against the standards of the City of Morgan Hill General Plan Noise Element, Ref. (b), and the State of California Code of Regulations, Title 24, Ref. (c). The analysis of the on-site noise the measurements indicates that the noise environment is created primarily by traffic sources on Monterey Road traffic sources. The results of the analysis reveal that the exterior noise exposures at the community courtyard of the project will be within the limits of the City of Morgan Hill Noise Element standards. Mitigation measures will not be required. The interior noise exposures will exceed the limits of the standards. Noise mitigation measures for the interior living spaces will be required.

Sections I and II of this report contain a summary of our findings and recommendations, respectively. Subsequent sections contain site, traffic and project descriptions, analyses and evaluations. Appendices A, B and C, attached, contain the list of references, descriptions of the standards, definitions of the terminology, descriptions of the instrumentation used for the field survey, general building shell controls and the on-site noise measurement data and calculation tables.

I. Summary of the Findings

A. Noise Standards and Criteria

City of Morgan Hill Noise Element

The noise exposures presented herein were evaluated against the standards of the City of Morgan Hill Noise Element, which utilizes the Day-Night Level (DNL) 24-hour descriptor to define acceptable noise exposures for various land uses. The standards specify a limit of 65 decibels (dB) DNL at common areas of multi-family developments if mitigation to achieve 60 dB DNL is not feasible. The exterior noise standards are typically not applied to small, limited use areas such as balconies and decks. A limit of 65 dB DNL is used herein as the criterion for the patios. .

A limit of 45 dB DNL is specified for interior living spaces. In addition, the Noise Element specifies that when the exterior noise exposure is greater than 60 dB DNL, the *maximum instantaneous* noise levels shall not exceed 50 dBA in bedrooms and 55 dBA in other living spaces. The exterior noise exposures at the planned building facades along Monterey Road will be higher than 60 dB DNL under existing and future conditions. Thus, the interior maximum noise limits are applicable.

This study evaluates the highest hourly maximum noise level during the daytime hours of 7:00 a.m. to 10:00 p.m. calculated for the interior living spaces against the 55 dBA limit for other living spaces (other than bedrooms). This study also evaluates the highest hourly maximum noise level during the nighttime hours of 10:00 p.m. to 7:00 a.m. calculated for the bedrooms against the 50 dBA limit for bedrooms.

California Code of Regulations, Title 24

The Title 24 standards also use the DNL descriptor and specify a limit of 45 dB DNL or lower for interior living spaces from exterior noise sources.

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 and floor/ceiling assemblies must have a design Sound Transmission Class (STC) rating of 50 or higher. As design details for the interior partitions of the project were not available at the time of this study, an evaluation of the interior partitions has not been made.

B. Exterior Noise Exposures and Noise Levels

The noise exposures shown below are without the application of mitigation measures and represent the noise environment for project conditions.

- The existing exterior noise exposure at the most impacted community courtyard, 123 ft. from the centerline of Monterey Road and behind the community building will be up to 46 dB DNL. Under future traffic conditions, the noise exposure is expected to remain at 46 DNL. Thus, the noise exposures will be within the 65 dB DNL limit of the City of Morgan Hill Noise Element standards.
- The existing exterior noise exposure at the most impacted building setback from Monterey Road, 71 ft. from the centerline, is 70 dB DNL. Under future traffic conditions, the noise exposure is expected to remain at 70 dB DNL. Thus, the noise exposures will be up to 10 dB in excess of the Title 24 criterion.

- The exterior noise exposure at the most impacted units of the rear building and at the family courtyard, 216 ft. from the centerline of Monterey Road, was calculated to be 60 dB DNL under existing and future traffic conditions. Thus, the noise exposures will be within the 65 dB DNL limit of the City of Morgan Hill Noise Element standards.
- The exterior maximum noise levels at the planned building setback from Monterey Road ranged from 71 to 75 dBA during the daytime and from 65 to 75 dBA during the nighttime.

As the noise exposures in the exterior living areas of the project will be within the limits of the City of Morgan Hill Noise Element, noise mitigation measures for the exterior areas will not be required.

