CHRISTOPHER JEAN & ASSOCIATES, INC.
ACOUSTICAL CONSULTING SERVICES

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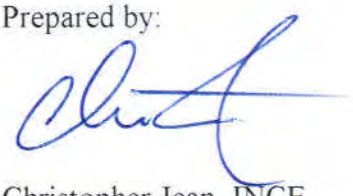
November 19, 2015

REVISED ACOUSTICAL ANALYSIS

COURTYARD & TOWNEPLACE SUITES

CITY OF AGOURA HILLS

Prepared by:



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CHRISTOPHER JEAN & ASSOCIATES, INC.
ACOUSTICAL CONSULTING SERVICES

SUMMARY

This revised analysis has been completed to determine the exterior and interior noise exposure and the necessary mitigation measures for the proposed COURTYARD & TOWNEPLACE SUITES project located on Agoura Road in the City of Agoura Hills. A list of requirements and recommendations is given in the following summary. Details are discussed in the body of the report.

A. EXTERIOR NOISE CONTROL

The proposed building structure itself will provide sufficient acoustical shielding to ensure that the central courtyard and rooftop deck exterior use areas do not exceed 65 dBA CNEL. No additional exterior noise mitigation is necessary.

B. INTERIOR NOISE CONTROL

The building shall be constructed, as a minimum, in accordance with the outline of Table 7 found in the body of the report. This will be adequate for all units with the following exceptions:

(1) Add STC 36 glazing to all guest rooms facing the Ventura Freeway

(2) Add STC 32 glazing to all guest rooms facing east or west

(3) Add STC 26 glazing to all guest rooms facing south or into the central courtyard

(4) Add resilient channels to the exterior wall assemblies of all Studio and One Bedroom guest units facing north, east or west

(5) All through-wall HVAC units shall be sound rated at least STC 36

C. VENTILATION

This analysis assumed that all windows and doors are kept closed. If the allowable interior noise levels are met by requiring that windows and doors be kept closed, then the design of the structure must also specify a ventilation or air conditioning system to provide a habitable interior environment. The ventilation system must not compromise the dwelling or guest room noise reduction.

D. UNIT-TO-UNIT NOISE CONTROL

Common floor/ceiling assemblies between units are subject to Title 24 Sound Transmission Class (STC) and Impact Insulation Class (IIC) requirements. The plan set provided for this analysis did not include common floor/ceiling assembly details. It is highly recommended that one of the following widely used common floor/ceiling assemblies, all of which rate at least STC 50, be incorporated into the building plans:

(1) 8" concrete slab (Riverbank Acoustical Labs, TL 76-77, 1977, 16f, for Pre-stressed Concrete Institute, STC 58 – IIC 71 with carpet, IIC 34 for bare floor)

(2) 1 1/2" lightweight concrete, plywood sub-floor, 3 1/2" thick fiberglass insulation, resilient channels, drywall ceiling (Geiger and Hamme CCA-14MT, CCA-15MT, 1972, 16f, for Cellular Concrete Association, STC 60 – IIC 73 with carpet, IIC 47 with vinyl tile)

(3) 1 3/8" Gyp-Crete, plywood sub-floor, 2" by 10" wood joists, 3 1/2" thick fiberglass insulation, resilient channels, 1/2" drywall ceiling (Riverbank Acoustical Labs TL 81-16, for Gyp-Crete Corporation, 1981, STC 60 – Riverbank Acoustical Labs IN 81-14, for Gyp-Crete Corporation, 1981, IIC 51 with sheet vinyl)

As can be seen by the above list, some of the recommended assemblies cannot meet the IIC 50 minimum requirement without carpet. Uncarpeted areas above other living units will require some form of proprietary isolation product included in the assembly to achieve the required rating. Such products include Enkasonic, Acousti-Mat, Regupol and others. Such products are designed to be installed atop the bare sub-floor and topped with either lightweight concrete/Gyp-Crete pour or additional layers of plywood. Each product has its own specific installation requirements. These products can produce both design and field IIC compliance with sheet vinyl or wood flooring. While various lab tests have shown these same products to produce design IIC compliance when used with ceramic tile, field testing experience has proven that actual ceramic tile installations are marginal. The use of ceramic tile or marble is not recommended, regardless of the installation method.

The plan set provided for this analysis did not include common wall assembly details. It is highly recommended that one of the following widely used common wall assemblies, all of which rate at least STC 50, be incorporated into the building plans:

(1) Two layers of 1/2" direct nailed drywall, 2" by 6" plate, 2" by 4" staggered studs, 3 1/2" thick fiberglass insulation, two layers 1/2" direct nailed drywall (Owens/Corning Fiberglas, OCF W-55-69, 1969, 16f, for Owens/Corning Fiberglas, STC 54)

(2) Two layers of 5/8" direct nailed drywall, 2" by 6" plate, 2" by 4" staggered studs, 3 1/2' thick fiberglass insulation, two layers 5/8" direct nailed drywall (National Gypsum Company NGC 2376, 1970, 16f, STC 53)

(3) 5/8" direct nailed drywall, 2" by 4" plate with 2" by 4" studs, 3 1/2" thick fiberglass insulation, 1" clear air space at plate, 2" by 4" plate with 2" by 4" studs, 5/8" direct nailed drywall (Owens/Corning Fiberglas OCF 448, 1967, 16f, STC 56)

(4) Same as #3 but with two layers of 3 1/2" thick fiberglass insulation (Riverbank Acoustical Labs TL 75-83, 1975, 16f, for U. S. Department of Agriculture, STC 57)

(5) Two layers 5/8" direct nailed drywall, 2" by 4" plate with 2" by 4" studs, 3 1/2" thick fiberglass insulation, 1" clear air space at plate, 2" by 4" plate with 2" by 4" studs, two layers 5/8" direct nailed drywall (National Gypsum Company, NGC 3056, 1970, 16f, for Gypsum Association, STC 58)

(6) Same as #5 but with two layers of 3 1/2" thick fiberglass insulation (Riverbank Acoustical Labs TL 75-82, 1975, 16f, for U. S. Department of Agriculture, STC 63)

All wall assemblies between any common space and a living unit must be an STC 50 minimum rated assembly. All plumbing, mechanical and electrical installations shall be installed per the instructions and details contained in Appendix 6. Add all appropriate details to the project plans.

E. ROOFTOP MECHANICAL INSTALLATIONS

All rooftop mechanical installations shall incorporate measures to insure 100 percent vibration isolation from the building structure as discussed in Section 5.5 found in the body of this report.

F. PROJECT DISCLOSURE

The acoustical code requirements represent minimal acceptable standards. Compliance with the Building Department acoustical criteria does not require, guarantee or even imply that local sound sources will be mitigated to inaudibility. Compliance with an exterior noise limit of 65 dBA CNEL means that exterior noise will remain clearly audible within the mitigated exterior space. Compliance with an interior noise limit of 45 dBA CNEL means that exterior noise sources will remain audible on the interior of a building.

Due to quality control and other field related problems, the code minimum laboratory ratings of STC/IIC 50 for common assemblies does not guarantee that all common assemblies will pass a field test. In fact, there is a 50 percent chance that half of all common assemblies rated at the STC/IIC minimum could fail field tests. An STC 50 rated assembly will produce around 45 dBA of voice reduction in the field. This means that normal conversation in adjoining units will be audible a certain percentage of the time.

Do not misrepresent the degree of exterior to interior or unit-to-unit acoustical isolation as anything more than meeting code during any phase of this project. Never, ever, use any form of the term "Soundproof" to describe any portion of this project.

G. CONSTRUCTION PHASE

There is a potential for construction phase noise impacts upon the adjacent animal shelter. Construction noise mitigation could include the following:

1. Erect a temporary sound barrier along the common property line between the project site and the adjacent animal shelter. A very effective noise barrier can be created by attaching 4' by 8' panels of 1/2" plywood or OSB on end and overlapping slightly to the length of the existing property line chain link fence. Depending on the height of the noise source and its distance from the barrier, a temporary sound barrier eight feet high could produce an average of 10 dBA of noise reduction on the animal shelter property. Alternately, or in conjunction with sections of temporary barriers, locating construction trailers and/or storage trailers/containers along the property line will achieve similar noise reduction results.

2. Locate all stationary noise sources as far from the animal shelter property as practically possible for each construction activity.

3. Prohibit the use of radios or other music reproduction devices within 50 feet of the common property line.

4. Maintain all construction equipment, especially engine exhaust mufflers, in like-new condition for the duration of the construction phase.

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1.0 INTRODUCTION

This revised report presents the results of a noise impact and design study of the proposed COURTYARD & TOWNEPLACE SUITES project located on Agoura Road in the City of Agoura Hills. This report includes a discussion of the expected exterior community noise environment and the recommendations for control of noise in the exterior and interior living spaces.

A vicinity map showing the general location of the project site is presented in Exhibit 1 – Site Location Map. An aerial photograph of the existing project site and its surroundings is shown on Exhibit 2. The project site plan is shown on Exhibit 3. The project consists of a three-story hotel building.

2.0 APPLICABLE NOISE CRITERIA

The City of Agoura Hills requires all residential projects to conform to the requirements of Table 1.

TABLE 1

APPLICABLE NOISE CRITERIA (1)

Exterior	65 dBA CNEL
Interior	45 dBA CNEL
Unit-to-Unit	STC 50/IIC 50

(1) Please see Noise Rating Methods (Appendix 1) for an explanation of the commonly applicable acoustical terminology.

3.0 EXISTING NOISE LEVELS

3.1 ROADWAYS

A measurement was performed on the site. The measurement was conducted using a Larson-Davis Model 700 Integrating Sound Level Meter. The average noise level reported from the measurement taken at a point 130 feet from the centerline of the Ventura Freeway (U.S. 101) was 70.2 dBA Leq. A measurement of Agoura Road was not possible due to extensive construction work along the roadway.

A ten minute traffic count was taken during the measurement period. The results of the count are listed in Table 2.

TABLE 2

OBSERVED TRAFFIC COUNT -- VENTURA FREEWAY

	AUTOS	MEDIUM TRUCKS	HEAVY TRUCKS	TOTAL
TEN MINUTES	1,397	94	57	1,548
HOURLY EQUIVALENT	8,382	564	342	9,288
PERCENTAGE	94.4	2.8	2.8	100.0

The primary function of the measurements is to calibrate the Noise Model (FHWA RD-77-108) used to compute the CNEL data. The model relies on the acoustical metric of the average noise level (Leq). By taking the traffic count during the measurement, calculating the Leq value for that traffic sample, and comparing it the measured Leq value, it is possible to calibrate the CNEL model for any factors that are present and not adequately identified in the prediction equations.