C. Interior Noise Exposures and Noise Levels

- The interior noise exposures in the most impacted living spaces closest to Monterey Road will be 55 dB DNL under existing and future traffic conditions. Thus, the noise exposures will be up to 10 dB in excess of the 45 dB DNL limit of the City of Morgan Hill Noise Element and Title 24 standards.
- The interior maximum noise levels in the most impacted living spaces closest to Monterey Road will range from 47 to 51 dBA during the daytime and from 41 to 51 dBA at night. Thus, the interior maximum noise levels will be within the 55 dBA daytime limit applied to living spaces but up to 1 dB in excess of the 50 dBA nighttime limit applied to bedrooms.

As the maximum noise levels are produced by singular noise sources, increases in future traffic volume do not affect the maximum noise levels.

The interior noise exposures will exceed the 45 dB DNL and 50 dBA maximum limits of the standards of the City of Morgan Hill Noise Element and Title 24. Noise mitigation measures for the project interiors will be required.

D. Construction Noise Impacts

Short-term construction impacts may be created during construction of the development. Construction equipment generates noise levels in the range of 75 to 95 dBA at a 30 ft. distance from the source. Noise from construction equipment dissipates at the rate of 6 dB per doubling of the distance from the source to the receiver. At receptor locations adjacent to the south, construction noise will be in the range of 81 to 101 dBA, which would result in noticeable noise conditions. At receptor locations across Keith Way to the east, construction noise will be in the range of 66 to 86 dBA, which would result in moderate noise conditions.

Since construction is carried out in several reasonably discrete phases, each has its own mix of equipment and consequently, its own noise characteristics. Generally, the site preparation requires the use of heavy equipment such as bulldozers, loaders, scrapers, and diesel trucks. Upon completion of the project, the area's sound levels will reduce essentially to the predicted traffic noise exposures analyzed in this study.

Over the course of a construction day, the noise exposure is expected to be up to 75 dB DNL at the existing residences adjacent to the south and 61 dB DNL at residences to the east.

As construction noise is predicted to be noticeable to nearby residences, general mitigation measures are recommended to minimize the potential for annoyance. The recommended measures are described in Section II.

II. Recommendations

A. Interior Noise Control

To achieve compliance with the 45 dB DNL limit of the City of Morgan Hill Noise Element and Title 24, and the 50 dBA limit for bedrooms, the following window and door controls will be required:

- Maintain closed at all times all windows and glass doors of living spaces of the front building and with a direct or side view to Monterey Road (north, west and south facades) and at bedroom windows in the west façade of the rear building. Install windows and glass doors rated minimum Sound Transmission Class (STC) 32 at these living spaces of the front building. Install windows rated minimum STC 28 at bedroom windows of the rear building in the west façade. Provide some type of mechanical ventilation at all living spaces with the closed window condition.

All remaining windows of the project, including bathroom windows, may be fitted with any type of glass and may be kept open as desired, with the exception of bathroom windows that are in integral part of a noise impacted living space and not separated by a closeable door.

All windows must be of good quality and provide tight seals to prevent sound infiltration. To achieve an acoustically-effective window construction, the operable window panels must form an air-tight seal when in the closed position. In addition, the window and door frames must be caulked to the wall opening around their entire perimeter with a non-hardening caulking compound or acoustical sealant.

When windows are maintained closed for noise control, they are to be operable, as the requirement does not imply a "fixed" condition. Also, under the closed window requirement some type of mechanical ventilation should be provided to assure a habitable environment, as specified by the Uniform Building Code (UBC). In addition, the ventilation methods or equipment shall not compromise the acoustical integrity of the building shell.

Please be aware that many dual-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 and doors should be reviewed by a qualified acoustician to ensure that the chosen windows and doors will adequately reduce traffic noise to acceptable levels.

C. Construction Noise Mitigation

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. 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. Construction noise can also be mitigated by the following:

- Scheduling noisy operations for the daytime hours of 7:00 AM to 8:00 PM Monday through Friday and from 9:00 AM to 6:00 PM Saturday, for compliance with the City of Morgan Hill Zoning Ordinance.
- Diesel powered equipment usage should be minimized and used at least 100 ft. from residences as much as possible.