The Leq value computer calculation printout is contained in Appendix 2. The calculated and measured Leq values are compared in Table 3.

TABLE 3

COMPARISON OF CALCULATED AND MEASURED AVERAGE NOISE LEVELS

Calculated	80.9
Measured	70.2
DIFFERENCE	- 10.7

The results of Table 3 show that area terrain conditions produce shielding of the project site from the freeway noise sources. However, a more conservative shielding factor of only 6 dBA will be applied to the freeway design noise level (CNEL) calculations.

3.2 RAILROAD

There are no railroad operations in the vicinity of the project site. Railroad noise does not impact the site.

3.3 AIRCRAFT

There are no concentrated aircraft operations in the vicinity of the project site. Aircraft noise does not impact the site.

3.4 COUNTY ANIMAL SHELTER

The project site lies directly adjacent to a County operated animal shelter. This facility houses both large and small animals in various enclosures. It was noted during the site visit that intermittent noise was produced by the animal shelter (mainly barking dogs). Although animal shelter noise was indeed audible at the common property line, the animal shelter noise was so far below the average noise levels produced by the nearby Ventura Freeway that the animal shelter made no significant contribution to the total noise environment. It should also be noted that the City defines noise impacts using the CNEL 24-hour noise metric. Regardless of the actual animal shelter noise levels, noise from the animal shelter is so intermittent that the animal shelter CNEL value will likely never come close to the freeway CNEL value at the project site. Thus, the project exterior noise impact and the required noise mitigation will be defined by roadway noise alone. City staff is concerned that the sound of dogs barking might be more disturbing than freeway noise. In an otherwise quiet neighborhood, the sound of a barking dog can indeed be disturbing to some people. In the far louder noise environment at the project site, barking dogs will be no more disturbing than the far more frequent freeway sounds of heavy truck Jake brakes, loud motorcycles and horn use.

4.0 DESIGN NOISE LEVELS

4.1 ROADWAY

The expected future roadway noise impact was projected using the Federal Highway Administration's Highway Noise Prediction Model (FHWA RD-77-108) together with several roadway and site parameters that determine the projected impact of vehicular traffic noise. These include the roadway cross-section (e.g. number of lanes), the roadway active width, the average daily traffic (ADT), the vehicle travel speed, the percentage of auto and truck traffic, the roadway grade, the angle of view, the site conditions ("hard" or "soft" site), and the percentage of average daily traffic that flows each hour throughout a 24 hour period.

The Agoura Road future forecast traffic volume was estimated by applying a ten-year traffic projection, at a growth rate of two percent per year, to the existing traffic volume published in the document titled: City of Agoura Hills Final Report for the 2011 Engineering And Traffic Survey To Establish Speed Limits. The percentage of truck traffic was taken from a standard arterial mix. The same source was used to project the distribution by time of day. The input data is listed in Table 4.

TABLE 4

TRAFFIC INPUT DATA -- AGOURA ROAD

	% DAY	% EVENING	% NIGHT	% VOLUME
Autos	75.51	12.57	9.34	100.0
Medium Trucks	1.56	0.09	0.19	100.0
Heavy Trucks	0.64	0.02	0.08	100.0
Volume =	11,350 ADT			
Speed =	45 MPH			

The Ventura Freeway forecast traffic volume was obtained from CALTRANS data. CALTRANS data was also used for the percentage of truck traffic and to project the distribution by time of day. The input data is listed in Table 5 on the following page.

TABLE 5

TRAFFIC INPUT DATA -- VENTURA FREEWAY

	% DAY	% EVENING	% NIGHT	% VOLUME
Autos	73.00	8.60	18.40	95.8
Medium Trucks	73.00	8.60	18.40	1.8
Heavy Trucks	69.10	6.70	24.20	2.4

Volume = 212,000 ADT on Indianapolis

Speed = 65 MPH

The calculations are contained in Appendix 3. The calculations yield design noise levels of 66 dBA CNEL at 100 feet from the centerline of Agoura Road and 79 dBA CNEL at 100 feet from the centerline of the Ventura Freeway (-6 dBA shielding correction applied).

4.2 RAILROAD

Railroad noise is not expected to increase. Thus, railroad noise will not impact the project site.

4.3 AIRCRAFT

Aircraft noise is not expected to increase. Thus, aircraft noise will not impact the project site.

4.4 COUNTY ANIMAL SHELTER

Animal shelter noise levels, although sometimes audible, will never approach the noise levels of the Ventura Freeway on the project site. Regardless, animal shelter noise will automatically be mitigated by any project measures required to reduce freeway noise levels.

5.0 MITIGATION MEASURES

5.1 EXTERIOR

The City of Agoura Hills requires that exterior use areas of the project be mitigated to 65 dBA CNEL. The project proposes a large central courtyard that will be shielding from various exterior noise sources by the project building itself. The project also proposes a rooftop deck near the front of the building. The rooftop deck should also benefit from shielding by the project building. The assumptions for the shielding calculations are listed in Table 6.

TABLE 6

BARRIER ANALYSIS GENERAL ASSUMPTIONS
FOR RECEIVER AND SOURCE GEOMETRY

RECEIVER ASSUMPTIONS	
HORIZONTAL GEOMETRY	VERTICAL GEOMETRY
Distance behind top-of-roadways barrier: 5' to 10'	Height above pad for ground level receivers: 5'
Distance behind individual patio and balcony barriers: 1' to 3'	Height above pad for second level receivers: 14'

SOURCE ASSUMPTIONS		
HORIZONTAL GEOMETRY *	VERTICAL GEOMETRY	
For roadways with grades no greater than 2%, all vehicles were located at the single lane equivalent acoustic center of the full roadway. For roadways with over 2% grade, vehicle count was divided in half and located at the single lane equivalent acoustic center for each side of the roadway.	Automobiles:	0' above center of road grade
	Medium Trucks:	2.3' above center of road grade
	Heavy Trucks:	8' above center of road grade

* = Single Lane Equivalent (SLE) location.

The barrier shielding calculations are contained in Appendix 4. These calculations show that the proposed building structure will provide adequate noise shielding to ensure that future exterior noise levels will not exceed 65 dBA CNEL in the central courtyard and at the rooftop deck. No additional exterior noise mitigation is required.

5.2 INTERIOR

The City's exposure criteria for new residential construction require that the interior noise environment, attributable to outside noise sources, be limited to 45 dBA CNEL. Analysis and recommendations for control of outdoor-to-indoor noise intrusion are presented in this section.

The exterior-to-interior noise reduction expected for the planned construction was based on a detailed analysis of sample rooms and units planned for the development. Calculations of the expected typical noise reduction performance were performed for sample rooms. The analysis was based on the typical spectra expected for the primary sources of community noise impact, the typical octave-band transmission loss for each element in the planned building shell, the relative square footage of each element of the planned building shell, the expected typical interior surface treatment, and the acoustical absorption coefficient for each interior surface treatment. Corrections for the "A" Weighted room absorption factors are also included.

Each component of the building shell (e.g. exterior wall, windows, doors, etc.) provides a different amount of transmission loss for each "A" Weighted octave- band of community noise. With the knowledge of the building shell components and their individual octave band transmission loss values for the noise sources, calculations of the composite building shell transmission loss can be made for each room.

The characteristics of the basic building shell are listed in Table 7.

TABLE 7

BASIC BUILDING SHELL CHARACTERISTICS

PANEL	CONSTRUCTION
Exterior Wall	Siding or stucco, 2" X 4" studs, R-13 fiberglass insulation, 1/2" drywall
Windows	Double pane
Sliding Glass Door	Double pane
Roof	Shingle over 1/2" plywood, fiberglass insulation, 5/8" drywall, vented
Floor	Carpeted except kitchen and baths

Table 7 construction minimums will provide around 20 dBA of interior noise reduction which is acceptable for exterior noise levels as high as 65 dBA CNEL. For

convenience of assessment, the specific noise levels at the building faces are given in Table 8.

TABLE 8

NOISE LEVELS AT THE BUILDING FACES

FACE			
NORTH	EAST	SOUTH	WEST
76	70 - 73	66	70 - 73

The results of Table 8 show that interior noise reduction levels as high as 31 dBA will be required for units facing the Ventura Freeway. Since Table 7 construction will yield only around 20 dBA, specific room calculations were carried out to determine whether additional mitigation is needed.

The calculations are contained in Appendix 5, and the results are given in Table 9.

TABLE 9

ROOM NOISE REDUCTION VALUES

	NOISE REDUCTION VS. GLAZING STC							
ROOM	24	26	28	30	32	34	36	38
Double Queen	23	25	27	28	30	31	32	33
King	23	25	26	28	29	31	32	33
One Bedroom	20	22	24	26	27	28	29	30
Studio	22	24	25	27	28	29	30	31
One Bedroom*	21	23	25	26	28	30	31	33

The results of Table 9 show that Table 7 construction should be adequate for all units with the following exceptions:

(1) Add STC 36 glazing to all guest rooms facing the Ventura Freeway

(2) Add STC 32 glazing to all guest rooms facing east or west

(3) Add STC 26 glazing to all guest rooms facing south or into the central courtyard

(4) Add resilient channels to the exterior wall assemblies of all Studio and One Bedroom guest units facing north, east or west

(5) All through-wall HVAC units shall be sound rated at least STC 36

5.3 VENTILATION

If interior allowable noise levels are met by requiring that windows be unopenable or remain closed, then the design of the structure must also specify a ventilation or air conditioning system to provide a habitable interior environment. The ventilation system must not compromise the dwelling unit or guest room noise reduction.

5.4 UNIT-TO-UNIT NOISE CONTROL

Common floor/ceiling assemblies between units are subject to Title 24 Sound Transmission Class(STC) and Impact Insulation Class (IIC) requirements. The plan set provided for this analysis did not include common floor/ceiling assembly details. It is highly recommended that one of the following widely used common floor/ceiling assemblies, all of which rate at least STC 50, be incorporated into the building plans:

(1) 8" concrete slab (Riverbank Acoustical Labs, TL 76-77, 1977, 16f, Pre-stressed Concrete Institute, STC 58 -- IIC 71 with carpet, IIC 34 for bare floor)

(2) 1 1/2" lightweight concrete, sub-floor, R-11 insulation, resilient channel, drywall ceiling (Geiger and Hamme CCA-14MT, CCA-15MT, 1972, 16f, Cellular Concrete Associates, STC 60 --IIC 73 with carpet, IIC 47 with vinyl tile)

(3) 1 3/8" Gyp-Crete, sub-floor, 2" by 10" joists, R-11 insulation, resilient channel, 1/2" drywall ceiling (Riverbank Acoustical Labs TL 81-16, Gyp-Crete Corp., 1981, STC 60 -- Riverbank Acoustical Labs IN 81-14, Gyp-Crete Corp., 1981, IIC 51 with sheet vinyl)

As can be seen by the above list, some of the recommended assemblies cannot meet the IIC 50 minimum requirement without carpet. Uncarpeted areas above other living units will require some form of proprietary isolation product under the floor to achieve the required rating. Such products include Enkasonic, Acousti-Mat, Monsanto SC50, and others. Such products are designed to be installed atop the bare sub-floor and topped with either a LWC/Gyp-Crete pour or additional layers of plywood. Each product has its own specific installation requirements. These products can produce both design and field IIC compliance with sheet vinyl or wood flooring. While various lab tests have shown these same products to produce design IIC compliance when used with ceramic tile, field testing experience has proven that actual ceramic tile installations are marginal. The use of ceramic tile or marble flooring is not recommended, regardless of the installation method.

The plan set provided for this analysis did not include common wall assembly details. It is highly recommended that one of the following widely used common wall assemblies, all of which rate at least STC 50, be incorporated into the building plans:

(1) Two layers 1/2" direct nailed drywall, 2" by 6" plate, 2" by 4" staggered studs, fiberglass insulation, two layers 1/2" direct nailed drywall (Owens/Corning Fiberglas, OCF W-55-69, 1969, 16f, Owens/Corning Fiberglas, STC 54)

(2) Two layers 5/8" direct nailed drywall, 2" by 6" plate, 2" by 4" staggered studs, R-11 insulation, two layers 5/8" direct nailed drywall (National Gypsum Co. NGC 2376, 1970, 16f, STC 53)

(3) 5/8" direct nailed drywall, 2" by 4" plate with 2" by 4" studs, R-11 insulation, 1" airspace at plate, 2" by 4" plate with 2" by 4" studs, 5/8" direct nailed drywall (Owens/Corning Fiberglas OCF 448, 1967, 16f, STC 56)

(4) Same as #3 with two layers of R-11 insulation (Riverbank Acoustical Labs TL75-83, 1975, 16f, U.S. Department of Agriculture, STC 57)

(5) Two layers 5/8" drywall direct nailed, 2" by 4" plate with 2" x 4" studs, 1" air space, 2" by 4" plate with 2" by 4" studs, R-11 insulation, two layers 5/8" drywall (National Gypsum Co. NGC 3056, 1970, 16f, Gypsum Association, STC 58)

(6) Same as #5 with two layers of R-11 insulation (Riverbank Acoustical Labs TL 75-82, 1975, 16f, U.S. Department of Agriculture, STC 63)

All wall assemblies between any common space and a living unit must be an STC 50 minimum rated assembly. All Plumbing and electrical installations shall be installed per the instructions contained in Appendix 6. Put all details onto Plans.

5.5 ROOFTOP MECHANICAL EQUIPMENT

Improper installation of rooftop mechanical noise can transfer unwanted noise and vibration into the project building. In an effort to minimize noise and vibration impacts, all rooftop mechanical units shall be mounted atop a 3" thick concrete inertia pad using appropriate sized vibration isolating mounts such as those available from Mason Industries and others. Care shall be taken to ensure that required seismic limiters do not impede the desired travel of the vibration mounts. All electrical conduits between the roof and each rooftop mechanical unit shall be an approved flexible type conduit. All refrigerant, return and condensate lines shall be 100 percent isolated from the building structure using appropriate vibration isolating products available from Holdrite Systems or Acousti-Plumb. Preformed pipe insulation, expanding foam insulation or felt wrap products shall not be used to isolate pipes.

All ducting runs between rooftop mechanical units and the interior of the building shall employ some form of vibration isolating flexible joint between the mechanical unit and the duct run penetrating the roof diaphragm.

Rooftop mechanical units located within 50 feet of the rooftop deck shall be shielded from view using a solid screen wall at least one foot taller than the mechanical unit and extending around the three sides of the unit(s) nearest the rooftop deck.

5.6 PROJECT DISCLOSURE

The acoustical code requirements are minimal acceptable standards. Compliance with Building Department acoustical criteria does not require, guarantee or even imply that local sound sources will be mitigated to inaudibility. Compliance with an exterior noise limit of 65 dBA CNEL means that exterior noise will remain clearly audible within the mitigated exterior space. Compliance with an interior noise limit of 45 dBA CNEL means that exterior noise sources will remain audible on the interior of a structure.

Due to quality control and other field related problems, the code minimum laboratory rating of STC/IIC 50 for common assemblies does not guarantee that all common assemblies will pass a field test. In fact, there is a 50% chance that half of all laboratory rated STC/IIC 50 common assemblies could fail field tests. An STC 50 rated assembly will produce around 45 dBA of voice reduction in the field. This means that normal conversation in adjoining units will be audible a certain percentage of the time.

Do not misrepresent the degree of exterior to interior or unit to unit acoustical isolation as anything more than meeting code during any phase of this project. Never, ever, use any form of the term "Soundproof" to describe any portion of this project.

6.0 CONSTRUCTION NOISE

The City has expressed concern that noise produced by the project during the construction phase will disturb the animals at the adjacent animal shelter. Contrary to what animal activists often claim, past field measurement experience has shown that animals react to sound in a manner very similar to that of people. While a new sound source might at first startle and/or alert an animal, that animal soon comes to ignore the sound once it discovers that the sound does not equate to any danger.

In the case of the animal shelter adjacent to the project site, the animals are already subjected to a high noise environment caused by the proximity to the freeway. Intermittent construction impact noise might exceed the background average noise levels but it is unlikely that such sounds would adversely affect the animals. Regardless, certain mitigation steps can be taken to minimize the potential for adverse construction phase noise impacts. These steps include the following:

1. Erect a temporary sound barrier along the common property line between the project site and the adjacent animal shelter. A very effective noise barrier can be created by attaching 4' by 8' panels of 1/2" plywood or OSB on end and

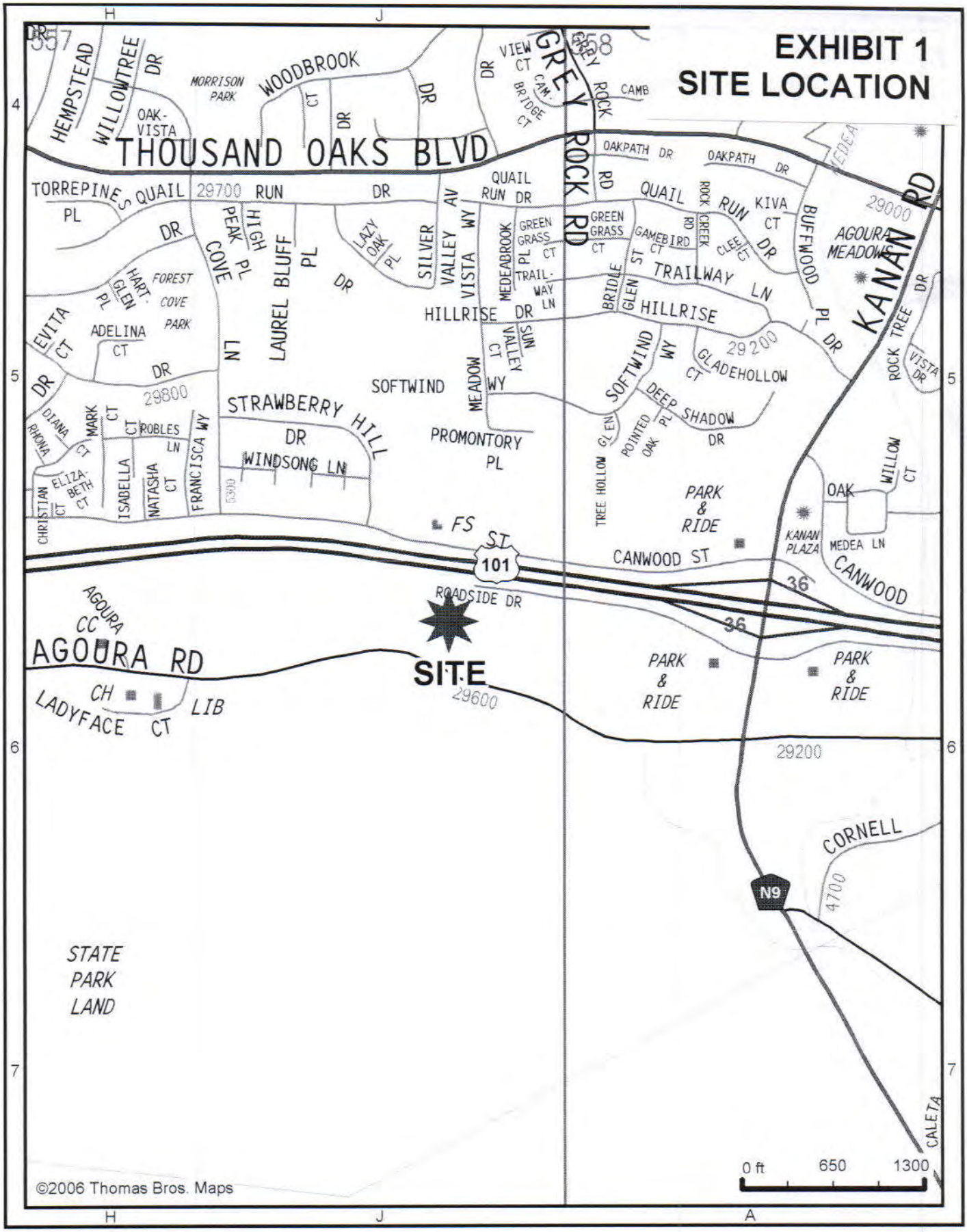
overlapping slightly to the length of the existing property line chain link fence. Depending on the height of the noise source and its distance from the barrier, a temporary sound barrier eight feet high could produce an average of 10 dBA of noise reduction on the animal shelter property. Alternately, or in conjunction with sections of temporary barriers, locating construction trailers and/or storage trailers/containers along the property line will achieve similar noise reduction results.