- Dirt berms and stockpiling materials can also help reduce noise to sensitive receptor locations.
- Use Monterey Road only for construction traffic.
- Keep the site travel paths graded smooth to prevent “banging” noise and vibration from trucks traveling over rough or bumpy roads.

As noise reduction benefit can also be achieved by appropriate selection of equipment utilized for various operations, subject to equipment availability and cost considerations, the following recommendations for minimizing impacts on the surrounding area are offered:

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

Ground Preparation: Use a motor grader rather than a bulldozer for final grading.

Building Construction: Powers saws should be shielded or enclosed where practical to decrease noise emissions. Nail guns should be used where possible as they are less noisy than manual hammering.

Construction Phasing: Construct buildings or other significant structures at the site perimeter to help shield existing sensitive receptors from noise generated on the site.

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

III. Site, Traffic and Project Descriptions

The planned project site is located along Monterey Road in Morgan Hill. The site is currently contains a vacant restaurant and is relatively flat and at-grade with Monterey Road. Surrounding land uses include an Enterprise car rental facility adjacent to the north, single-family residential across Keith Avenue to the east, single-family residential and a dental building adjacent to the south and a retail/commercial building across Monterey Road to the west.

The on-site noise environment is controlled primarily by traffic sources on Monterey Road, which carries an existing Average Daily Traffic (ADT) volume of 23,119 vehicles. This traffic volume was interpolated from the reported 2009 and 2030 volumes shown in the City of Morgan Hill Circulation Element, Ref. (d).

The planned project includes the construction of 19 apartment units with 6 units over the community building and commercial use in the front building and 13 units in a two-story building at the rear of the site. At-grade parking will be between the two buildings. Ingress and egress to the project will be by way of a project driveway off of Monterey Road. The Site Plan is shown on Figure 1, below.



FIGURE 1 – Site Plan

IV. Analysis of the Noise Levels

A. Existing Noise Levels

To determine the existing noise environment at the site, continuous recordings of the sound levels were made at a location 79 ft. ft. from the centerline of Monterey Road on the roof of the existing restaurant building on the site. This location was chosen for security of the sound measuring instrument. The measurements were made on October 29-30, 2015 using a Larson-Davis LDL 812 Precision Integrating Sound Level Meter.

The meter yields, by direct readout, a series of descriptors of the sound levels versus time, as described in Appendix B. The measured descriptors included the L_1 , L_{10} , L_{50} , and L_{90} , i.e., those levels that are 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 measurement location is shown on Figure 3 on page 11.

The measurements were made for a total period of 24 hours and included recordings of the noise levels during representative hours of the daytime and nighttime periods of the DNL index. The results of the measurements are shown in data tables in Appendix C.

As shown in the tables, the L_{eq} 's at the measurement location, 79 ft. from the centerline of the road, ranged from 62.7 to 68.6 dBA during the daytime and from 52.0 to 67.9 dBA at night.

The maximum noise levels at the planned building setback ranged from 72 to 76 dBA during the daytime and from 66 to 76 dBA at night.

Traffic noise dissipates at the rate of 3 to 6 dB for each doubling of the distance from the source to the receiver. Therefore, other locations on the site at greater distances from the roadway will have lower noise levels. Additional noise shielding will be provided by interposed buildings of the project.