2. Locate all stationary noise sources as far from the animal shelter property as practically possible for each construction activity.

3. Prohibit the use of radios or other music reproduction devices within 50 feet of the common property line.

4. Maintain all construction equipment, especially engine exhaust mufflers, in like-new condition for the duration of the construction phase.

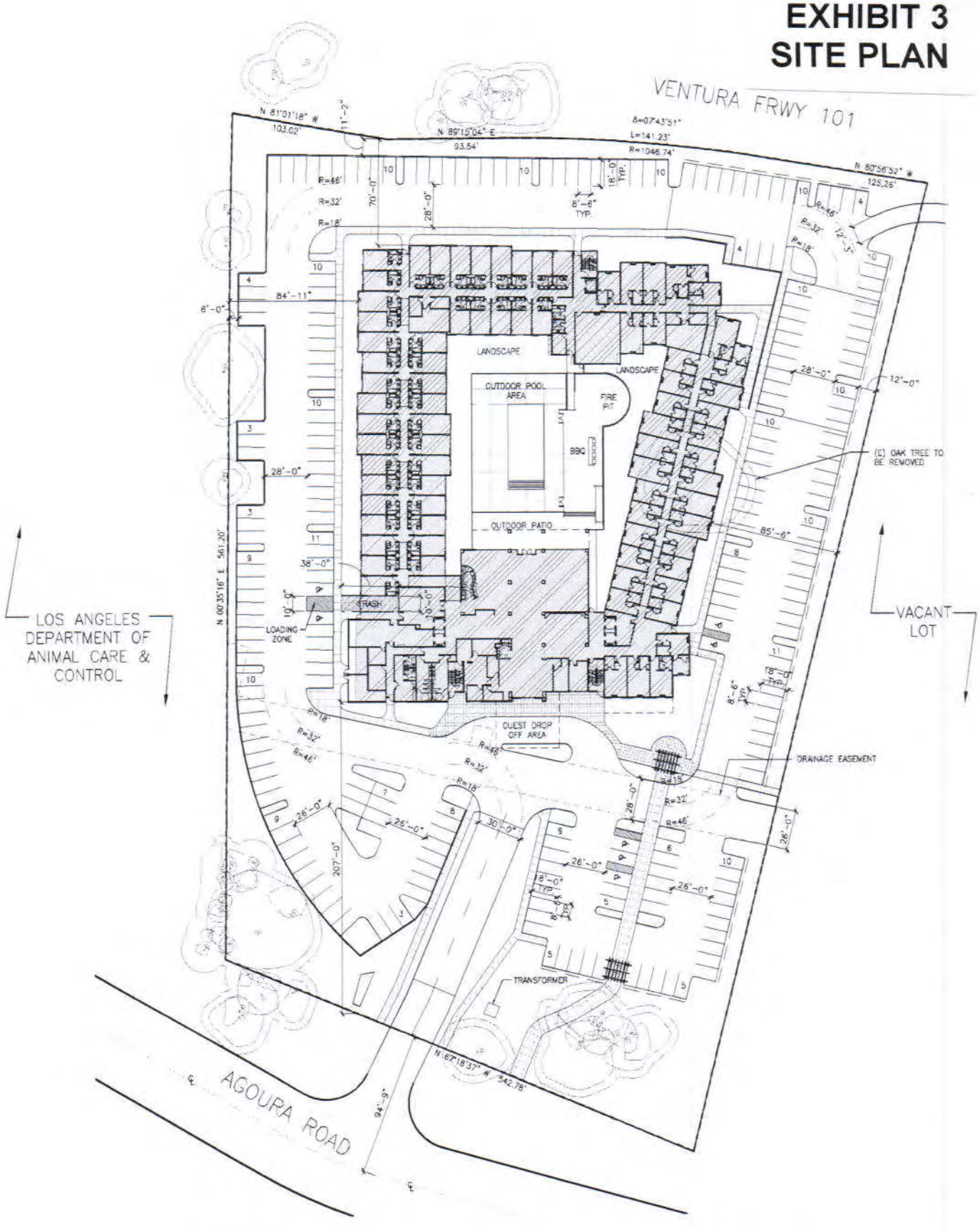
EXHIBIT 1
SITE LOCATION



SITE: 557 - J6

EXHIBIT 2
AERIAL PHOTO

EXHIBIT 3
SITE PLAN



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APPENDIX 1

NOISE RATING METHODOLOGY

P. O. BOX 2325 • FULLERTON, CALIFORNIA • 92837
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CHRISTOPHER JEAN & ASSOCIATES, INC.
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NOISE RATING METHODOLOGY

The A-weighted decibel (dBA) or "A" scale on a sound level meter is typically used for environmental noise measurements because the weighting characteristics of the "A" scale approximate the subjective response of the human ear to a broad frequency band noise source by discriminating against the very low and very high frequencies of the audible sound spectrum.

Since community noise is seldom constant, varying from moment to moment and throughout the day, the "A" weighted noise level needs to be further described to provide meaningful data. The Environmental Protection Agency, the Federal Department of Transportation, several foreign countries and many private consultants are now using three time-exceeded percentile figures to describe noise, which are:

(1) L_{90} is the noise level that is exceeded 90 percent of any sample measurement period (such as 24 hours) and is often used to describe the background or ambient noise level.

(2) L_{50} is the noise level that is exceeded 50 percent of any sample measurement period. It is generally considered to represent the median noise level.

(3) L_{10} is the noise level that is exceeded 10 percent of any sample measurement period. It is a good descriptor of fluctuating noise sources such as vehicular traffic. It indicates the near-maximum noise levels that occur for groups of single noise events. Being related to the subjective annoyance to community noise, the L_{10} is a good design tool in the planning of acoustical barriers.

More recent noise assessment methods are based on the equivalent energy concept where Leq(x) represents the average energy content of a fluctuating noise source over a sample measurement period. The subscript (x) represents the period over which the energy is computed and/or measured. Current practice references the time quantity to either one (1) hour, eight (8) hours, or twenty-four (24) hours. When referenced to one (1) hour, Leq is also called the HNL (Hourly Noise Level).

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Since Leq is the summation of the functional products of noise level and duration, many different combinations of noise levels, duration times and time histories can produce similar Leq values. Thus a value of Leq(24) equals 50 means only that the average noise level is 50 dB. During that 24-hour period, there can be times when the noise level is higher than 50 dB and times when it is lower than 50 dB.

If the period of the measurement is only a single event, the energy content is not averaged. The energy expression for a single event is simply the sum of the functional product of the noise level and duration time of the event. This term is called the Le or SENEL (Single Event Noise Exposure Level). The summation of Le values averaged over one hour is Leq(1), over eight hours is Leq(8), over 24 hours is Leq(24), etc.

Leq is further refined into Ldn (Level Day-Night) and CNEL (Community Noise Equivalent Level), where noise that occurs during certain hours of the day are weighted (or penalized) in an attempt to compensate for the general perception that such noise is more annoying during these time periods (typically evening and nighttime hours).

(1) Ldn is the sound level in dBA that corresponds to the average energy content of the noise being measured over a 24-hour period but includes a ten (10) dBA weighting penalty for noise that occurs during the nighttime hours between 10:00 PM and 7:00 AM. The Ldn is a noise rating method recommended by the Environmental Protection Agency because it takes into account those subjectively more annoying noise events that occur during normal sleeping hours.

(2) CNEL is the sound level in dBA that corresponds to the average energy content of the noise being measured over a 24-hour period but includes a five (5) dBA penalty for noise that occurs during the evening hours between 7:00 PM and 10:00 PM, and a ten (10) dBA penalty for noise that occurs during the nighttime hours between 10:00 PM and 7:00 AM. For typical highway vehicular traffic situations, computer analysis has shown that the Ldn and CNEL values correlate within 0.5 dBA.

The percentile figures L_{10}, L_{50} and L_{90} can be directly scaled from a graphical recording of the measured noise sample over a particular time period. These figures can also be measured directly using modern automatic noise measuring equipment. Measurement of the parameters Le, Leq, Ldn and CNEL requires even more sophisticated and correspondingly expensive noise measuring equipment. As a result, engineers have devised ways of estimating Leq (and hence, Ldn) using standard instrumentation and methods.

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APPENDIX 2

EXISTING TRAFFIC NOISE CALCULATIONS

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HOURLY NOISE LEVEL

PROJECT : COURTYARD & TOWNPLACE SUITES
STREET NAME : VENTURA FREEWAY
SITE TYPE : HARD

INPUT DATA

	AUTO	METK	HVTK
SPEED:	65	65	65
% VOLUME:	94.4	2.8	2.8

VOLUME = 11184
HVY TRK GRADIENT = 0 DBA

NOISE LEVEL

AUTO	82.4
MED.TRK.	76.7
HVY.TRK.	79.9
TOTAL	85.0

NOISE LEVEL AT 130 FT

AUTO	MEDIUM TRK	HEAVY TRK	TOTAL
78.3	72.5	75.7	80.9

LEQ AT SPECIFIED DISTANCES

DISTANCE	LEQ
50	85.0
75	83.3
100	82.0
125	81.0
150	80.3
175	79.6
200	79.0
250	78.0
300	77.2
350	76.6
400	76.0
450	75.5
500	75.0
550	74.6
600	74.2
650	73.9
700	73.6
750	73.3
800	73.0
1000	72.0

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APPENDIX 3

FUTURE TRAFFIC NOISE CALCULATIONS

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FHWA RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT NAME :COURTYARD & TOWNPLACE SUITES
SITE LOCATION :AGOURA HILLS
DESCRIPTION :AGOURA ROAD
SITE TYPE :HARD

INPUT DATA	AUTO	MEDIUM TRUCK	HEAVY TRUCK
SPEED	45	45	45
% DAY	75.51	1.56	.64
% EVENING	12.57	0.09	0.02
% NIGHT	9.34	.19	.08
% VOLUME	100	100	100
VOLUME	11350		

	----AVERAGE HOURLY NOISE LEVELS AT 50 FEET---- DAY	EVENING	NIGHT	24 HOUR	CNEL
AUTO	66.23	64.46	58.40	64.32	67.59
MEDIUM TRK.	59.60	53.24	51.71	57.31	60.38
HEAVY TRK.	60.40	51.36	52.61	58.02	61.08
TOTAL	67.93	64.97	60.10	65.89	69.09

NOISE LEVEL AT SPECIFIED DISTANCES

DISTANCE	CNEL
50	69.09
75	67.33
100	66.08
125	65.11
150	64.32
175	63.65
200	63.07
225	62.56
250	62.10
275	61.69
300	61.31
325	60.96
350	60.64
375	60.34
400	60.06
450	59.55
500	59.09
550	58.68
600	58.30
650	57.95
700	57.63
750	57.33
800	57.05

FHWA RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT NAME	:COURTYARD & TOWNPLACE SUITES
SITE LOCATION	:AGOURA HILLS
DESCRIPTION	:101 FREEWAY
SITE TYPE	:HARD

INPUT DATA	AUTO	MEDIUM TRUCK	HEAVY TRUCK
SPEED	65	65	65
% DAY	73	73	69.1
% EVENING	8.60	8.60	6.70
% NIGHT	18.4	18.4	24.2
% VOLUME	95.8	1.8	2.4
VOLUME	212000		

----AVERAGE HOURLY NOISE LEVELS AT 50 FEET----

	DAY	EVENING	NIGHT	24 HOUR	CNEL
AUTO	83.10	79.83	78.36	81.45	85.97
MEDIUM TRK.	75.39	72.12	70.65	73.74	78.26
HEAVY TRK.	79.58	75.46	76.27	78.17	83.37
TOTAL	85.17	81.69	80.88	83.60	88.32

NOISE LEVEL AT SPECIFIED DISTANCES

DISTANCE	CNEL
50	88.32
75	86.56
100	85.31
125	84.34
150	83.55
175	82.88
200	82.30
225	81.79
250	81.33
275	80.92
300	80.54
325	80.19
350	79.87
375	79.57
400	79.29
450	78.78
500	78.32
550	77.91
600	77.53
650	77.18
700	76.86
750	76.56
800	76.28

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APPENDIX 4

BUILDING NOISE SHIELDING CALCULATIONS

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BARRIER NOISE REDUCTION ANALYSIS,WALL HEIGHT VARIABLE

REFERENCE VEHICLE LEVELS AT 50 FEET

AUTO.....= 79.97
M.TRUCK.....= 72.26
H.TRUCK.....= 77.37

PROJECT.....COURTYARD & TOWNPLACE SUITES
DESCRIPTION..POOL AREA BUILDING SHIELDING
SOURCE ELEVATION..... 10
RECEIVER ELEVATION..... 0
BARRIER ELEVATION..... 0
RECEIVER HEIGHT..... 5
DISTANCE TO SOURCE..... 250
DISTANCE TO RECEIVER... 100
AUTO NOISE LEVEL..... 71.51902
M.TRK NOISE LEVEL..... 63.80902
H.TRK NOISE LEVEL..... 68.91902
SOURCE NOISE LEVEL..... 73.87

ANGULAR CORRECTION(DB) - 0

WALL HEIGHT	ANL	MTNL	HTNL	TNL	TIL
35.00	55.79	48.16	53.56	58.27	15.60
FN	5.5964	5.3825	4.7331		

BARRIER NOISE REDUCTION ANALYSIS,WALL HEIGHT VARIABLE

REFERENCE VEHICLE LEVELS AT 50 FEET

AUTO.....= 79.97
M.TRUCK.....= 72.26
H.TRUCK.....= 77.37

PROJECT.....COURTYARD & TOWNPLACE SUITES
DESCRIPTION..SECOND FLOOR COURTYARD NOISE LEVELS
SOURCE ELEVATION..... 10
RECEIVER ELEVATION..... 10
BARRIER ELEVATION..... 0
RECEIVER HEIGHT..... 5
DISTANCE TO SOURCE..... 250
DISTANCE TO RECEIVER... 100
AUTO NOISE LEVEL..... 71.51902
M.TRK NOISE LEVEL..... 63.80902
H.TRK NOISE LEVEL..... 68.91902
SOURCE NOISE LEVEL..... 73.87

ANGULAR CORRECTION(DB) - 0

WALL HEIGHT	ANL	MTNL	HTNL	TNL	TIL
35.00	57.62	50.10	55.84	60.27	13.60
FN	3.1782	3.0185	2.5405		

BARRIER NOISE REDUCTION ANALYSIS,WALL HEIGHT VARIABLE

REFERENCE VEHICLE LEVELS AT 50 FEET

AUTO.....= 79.97
M.TRUCK.....= 72.26
H.TRUCK.....= 77.37

PROJECT.....COURTYARD & TOWNPLACE SUITES
DESCRIPTION..THIRD FLOOR COURTYARD NOISE LEVELS
SOURCE ELEVATION..... 10
RECEIVER ELEVATION..... 20
BARRIER ELEVATION..... 0
RECEIVER HEIGHT..... 5
DISTANCE TO SOURCE..... 250
DISTANCE TO RECEIVER... 100
AUTO NOISE LEVEL..... 71.51902
M.TRK NOISE LEVEL..... 63.80902
H.TRK NOISE LEVEL..... 68.91902
SOURCE NOISE LEVEL..... 73.87

ANGULAR CORRECTION(DB) - 0

WALL HEIGHT	ANL	MTNL	HTNL	TNL	TIL
35.00	60.48	53.03	58.99	63.24	10.63
FN	1.4154	1.3100	1.0033		

BARRIER NOISE REDUCTION ANALYSIS,WALL HEIGHT VARIABLE

REFERENCE VEHICLE LEVELS AT 50 FEET

AUTO.....= 79.97
M.TRUCK.....= 72.26
H.TRUCK.....= 77.37

PROJECT.....COURTYARD & TOWNPLACE SUITES
DESCRIPTION..ROOF DECK SHIELDING
SOURCE ELEVATION..... 10
RECEIVER ELEVATION..... 30
BARRIER ELEVATION..... 0
RECEIVER HEIGHT..... 5
DISTANCE TO SOURCE..... 250
DISTANCE TO RECEIVER... 175
AUTO NOISE LEVEL..... 70.67581
M.TRK NOISE LEVEL..... 62.96582
H.TRK NOISE LEVEL..... 68.07581
SOURCE NOISE LEVEL..... 73.03

ANGULAR CORRECTION(DB) - 0

WALL HEIGHT	ANL	MTNL	HTNL	TNL	TIL
35.00	62.60	55.23	61.34	65.46	7.57
FN	0.5058	0.4317	0.2359		

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APPENDIX 5

INTERIOR NOISE REDUCTION CALCULATIONS

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WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME DOUBLE QUEEN + STC = 24

FLOOR AREA 250

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		76	0.00760
EXT.WALL 2	43		24	0.00120
EXT.WALL 3	50		0	0.00000
INT.WALL			389	
WINDOW 1	22	.05	31	0.19560
WINDOW 2	25	.05	0	0.00000
WINDOW 3	32	.05	0	0.00000
SGD	22	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	250	0.00791
FLOOR		.6	250	
ET*S				0.21231
-10LOG(ET*S)				6.7
10LOGA				22.6
NOISE REDUCTION				23.3

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME DOUBLE QUEEN + STC = 26

FLOOR AREA 250

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		76	0.00760
EXT.WALL 2	43		24	0.00120
EXT.WALL 3	50		0	0.00000
INT.WALL			389	
WINDOW 1	24	.05	31	0.12341
WINDOW 2	27	.05	0	0.00000
WINDOW 3	34	.05	0	0.00000
SGD	24	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	250	0.00791
FLOOR		.6	250	
ET*S				0.14012
-10LOG(ET*S)				8.5
10LOGA				22.6
NOISE REDUCTION				25.1

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME DOUBLE QUEEN + STC = 28

FLOOR AREA 250

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		76	0.00760
EXT.WALL 2	43		24	0.00120
EXT.WALL 3	50		0	0.00000
INT.WALL			389	
WINDOW 1	26	.05	31	0.07787
WINDOW 2	29	.05	0	0.00000
WINDOW 3	36	.05	0	0.00000
SGD	26	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	250	0.00791
FLOOR		.6	250	
ET*S				0.09458
-10LOG(ET*S)				10.2
10LOGA				22.6
NOISE REDUCTION				26.8

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME DOUBLE QUEEN + STC = 30

FLOOR AREA 250

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		76	0.00760
EXT.WALL 2	43		24	0.00120
EXT.WALL 3	50		0	0.00000
INT.WALL			389	
WINDOW 1	28	.05	31	0.04913
WINDOW 2	31	.05	0	0.00000
WINDOW 3	38	.05	0	0.00000
SGD	28	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	250	0.00791
FLOOR		.6	250	
ET*S				0.06584
-10LOG(ET*S)				11.8
10LOGA				22.6
NOISE REDUCTION				28.4

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME DOUBLE QUEEN + STC = 32

FLOOR AREA 250

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		76	0.00760
EXT.WALL 2	43		24	0.00120
EXT.WALL 3	50		0	0.00000
INT.WALL			389	
WINDOW 1	30	.05	31	0.03100
WINDOW 2	33	.05	0	0.00000
WINDOW 3	40	.05	0	0.00000
SGD	30	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	250	0.00791
FLOOR		.6	250	
ET*S				0.04771
-10LOG(ET*S)				13.2
10LOGA				22.6
NOISE REDUCTION				29.8

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME DOUBLE QUEEN + STC = 34

FLOOR AREA 250

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		76	0.00760
EXT.WALL 2	43		24	0.00120
EXT.WALL 3	50		0	0.00000
INT.WALL			389	
WINDOW 1	32	.05	31	0.01956
WINDOW 2	35	.05	0	0.00000
WINDOW 3	42	.05	0	0.00000
SGD	32	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	250	0.00791
FLOOR		.6	250	
ET*S				0.03627
-10LOG(ET*S)				14.4
10LOGA				22.6
NOISE REDUCTION				31.0

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME DOUBLE QUEEN + STC = 36

FLOOR AREA 250

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		76	0.00760
EXT.WALL 2	43		24	0.00120
EXT.WALL 3	50		0	0.00000
INT.WALL			389	
WINDOW 1	34	.05	31	0.01234
WINDOW 2	37	.05	0	0.00000
WINDOW 3	44	.05	0	0.00000
SGD	34	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	250	0.00791
FLOOR		.6	250	
ET*S				0.02905
-10LOG(ET*S)				15.4
10LOGA				22.6
NOISE REDUCTION				31.9