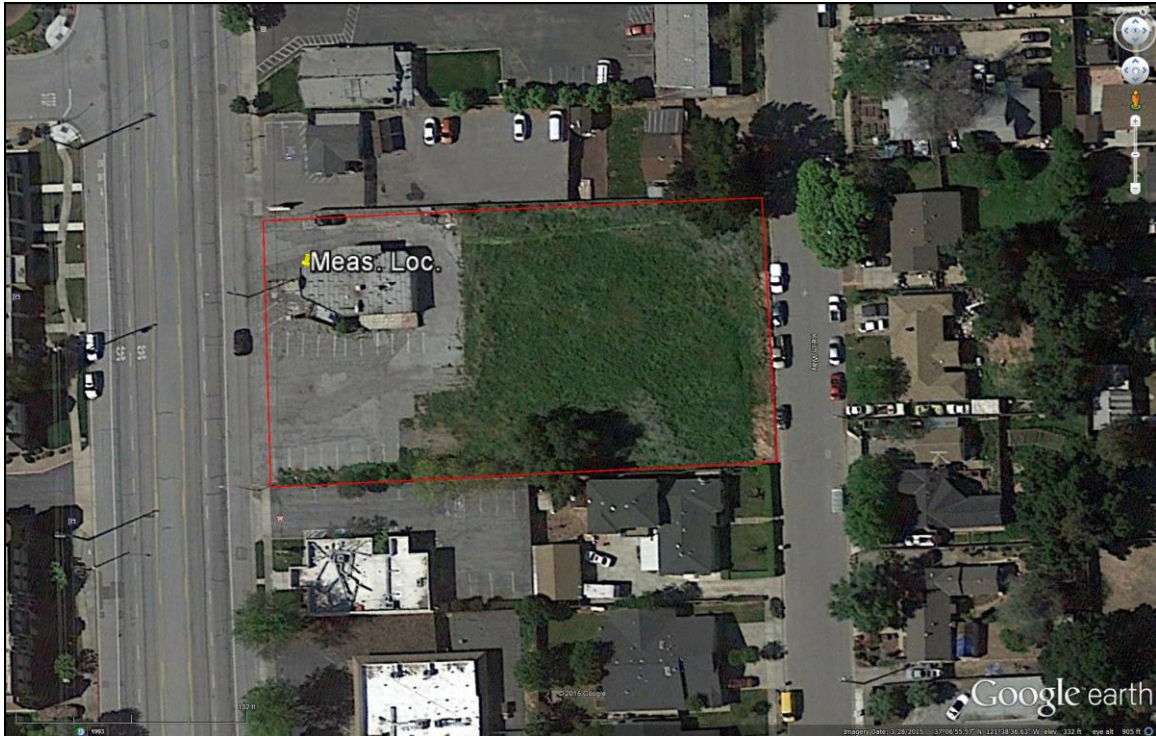


FIGURE 2 – Noise Measurement Location

B. Future Noise Levels

The future (2030) traffic volume data for Monterey Road were reported in the City of Morgan Hill Circulation Element. The 2030 Current General Plan and Recommended Roadway Forecast for Monterey Road predict an increase from the 2009 volume of 22,850 vehicles ADT to 24,000 vehicles ADT. The increase from the calculated 2014 volume of 23,119 vehicles ADT to the 2030 volume of 24,000 vehicles ADT yields a 0.16 dB increase in the traffic noise levels, which is negligible.

V. Evaluation of the Noise Exposures

A. Exterior Noise Exposures

The DNL for the survey location was 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 location using methods established by the Highway Research Board, Ref. (e).

The results of the calculations reveal that the noise exposure at the measurement location, 79 ft. from the centerline of Monterey Road, was calculated to be 69 dB DNL.

At the planned courtyard area, 123 ft. from the centerline of Monterey Road and behind the community building, the noise exposure was calculated to be 46 dB DNL. Under future traffic conditions, the noise exposure is expected to remain at 46 dB DNL. Thus, the noise exposures will be within the 65 dB DNL limit of the City of Morgan Hill Noise Element standards. Noise mitigation for the exterior area will not be required.

The exterior noise exposures at the most impacted planned building setback (dwelling units), 71 ft. from the centerline of Monterey Road, were calculated to be 70 dB DNL under existing and future traffic conditions. Thus, the noise exposures will be up to 10 dB in excess of the Title 24 criterion.

The exterior noise exposures at the most impacted units of the rear building and at the family courtyard, 216 ft. from the centerline of Monterey Road, were calculated to be 60 dB DNL under existing and future traffic conditions.

B. Interior Noise Exposures

To determine the interior noise exposures in project living spaces, a 15 dB reduction was applied to the exterior noise exposures at the building setbacks to represent the attenuation provided by a typical building shell under an *annual-average* condition. The annual-average condition assumes that windows are comprised of standard dual-pane thermal insulating glass and are kept open up to 50% of the time for natural ventilation.

The interior noise exposures in the living spaces closest to Monterey Road were calculated to be 55 dB DNL under existing and future traffic conditions. Thus, the noise exposures will be up to 10 dB in excess of the 45 dB DNL limit of the City of Morgan Hill Noise Element and Title 24 standards.