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME DOUBLE QUEEN + STC = 38

FLOOR AREA 250

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		76	0.00760
EXT.WALL 2	43		24	0.00120
EXT.WALL 3	50		0	0.00000
INT.WALL			389	
WINDOW 1	36	.05	31	0.00779
WINDOW 2	39	.05	0	0.00000
WINDOW 3	46	.05	0	0.00000
SGD	36	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	250	0.00791
FLOOR		.6	250	
ET*S				0.02450
-10LOG(ET*S)				16.1
10LOGA				22.6
NOISE REDUCTION				32.7

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME KING + STC = 24

FLOOR AREA 208

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		73	0.00730
EXT.WALL 2	43		0	0.00000
EXT.WALL 3	50		0	0.00000
INT.WALL			363	
WINDOW 1	22	.05	31	0.19560
WINDOW 2	25	.05	0	0.00000
WINDOW 3	32	.05	0	0.00000
SGD	22	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	208	0.00658
FLOOR		.6	208	
ET*S				0.20947
-10LOG(ET*S)				6.8
10LOGA				21.9
NOISE REDUCTION				22.6

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME KING + STC = 26

FLOOR AREA 208

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		73	0.00730
EXT.WALL 2	43		0	0.00000
EXT.WALL 3	50		0	0.00000
INT.WALL			363	
WINDOW 1	24	.05	31	0.12341
WINDOW 2	27	.05	0	0.00000
WINDOW 3	34	.05	0	0.00000
SGD	24	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	208	0.00658
FLOOR		.6	208	
ET*S				0.13729
-10LOG(ET*S)				8.6
10LOGA				21.9
NOISE REDUCTION				24.5

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME KING + STC = 28

FLOOR AREA 208

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		73	0.00730
EXT.WALL 2	43		0	0.00000
EXT.WALL 3	50		0	0.00000
INT.WALL			363	
WINDOW 1	26	.05	31	0.07787
WINDOW 2	29	.05	0	0.00000
WINDOW 3	36	.05	0	0.00000
SGD	26	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	208	0.00658
FLOOR		.6	208	
ET*S				0.09175
-10LOG(ET*S)				10.4
10LOGA				21.9
NOISE REDUCTION				26.2

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME KING + STC = 30

FLOOR AREA 208

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		73	0.00730
EXT.WALL 2	43		0	0.00000
EXT.WALL 3	50		0	0.00000
INT.WALL			363	
WINDOW 1	28	.05	31	0.04913
WINDOW 2	31	.05	0	0.00000
WINDOW 3	38	.05	0	0.00000
SGD	28	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	208	0.00658
FLOOR		.6	208	
ET*S				0.06301
-10LOG(ET*S)				12.0
10LOGA				21.9
NOISE REDUCTION				27.9

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME KING + STC = 32

FLOOR AREA 208

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		73	0.00730
EXT.WALL 2	43		0	0.00000
EXT.WALL 3	50		0	0.00000
INT.WALL			363	
WINDOW 1	30	.05	31	0.03100
WINDOW 2	33	.05	0	0.00000
WINDOW 3	40	.05	0	0.00000
SGD	30	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	208	0.00658
FLOOR		.6	208	
ET*S				0.04488
-10LOG(ET*S)				13.5
10LOGA				21.9
NOISE REDUCTION				29.3

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME KING + STC = 34

FLOOR AREA 208

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		73	0.00730
EXT.WALL 2	43		0	0.00000
EXT.WALL 3	50		0	0.00000
INT.WALL			363	
WINDOW 1	32	.05	31	0.01956
WINDOW 2	35	.05	0	0.00000
WINDOW 3	42	.05	0	0.00000
SGD	32	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	208	0.00658
FLOOR		.6	208	
ET*S				0.03344
-10LOG(ET*S)				14.8
10LOGA				21.9
NOISE REDUCTION				30.6

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME KING + STC = 36

FLOOR AREA 208

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		73	0.00730
EXT.WALL 2	43		0	0.00000
EXT.WALL 3	50		0	0.00000
INT.WALL			363	
WINDOW 1	34	.05	31	0.01234
WINDOW 2	37	.05	0	0.00000
WINDOW 3	44	.05	0	0.00000
SGD	34	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	208	0.00658
FLOOR		.6	208	
ET*S				0.02622
-10LOG(ET*S)				15.8
10LOGA				21.9
NOISE REDUCTION				31.7

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME KING + STC = 38

FLOOR AREA 208

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		73	0.00730
EXT.WALL 2	43		0	0.00000
EXT.WALL 3	50		0	0.00000
INT.WALL			363	
WINDOW 1	36	.05	31	0.00779
WINDOW 2	39	.05	0	0.00000
WINDOW 3	46	.05	0	0.00000
SGD	36	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	208	0.00658
FLOOR		.6	208	
ET*S				0.02166
-10LOG(ET*S)				16.6
10LOGA				21.9
NOISE REDUCTION				32.5

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME ONE BEDROOM + STC = 24

FLOOR AREA 127

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		72	0.00720
EXT.WALL 2	43		76	0.00381
EXT.WALL 3	50		0	0.00000
INT.WALL			180	
WINDOW 1	22	.05	24	0.15143
WINDOW 2	25	.05	15	0.04743
WINDOW 3	32	.05	0	0.00000
SGD	22	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	127	0.00402
FLOOR		.6	127	
ET*S				0.21389
-10LOG(ET*S)				6.7
10LOGA				19.7
NOISE REDUCTION				20.4

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME ONE BEDROOM + STC = 26

FLOOR AREA 127

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		72	0.00720
EXT.WALL 2	43		76	0.00381
EXT.WALL 3	50		0	0.00000
INT.WALL			180	
WINDOW 1	24	.05	24	0.09555
WINDOW 2	27	.05	15	0.02993
WINDOW 3	34	.05	0	0.00000
SGD	24	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	127	0.00402
FLOOR		.6	127	
ET*S				0.14050
-10LOG(ET*S)				8.5
10LOGA				19.7
NOISE REDUCTION				22.2

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME ONE BEDROOM + STC = 28

FLOOR AREA 127

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		72	0.00720
EXT.WALL 2	43		76	0.00381
EXT.WALL 3	50		0	0.00000
INT.WALL			180	
WINDOW 1	26	.05	24	0.06029
WINDOW 2	29	.05	15	0.01888
WINDOW 3	36	.05	0	0.00000
SGD	26	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	127	0.00402
FLOOR		.6	127	
ET*S				0.09419
-10LOG(ET*S)				10.3
10LOGA				19.7
NOISE REDUCTION				24.0

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME ONE BEDROOM + STC = 30

FLOOR AREA 127

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		72	0.00720
EXT.WALL 2	43		76	0.00381
EXT.WALL 3	50		0	0.00000
INT.WALL			180	
WINDOW 1	28	.05	24	0.03804
WINDOW 2	31	.05	15	0.01191
WINDOW 3	38	.05	0	0.00000
SGD	28	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	127	0.00402
FLOOR		.6	127	
ET*S				0.06498
-10LOG(ET*S)				11.9
10LOGA				19.7
NOISE REDUCTION				25.6

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME ONE BEDROOM + STC = 32

FLOOR AREA 127

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		72	0.00720
EXT.WALL 2	43		76	0.00381
EXT.WALL 3	50		0	0.00000
INT.WALL			180	
WINDOW 1	30	.05	24	0.02400
WINDOW 2	33	.05	15	0.00752
WINDOW 3	40	.05	0	0.00000
SGD	30	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	127	0.00402
FLOOR		.6	127	
ET*S				0.04654
-10LOG(ET*S)				13.3
10LOGA				19.7
NOISE REDUCTION				27.0

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME ONE BEDROOM + STC = 34

FLOOR AREA 127

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		72	0.00720
EXT.WALL 2	43		76	0.00381
EXT.WALL 3	50		0	0.00000
INT.WALL			180	
WINDOW 1	32	.05	24	0.01514
WINDOW 2	35	.05	15	0.00474
WINDOW 3	42	.05	0	0.00000
SGD	32	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	127	0.00402
FLOOR		.6	127	
ET*S				0.03491
-10LOG(ET*S)				14.6
10LOGA				19.7
NOISE REDUCTION				28.3

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME ONE BEDROOM + STC = 36

FLOOR AREA 127

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		72	0.00720
EXT.WALL 2	43		76	0.00381
EXT.WALL 3	50		0	0.00000
INT.WALL			180	
WINDOW 1	34	.05	24	0.00955
WINDOW 2	37	.05	15	0.00299
WINDOW 3	44	.05	0	0.00000
SGD	34	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	127	0.00402
FLOOR		.6	127	
ET*S				0.02757
-10LOG(ET*S)				15.6
10LOGA				19.7
NOISE REDUCTION				29.3

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME ONE BEDROOM + STC = 38

FLOOR AREA 127

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		72	0.00720
EXT.WALL 2	43		76	0.00381
EXT.WALL 3	50		0	0.00000
INT.WALL			180	
WINDOW 1	36	.05	24	0.00603
WINDOW 2	39	.05	15	0.00189
WINDOW 3	46	.05	0	0.00000
SGD	36	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	127	0.00402
FLOOR		.6	127	
ET*S				0.02294
-10LOG(ET*S)				16.4
10LOGA				19.7
NOISE REDUCTION				30.1

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME STUDIO + STC = 24

FLOOR AREA 187

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		92	0.00920
EXT.WALL 2	43		101	0.00506
EXT.WALL 3	50		0	0.00000
INT.WALL			219	
WINDOW 1	22	.05	31	0.19560
WINDOW 2	25	.05	0	0.00000
WINDOW 3	32	.05	0	0.00000
SGD	22	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	187	0.00591
FLOOR		.6	187	
ET*S				0.21577
-10LOG(ET*S)				6.7
10LOGA				21.3
NOISE REDUCTION				22.0

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME STUDIO + STC = 26

FLOOR AREA 187

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		92	0.00920
EXT.WALL 2	43		101	0.00506
EXT.WALL 3	50		0	0.00000
INT.WALL			219	
WINDOW 1	24	.05	31	0.12341
WINDOW 2	27	.05	0	0.00000
WINDOW 3	34	.05	0	0.00000
SGD	24	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	187	0.00591
FLOOR		.6	187	
ET*S				0.14359
-10LOG(ET*S)				8.4
10LOGA				21.3
NOISE REDUCTION				23.7

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME STUDIO + STC = 28

FLOOR AREA 187

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		92	0.00920
EXT.WALL 2	43		101	0.00506
EXT.WALL 3	50		0	0.00000
INT.WALL			219	
WINDOW 1	26	.05	31	0.07787
WINDOW 2	29	.05	0	0.00000
WINDOW 3	36	.05	0	0.00000
SGD	26	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	187	0.00591
FLOOR		.6	187	
ET*S				0.09804
-10LOG(ET*S)				10.1
10LOGA				21.3
NOISE REDUCTION				25.4

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME STUDIO + STC = 30

FLOOR AREA 187

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		92	0.00920
EXT.WALL 2	43		101	0.00506
EXT.WALL 3	50		0	0.00000
INT.WALL			219	
WINDOW 1	28	.05	31	0.04913
WINDOW 2	31	.05	0	0.00000
WINDOW 3	38	.05	0	0.00000
SGD	28	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	187	0.00591
FLOOR		.6	187	
ET*S				0.06931
-10LOG(ET*S)				11.6
10LOGA				21.3
NOISE REDUCTION				26.9

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME STUDIO + STC = 32

FLOOR AREA 187

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		92	0.00920
EXT.WALL 2	43		101	0.00506
EXT.WALL 3	50		0	0.00000
INT.WALL			219	
WINDOW 1	30	.05	31	0.03100
WINDOW 2	33	.05	0	0.00000
WINDOW 3	40	.05	0	0.00000
SGD	30	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	187	0.00591
FLOOR		.6	187	
ET*S				0.05118
-10LOG(ET*S)				12.9
10LOGA				21.3
NOISE REDUCTION				28.2

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME STUDIO + STC = 34

FLOOR AREA 187

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		92	0.00920
EXT.WALL 2	43		101	0.00506
EXT.WALL 3	50		0	0.00000
INT.WALL			219	
WINDOW 1	32	.05	31	0.01956
WINDOW 2	35	.05	0	0.00000
WINDOW 3	42	.05	0	0.00000
SGD	32	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	187	0.00591
FLOOR		.6	187	
ET*S				0.03974
-10LOG(ET*S)				14.0
10LOGA				21.3
NOISE REDUCTION				29.3

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME STUDIO + STC = 36

FLOOR AREA 187

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		92	0.00920
EXT.WALL 2	43		101	0.00506
EXT.WALL 3	50		0	0.00000
INT.WALL			219	
WINDOW 1	34	.05	31	0.01234
WINDOW 2	37	.05	0	0.00000
WINDOW 3	44	.05	0	0.00000
SGD	34	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	187	0.00591
FLOOR		.6	187	
ET*S				0.03252
-10LOG(ET*S)				14.9
10LOGA				21.3
NOISE REDUCTION				30.2

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME STUDIO + STC = 38

FLOOR AREA 187

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	40		92	0.00920
EXT.WALL 2	43		101	0.00506
EXT.WALL 3	50		0	0.00000
INT.WALL			219	
WINDOW 1	36	.05	31	0.00779
WINDOW 2	39	.05	0	0.00000
WINDOW 3	46	.05	0	0.00000
SGD	36	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	187	0.00591
FLOOR		.6	187	
ET*S				0.02796
-10LOG(ET*S)				15.5
10LOGA				21.3
NOISE REDUCTION				30.8

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME ONE BEDROOM + UPGRADED WALLS + STC = 24

FLOOR AREA 127

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	50		72	0.00072
EXT.WALL 2	53		76	0.00038
EXT.WALL 3	60		0	0.00000
INT.WALL			180	
WINDOW 1	22	.05	24	0.15143
WINDOW 2	25	.05	15	0.04743
WINDOW 3	32	.05	0	0.00000
SGD	22	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	127	0.00402
FLOOR		.6	127	
ET*S				0.20398
-10LOG(ET*S)				6.9
10LOGA				19.7
NOISE REDUCTION				20.6

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME ONE BEDROOM + UPGRADED WALLS + STC = 26

FLOOR AREA 127

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	50		72	0.00072
EXT.WALL 2	53		76	0.00038
EXT.WALL 3	60		0	0.00000
INT.WALL			180	
WINDOW 1	24	.05	24	0.09555
WINDOW 2	27	.05	15	0.02993
WINDOW 3	34	.05	0	0.00000
SGD	24	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	127	0.00402
FLOOR		.6	127	
ET*S				0.13059
-10LOG(ET*S)				8.8
10LOGA				19.7
NOISE REDUCTION				22.6

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME ONE BEDROOM + UPGRADED WALLS + STC = 28

FLOOR AREA 127

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	50		72	0.00072
EXT.WALL 2	53		76	0.00038
EXT.WALL 3	60		0	0.00000
INT.WALL			180	
WINDOW 1	26	.05	24	0.06029
WINDOW 2	29	.05	15	0.01888
WINDOW 3	36	.05	0	0.00000
SGD	26	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	127	0.00402
FLOOR		.6	127	
ET*S				0.08429
-10LOG(ET*S)				10.7
10LOGA				19.7
NOISE REDUCTION				24.5

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME ONE BEDROOM + UPGRADED WALLS + STC = 30

FLOOR AREA 127

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	50		72	0.00072
EXT.WALL 2	53		76	0.00038
EXT.WALL 3	60		0	0.00000
INT.WALL			180	
WINDOW 1	28	.05	24	0.03804
WINDOW 2	31	.05	15	0.01191
WINDOW 3	38	.05	0	0.00000
SGD	28	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	127	0.00402
FLOOR		.6	127	
ET*S				0.05507
-10LOG(ET*S)				12.6
10LOGA				19.7
NOISE REDUCTION				26.3

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME ONE BEDROOM + UPGRADED WALLS + STC = 32

FLOOR AREA 127

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	50		72	0.00072
EXT.WALL 2	53		76	0.00038
EXT.WALL 3	60		0	0.00000
INT.WALL			180	
WINDOW 1	30	.05	24	0.02400
WINDOW 2	33	.05	15	0.00752
WINDOW 3	40	.05	0	0.00000
SGD	30	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	127	0.00402
FLOOR		.6	127	
ET*S				0.03663
-10LOG(ET*S)				14.4
10LOGA				19.7
NOISE REDUCTION				28.1

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME ONE BEDROOM + UPGRADED WALLS + STC = 34

FLOOR AREA 127

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	50		72	0.00072
EXT.WALL 2	53		76	0.00038
EXT.WALL 3	60		0	0.00000
INT.WALL			180	
WINDOW 1	32	.05	24	0.01514
WINDOW 2	35	.05	15	0.00474
WINDOW 3	42	.05	0	0.00000
SGD	32	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	127	0.00402
FLOOR		.6	127	
ET*S				0.02500
-10LOG(ET*S)				16.0
10LOGA				19.7
NOISE REDUCTION				29.7

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME ONE BEDROOM + UPGRADED WALLS + STC = 36

FLOOR AREA 127

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	50		72	0.00072
EXT.WALL 2	53		76	0.00038
EXT.WALL 3	60		0	0.00000
INT.WALL			180	
WINDOW 1	34	.05	24	0.00955
WINDOW 2	37	.05	15	0.00299
WINDOW 3	44	.05	0	0.00000
SGD	34	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	127	0.00402
FLOOR		.6	127	
ET*S				0.01766
-10LOG(ET*S)				17.5
10LOGA				19.7
NOISE REDUCTION				31.2

WORK SHEET FOR CALCULATING ROOM NOISE REDUCTION VALUE

ROOM NAME ONE BEDROOM + UPGRADED WALLS + STC = 38

FLOOR AREA 127

SURFACES	TL	@	AREA	T*S
EXT.WALL 1	50		72	0.00072
EXT.WALL 2	53		76	0.00038
EXT.WALL 3	60		0	0.00000
INT.WALL			180	
WINDOW 1	36	.05	24	0.00603
WINDOW 2	39	.05	15	0.00189
WINDOW 3	46	.05	0	0.00000
SGD	36	.05	0	0.00000
DOORS	0	.04	0	0.00000
ROOF	45	.04	127	0.00402
FLOOR		.6	127	
ET*S				0.01303
-10LOG(ET*S)				18.8
10LOGA				19.7
NOISE REDUCTION				32.6

CHRISTOPHER JEAN & ASSOCIATES, INC.
ACOUSTICAL CONSULTING SERVICES

APPENDIX 6

PLUMBING AND ELECTRICAL INSTALLATIONS

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PHONE: 714-805-0115

CHRISTOPHER JEAN & ASSOCIATES
ACOUSTICAL CONSULTING SERVICES

PLUMBING NOISE REDUCTION REQUIREMENTS FOR COMPLIANCE WITH THE CALIFORNIA CODE OF REGULATIONS TITLE 24, PART 2, APPENDIX CHAPTER 35

REQUIRED PLUMBING DESIGN FEATURE IN COMON WALL AND FLOOR/CEILING ASSEMBLIES

The plumbing system, by its nature, can degrade the acoustical integrity of a common wall or floor/ceiling assembly. This is primarily due to the fact that the plumbing system, a sound carrier and a sound source, is generally attached to the studs, plates, joists and drywall of a building's walls and floors. In order to alleviate the problem of plumbing system noise, one hundred percent of the plumbing system must be isolated from the building structure (not just at the common assemblies). Special installation requirements are necessary in order to:

(1) reduce the level of noise from the plumbing system, and

(2) isolate the total plumbing system from the building structure.

These special isolation procedures may be accomplished by using an approved commercial isolation system. Hard plastic "isolators" are **NOT** acceptable. Examples of approved commercial isolation systems in order of preference are:

(1) "Acousto-Plumb" ™ system by Specialty Products, Inc. (www.ispproducts.com),

(2) Holdrite Silencer System by Holdrite, Inc. (www.holdrite.com), and

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(3) the felt lined series of isolators, clamps and hangers from Tolco, Inc.

Only when appropriate commercial isolation products are not available for unusual applications or extra large pipe sizes, will it be acceptable to use high density, 1/4" thick, 2" wide, adhesive backed felt wrap and/or 1/2" thick pre-formed, self-adhesive foam rubber pipe insulation such as Armaflex or Rubatex. If the felt wrap or pre-formed pipe insulation is used, great care must be taken not to compress the insulation material when strapping or anchoring the attachment points. Use of expanding foam products as plumbing isolation is **strictly prohibited**.