To determine the interior maximum noise levels, a 25 dB reduction factor was applied to the measured maximum noise levels at the building setbacks to account for the noise reduction provided by the building shell under a closed window condition.

The interior maximum noise levels in the most impacted living spaces closest to Monterey Road were calculated to be 47 to 51 dBA during the daytime. Thus, the maximum interior noise levels will be within the 55 dBA limit for living spaces. The maximum interior noise levels were calculated to be 41 to 51 dBA during the nighttime period. Thus, the maximum interior noise levels will be up to 1 dB in excess of the 50 dBA limit for bedrooms.

As shown by the above evaluations, the interior noise exposures will exceed the limits of the standards. Noise mitigation measures for the interior living spaces will be required. The recommended measures are described in Section II of this report.

The above report presents a noise assessment study for the planned “Belle Salici” multi-family development along Monterey Road in Morgan Hill. The study findings for present conditions are based on field measurements and other data and are correct to the best of our knowledge. Future noise exposures were based on information provided by the City of Morgan Hill. Significant deviations in the future traffic volumes, or changes in motor vehicle technology, speed limits, noise regulations, or other future changes beyond our control may produce long-range noise results different from our estimates.

If you need any additional information or would like an elaboration on this report, please call me.

Sincerely,

EDWARD L. PACK ASSOC., INC.

A handwritten signature in blue ink, reading "Jeffrey K. Pack", is written over a horizontal line.

Jeffrey K. Pack
President

Attachment: Appendices A, B and C

APPENDIX A

References:

- (a) Site Plan, Belle Salici, by Chris Lamén & Associates, June 8, 2015
- (b) City of Morgan Hill General Plan, Health and Safety Element, “Noise”, July 2001
- (c) California Code of Regulations, Title 24, California Building Code 2010, Chapter 12, Section 1207.11.2 Allowable Interior Noise Levels (Revised 2013)
- (d) City of Morgan Hill General Plan Circulation Element Network and Policy Revisions Traffic Impact Analysis, by Fehr & Peers Transportation Consultants, May 2009
- (e) Highway Research Board, “Highway Noise – A Design Guide for Highway Engineers”, Report 117, 1971

APPENDIX B

Noise Standards, Terminology and Instrumentation

1. Noise Standards

A. City of Morgan Hill Noise Element Standards

The Public Health and Safety (Noise) Element of the City of Morgan Hill General Plan, adopted July, 2001, contains land use compatibility standards for various land uses. a section on noise.

The maximum exterior noise level of 60 dBA L_{dn} shall be applied in residential areas where outdoor use is a major consideration (e.g., backyards in single family housing developments and recreation areas in multi-family housing projects). Where the City determines that providing an L_{dn} of 60 dBA or lower cannot be achieved after the application of reasonable and feasible mitigation, an L_{dn} of 65 dBA maybe permitted.

- *Indoor noise levels should not exceed an L_{dn} of 45 dBA in new residential housing units.*

- *Noise levels in new residential development exposed to an exterior L_{dn} of 60 dBA or greater should be limited to a maximum instantaneous noise level(e.g., trucks on busy streets, train warning whistles) in bedrooms of 50dBA. Maximum instantaneous noise levels in all other habitable rooms should not exceed 55 dBA.*

The maximum outdoor noise level for new residences near the railroad shall be 70 dBA L_{dn} , recognizing that train noise is characterized by relatively few loud events.

The Noise Element references the Land Use Compatibility chart from the State of California Guidelines for the Preparation of a Noise Element. The “Normally Acceptable” standards for the land use categories are as follows:

Table 9. Acceptable Noise Levels

Land Use Category	Community Noise Exposure Ldn or CNEL, dBA					
	55	60	65	70	75	80
Residential: Single Family Duplexes, Mobile Homes		Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential: Multi-family		Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Transient Lodging: Motels, Hotels		Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Schools, Libraries, Churches, Hospitals, Nursing Homes		Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Auditoriums, Concert Halls Amphitheaters		Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Sports Arena, Outdoor Spectator Sports		Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Playgrounds, Neighborhood Parks		Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Golf Courses, Riding Stables, Water Recreation, Cemeteries		Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Office Buildings, Business Commercial and Professional		Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Industrial, Manufacturing, Utilities, Agriculture		Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable

INTERPRETATION



NORMALLY ACCEPTABLE

Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.