SUPPLY LINES

- All hot and cold water pipes, fittings and valves shall NEVER come in direct contact with either the building structure framing or drywall. Supply lines are to be isolated using Acousto-Plumb, Holdrite Silencer System, Tolco I.S.P. felt lined isolator products, 1/4" high density felt wrap or 1/2" pre-formed pipe insulation. Acousto-Plumb products and installation details can be found at www.lspproducts.com. Holdrite Silencer System products and installation details can be found at www.holdrite.com. Tolco I.S.P. products can be found at www. cooperindustries.com. Installation details for use of felt wrap or pre-formed pipe insulation are available upon request and approval. If felt wrap or pre-formed pipe insulation are used (and only with prior written approval by the acoustical consultant when appropriate commercial isolation products cannot be located), these installation details must be followed to the letter. No deviations from these details will be allowed.

- All sink and shower faucets, spouts and risers shall be isolated with resilient gaskets that are positioned between the faucet, spout or riser and its mounting surface.

- Water supply stub-outs shall be temporarily isolated from the drywall using the Acousto-Sleeve ™ during drywall installation, and then permanently isolated using the Acousto-Scutcheon ™ or resilient caulking and a standard plumbing escutcheon.

- Water pressure shall not exceed 65 psi.

- Shower head flow restrictors shall be used to limit water flow to less than three (3) gallons per minute.

- The pipe stubs commonly installed to combat water hammer are not effective. A commercially produced water hammer device consisting of a bellows, similar to that made by Plumbing Products, Inc., is recommended.

- Sections of the plumbing supply system employing PEX (cross linked polyethylene tubing) do not require acoustical isolation except where it transitions to or from conventional copper lines.

WASTE LINES

- The cavity under plastic or fiberglass tubs and showers shall be packed with fiberglass or spray-on insulation materials and/or lightweight concrete pours. The bottoms of such tubs shall be blocked or supported by lightweight concrete to reduce drumming.

- All waste lines above the slab and at the penetrations of any floor/ceiling assemblies and any walls (including non-common walls) shall be cast iron. The use of ABS waste lines is not recommended. If ABS is used, the entire framing cavity surrounding the ABS pipe shall be completely packed with fiberglass, mineral wool or spray–on adhesive cellulose insulation materials. All elbows below toilet and tub waste outlets shall be isolated from all positioning blocks using carpet padding or high-density 1/4" felt material. The entire framing cavity surrounding these elbows shall be completely packed with fiberglass, mineral wool or spray-on adhesive cellulose insulation materials.

- Waste lines of a diameter greater than two and a half inches (2.5") shall never be installed in a wall framed with less than 2" by 6" studs. Walls framed with 2" by 4" studs simply don't allow sufficient clearance to properly insulate and isolate waste lines and/or avoid pipe contact with the drywall.

Failure to COMPLETELY isolate the plumbing system from the building structure will result in a significant transfer of plumbing noise into the building. Therefore, it is important that all of the above measures and techniques are employed. Collectively, these measures and techniques act as parts of a complete system, each designed to perform a particular function of the total effort. Any circumvention of the function of any one component, whether intentional or not, will ultimately lessen the effectiveness of the entire system. **QUALITY CONTROL IS CRITICAL TO PROPER PLUMBING SYSTEM ISOLATION**.

CHRISTOPHER JEAN & ASSOCIATES, INC.
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ELECTRICAL SYSTEM INSTALLATION NOTES

The following items shall be incorporated into the building plans:

COMMON WALLS

- Electrical outlets, switches, phone jacks, television antennae boxes and computer outlet boxes installed in opposite sides of a common wall shall be offset a minimum of 24" to comply with the fire code. This offset is not needed for acoustical reasons if insulation is used in the framing cavities and Lowry's #10 putty pads or 3M fire pads are applied around the backs and sides of all outlets, switches, phone jacks, etc.
- All electrical outlets, switches, phone jacks, television antennae boxes and computer outlet boxes installed in common walls shall be backed by and Lowry's #10 putty pads, 3M fire pads or equivalent. Pads shall be stapled to the studs to insure that they remain in place indefinitely (the adhesive backing of the pads deteriorates over time).
- Wiring shall avoid crossing over the air gap of common walls. Where unavoidable, wiring crossovers between common wall studs shall include a loop where the depth is equal to its width.
- Electrical panel boxes, fixture boxes or outlet boxes greater than 25 square inches shall be set in raised boxes that do not touch the opposite side of the common wall.

COMMON FLOOR/CEILINGS

- Recessed lighting shall be set in recessed and airtight boxes made of plywood or drywall.
- All other precautions applicable to common wall installations shall also apply to common floor/ceiling installations.

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November 19, 2015

MR. PETER J. KRUSE
KRUSE DEVELOPMENT SERVICES
3247 Sitio Oceano
Carlsbad, California 92009

SUBJECT: PLAN CHECK COMMENT RESPONSES -- ACOUSTICAL ANALYSIS COURTYARD & TOWNEPLACE SUITES -- CITY OF AGOURA HILLS

Dear Mr. Kruse:

The City's Plan Check comments for the Acoustical Analysis 15/086 prepared for the Courtyard & Towneplace Suites project located on Agoura Road in teh City of Agoura Hills have been reviewed. The responses are as follows.

Reviewer Comment:

Page 8, Section 3.4 says that dog barking noise is less than freeway noise, so "project exterior noise impacts will be defined by the roadway noise alone." Yet, animal barking noise can be more disturbing than freeway noise, so this ambient condition needs to be addressed for the project site.

Response:

The City of Agoura Hills defines environmental noise impacts upon this project using the Community Noise Equivalent Level (CNEL). This is a time penalized 24-hour average noise level designed to account for increased sensitivity to noise during the evening and nighttime sleeping hours. It is not based on individual noise events, although such events, if

frequent enough during a 24 hour period, can contribute to the CNEL value. The project site and surrounding areas are dominated by the noise from the freeway which is nearly constant and already at levels higher than the barking dog sounds observed during the site visit. Future freeway noise levels, as examined in the analysis will be even higher. Interior noise mitigation designed to reduce the future freeway noise will also reduce animal noises an equal amount on the interior of the project building.

To illustrate why dog barking does not significantly add to the noise impacts on the project, let's postulate the scenario that the animal shelter produces a worst-case 5,000 barks of one second duration in a 24-hour period with barking noise levels as high as 80 dBA at the common property line (dog barking levels observed during the site visit were not this high). If 60% of the barking occurs during the day, 10% occurs in the evening, and the remaining 30% occurs at night, the resulting CNEL value of the dog barking at the common property would be 74 dBA CNEL. Projecting this worst-case level out to the nearest project building face at a rate of -6 dBA per doubling of distance reduces this level to only 65 dBA CNEL which is well below the 70-73 dBA CNEL freeway noise levels along this same building face. To claim that the lesser noise levels from barking dogs would be more disturbing than the 5 to 8 dBA higher noise levels produced by passing heavy trucks, Jake brakes, motorcycles and horns is simply incorrect. Since the project mitigation designed to reduce the freeway noise levels to 45 dBA CNEL will also reduce the noise of barking dogs by an equal amount, the issue is adequately addressed by the required interior noise mitigation.

Reviewer Comment:

Page 9 says the "Agoura Road forecast traffic volume was obtained by applying a ten year traffic projection, at a growth rate of two percent per year, to the existing traffic volume published by the Traffic Engineering Department of the City of Agoura Hills..." Please state how this information was obtained.

Response:

This statement in the acoustical report has been revised to read, "The Agoura Road future forecast traffic volume was estimated by applying a ten-year traffic projection, at a growth rate of two percent per year, to the existing traffic volume published in the document titled: City of Agoura Hills Final Report for the 2011 Engineering And Traffic Survey To Establish Speed Limits."

The above document was found on the Traffic Engineering Department's page of the City of Agoura Hills web site. This document states the existing traffic volume on the segment of Agoura Road between Ladyface Court and Kanan Road is 9,316 ADT. Thus, the future traffic volume was estimated at 11,350 ADT.

Reviewer Comment:

The acoustic analysis should also consider construction impacts to animals at the County Animal shelter. The report should incorporate short term mitigation measures to minimize impacts to the animals.

Response:

A section discussing construction phase noise impacts and possible mitigation measures has been added to the revised acoustical report. This section recommends creating a temporary noise barrier by attaching plywood panels to the existing property line fence and/or locating construction office and storage trailers/containers along the property line to shield the animal shelter property from construction noise. Several operational measures are also included.

Reviewer Comment:

Additionally, the Project Disclosure on page 16 of the report suggests that there will still be noise audible inside the hotel rooms with construction techniques incorporated. Could the impact be reduced even further to reach an acceptable level of comfort inside, especially on the north elevation of the building facing the freeway?

Response:

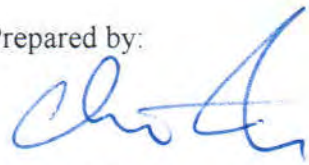
The disclaimer statement is included as a means of protecting this consultant, the project builder, the project owner, and the City of Agoura Hills from frivolous lawsuits initiated by people who do not understanding the limitations of sound mitigation. To the general public, the term "soundproofed" means silence, a condition that nobody but a totally deaf person can ever claim to have experienced. Even if a particular noise environment could be mitigated to approach silence, we would never experience actual silence because we start to hear our own bodily functions once the noise environment is reduced to around 25 dBA.

The Uniform Building Code already defines a level of 45 dBA CNEL to be an acceptable interior noise environment for residential structures, including sleeping rooms. The proposed project construction with the required interior noise mitigation incorporated will provide 31 dBA of exterior to interior noise reduction along the north face of the project building. This will be sufficient to comply with the 45 dBA CNEL UBC interior standard.

The reason that exterior noise sources will remain audible inside the hotel guest rooms is that the 45 dBA CNEL standard is based on average noise levels, not maximum levels. Thus, individual noise events such as a single motorcycle pass-by could produce levels inside the building higher than 45 dBA and would probably be audible inside the building. The fact that certain noise sources will remain audible is not a failure on the part of the building design or noise mitigation measures. It is simply a reality that all parties need to understand and accept.

Thank you, and if there are any questions, please do not hesitate to contact me.

Prepared by:



Christopher Jean
President