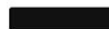
CONDITIONALLY ACCEPTABLE

New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.



NORMALLY UNACCEPTABLE

New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.



CLEARLY UNACCEPTABLE

New construction or development should generally not be undertaken.

Source: Office of Planning and Research, State of California General Plan Guidelines, Appendix A: Guidelines for the Preparation and Content of the Noise Element of the General Plan, 1990.

B. Title 24 Noise Standards

The California Code of Regulations, 1, Title 24, Chapter 2, Section 1207, "Sound Transmission", applies to all new multi-family dwellings including condominiums, apartments, hotels, motels and dormitories. The standards, which utilize either the Day-Night Level (DNL) descriptor or the Community Noise Equivalent Level (CNEL), whichever is consistent with the local jurisdictional standards, specify that interior noise exposures from exterior sources shall not exceed 45 dB DNL/CNEL in any habitable room.

The Title 24 standards also establish minimum sound insulation requirements for interior partitions separating different dwelling units from each other and dwelling units from common spaces such as garages, corridors, equipment rooms, etc. The common interior walls and floor/ceiling assemblies regulated by the California Building Code (apartments, condominiums, hotels, etc.) must achieve a minimum Sound Transmission Class (STC) rating of 50 for airborne noise. Common floor/ceiling assemblies must achieve an Impact Insulation Class (IIC) rating of 50 for impact noise. These ratings are based on laboratory tested partitions. Field tested partitions must achieve ratings of NIC and FIIC 45. Attached dwellings regulated by the California Residential Code (townhouses under 3 stories in height) must achieve minimum STC 45 for the common partition.

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 Level Meters. 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 the "mean" 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-state 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 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 sub-periods 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 dBA 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:

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

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 sound analyzer listed below. The instrumentation provides a direct readout of the L exceedance statistical levels including the equivalent-energy level (L_{eq}). Input to the meters were provided by microphones extended to a height of 5 ft. above the ground. The “A” weighting network and the “Fast” response setting of the meters were used in conformance with the applicable standards. The Larson-Davis meters were factory modified to conform to the Type 1 performance standards of ANSI S1.4. 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

4. 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 devices shall not compromise the acoustical integrity of the building shell.

APPENDIX C

On-Site Noise Measurement Data and Calculation Tables

DNL CALCULATIONS

CLIENT: EAH, INC.
 FILE: 47-079
 PROJECT: BELLE SALICI
 DATE: 10/29-30/2015
 SOURCE: MONTEREY HWY, UPRR

TIME	Leq	$10^{Leq/10}$		
LOCATION 1 Monterey Road				
Dist. To Source 79 ft.				
7:00 AM	65.5	3548133.9		
8:00 AM	67.7	5888436.6		
9:00 AM	67.4	5495408.7		
10:00 AM	67.0	5011872.3		
11:00 AM	68.5	7079457.8		
12:00 PM	67.5	5623413.3		
1:00 PM	67.9	6165950.0		
2:00 PM	67.7	5888436.6		
3:00 PM	67.6	5754399.4		
4:00 PM	68.4	6918309.7		
5:00 PM	68.6	7244359.6		
6:00 PM	67.8	6025595.9		
7:00 PM	66.0	3981071.7		
8:00 PM	64.4	2754228.7		
9:00 PM	62.7	1862087.1	SUM=	79241161
10:00 PM	60.4	1096478.2	Ld=	79.0
11:00 PM	57.5	562341.3		
12:00 AM	54.7	295120.9		
1:00 AM	54.0	251188.6		
2:00 AM	52.0	158489.3		
3:00 AM	53.8	239883.3		
4:00 AM	58.1	645654.2		
5:00 AM	65.2	3311311.2		
6:00 AM	67.9	6165950.0	SUM=	12726417
			Ln=	71.0
	Daytime Level=	79.0		
	Nighttime Level=	81.0		
	DNL=	69		
	24-Hour Leq=	65.8		