



# City of Santa Barbara California

## STAFF HEARING OFFICER STAFF REPORT

**REPORT DATE:** November 11, 2009  
**AGENDA DATE:** November 18, 2009  
**PROJECT ADDRESS:** 2430 Pine Drive (MST2009-00300)  
**TO:** Susan Reardon, Senior Planner, Staff Hearing Officer  
**FROM:** Planning Division, (805) 564-5470  
 Renee Brooke, AICP, Senior Planner *RLB*  
 Roxanne Milazzo, Associate Planner *RM*

### I. PROJECT DESCRIPTION

The 55,368 square foot project site is currently developed with a 3,068 square foot single family residence and attached 680 square foot garage. The proposed project involves the construction of an additional detached 954 square foot unit with an attached 478 square foot garage and 445 square feet of attached accessory space. The discretionary application required for this project is a Performance Standard Permit to permit an additional one-family dwelling on a one-family residentially zoned lot (SBMC §28.93.030.E).

Date Application Accepted: September 14, 2009 Date Action Required: December 14, 2009

### II. RECOMMENDATION

Staff recommends that the Staff Hearing Officer approve the project, subject to a condition.

### III. SITE INFORMATION AND PROJECT STATISTICS

#### A. SITE INFORMATION

Applicant:	Bruce Burnworth	Property Owner:	Same
Parcel Number:	049-100-021	Lot Area:	55,368 sf
General Plan:	5 Units Per Acre	Zoning:	E-3/PUD
Existing Use:	One-Family Residence	Topography:	14% Slope

#### Adjacent Land Uses:

North – Hyw 101 and SPRR	East - Multi-Family Residential
South – One-Family Residential	West – One-Family Residential

**B. PROJECT STATISTICS**

	<b>Existing Unit</b>	<b>Proposed Additional Unit</b>
Living Area	3,410 sf	954 sf
Garage	780 sf	478 sf
Accessory Space	320 sf detached	445 sf attached

**C. PROPOSED LOT AREA COVERAGE**

Building: 2,910 sf 8%      Hardscape: 9,185 sf 16%      Landscape: 41,981 sf 76%

**IV. ZONING ORDINANCE CONSISTENCY**

Chapter 28.93 of the Municipal Code provides opportunity for additional dwelling units on single family lots through the approval of a Performance Standard Permit (PSP). The criteria for granting a PSP requires that there be adequate lot area, egress and ingress, and that the location of the additional dwelling complies with all applicable ordinances.

The subject property is zoned E-3 which requires a minimum lot area of 7,500 square feet. Pursuant to SBMC §28.15.080, this E-3 zoned lot with its 14% slope requires 1½ times that amount for a total of 11,250 square feet per unit. This 57,287 square foot property provides adequate lot area for two residences. Access to the lot and ingress/egress to each unit will be provided by the existing driveway and the proposed improvements as shown on the plan. The proposed structure meets all current Zoning requirements. The new residence is subject to review and approval by the Single Family Design Board, prior to submitting for building permits.

**V. FINDINGS AND CONDITIONS**

The Staff Hearing Officer finds that the Performance Standard Permit complies with all standards of SBMC §28.93.030.E. including adequate lot area for two residential units, with associated existing accessory space, and adequate ingress and egress for each residence.

Said approval is subject to implementation and compliance with the noise mitigation measures outlined in Exhibit D.

Exhibits:

- A. Site Plan (under separate cover)
- B. Applicant's letter dated September 14, 2009
- C. SFDB Minutes
- D. Noise Mitigation Recommendations dated October 5, 2009

Contact/Case Planner: Roxanne Milazzo, Associate Planner  
(rmilazzo@SantaBarbaraCA.gov)  
630 Garden Street, Santa Barbara, CA 93101  
Phone: (805) 564-5470

2430 Pine Drive  
Santa Barbara, CA 93105  
September 14, 2009

Staff Hearing Officer  
Attn: Roxanne Milaso  
Community Development Department  
City of Santa Barbara  
630 Garden Street  
Santa Barbara, CA

**Subject: Application for Small, Efficient, Green, Passive, Zero Net Energy  
Additional House**

Dear Staff Hearing Officer:

I am seeking approval of a small, efficient, green second house on a large (1.3 acre) parcel and need Staff Hearing Officer Approval. In preparing for this application, I have met with numerous City staff from Planning, Building & Safety, Fire and Public Works as well as various neighbors. On August 31, 2009 the Single Family Design Board provided positive comments and indicated that they are inclined to grant preliminary approval when the house is brought back to them after Staff Hearing Officer approval. I had a pre-application consultation with Roxanne Milaso to confirm that the project is supportable and that the process consisted of SFDB positive comments, SHO approval, SFDB Preliminary Approval, SFDB Final Approval and Building Permit.

The proposed project reflects City desires for more small and efficient housing units that are green by design. This type of housing helps meet the need for more affordable housing and reduces the City's carbon footprint and use of limited resources. The proposed house will rely primarily on passive features such as super-insulation and triple glazed windows. Solar panels will allow the house to achieve zero net energy. The only energy source will be the sunshine that falls on the building.

At the present time I find myself needing more affordable housing. After my divorce two years ago and with my kids either graduated from college or in college, I found myself living in a 3,000 plus SF house on the property by myself. To make things worse as the economy slowed, I found myself marginally working as an independent consultant with little income. To top this off, the loan against the house that I needed to settle the divorce combined with the reduction in housing values has put my house upside down with me owing more than the property is worth.

Approval of this small, efficient, green, zero net energy additional house will allow me to live efficiently in the new house and rent out the existing house to a family that can more appropriately use the larger space.

In recent years I have extensively researched housing placement, design and construction techniques that are environmentally friendly and reduce our impact on the environment worldwide. I am just finishing a house near Bishop for my son that exceeds the title 24 requirements by over 35%. The house includes Insulated Concrete Form (ICF) walls, Structural Insulated Panels (SIPs), triple-glazed windows and radiant floor

Exhibit B

2430 Pine Dr. Additional House  
September 14, 2009

heating among other green features that reduce use of resources and construction waste.

My proposed small, efficient, green, zero net energy additional house will expand on what I learned while building an environmentally friendly house for my son. My further research has found additional features that will reduce the impact of the house on the environment and facilitate me living in the house more efficiently. For example, the proposed house will have a green roof and exceed Title 24 requirements by more than 50%.

Recently I attended a City-sponsored program on green construction. I found that while the City was encouraging the use of at least one item from each of several categories, I am using all of the items from all of the categories and many more not mentioned.

Highlights of the proposed green and sustainable features include:

**Green Site Features:**

- All paving will be permeable pavers to allow water to filter into the soil
- Ribbon driveway will be used where possible with the driving surface being permeable
- Existing bio-swales at each end of the property will be enhanced to allow additional percolation and further clean any water that leaves the site
- A thick layer of reused garden waste from the County mulch program reduces landscape water use, increases on-site water percolation and naturally fertilizes the soil
- Existing kitchen and garden trimming composting will be continued and enhanced
- Native and other drought tolerant landscaping specially suited to the site (tested through years of use) will be maintained, propagated onsite and improved
- More coast live oaks will be planted to supplement over 100 oaks that have already been planted primarily around the perimeter of the property
- The building footprint will be small with the living area over the garage/storage in the basement
- The existing noise berm that reduces noise in the entire neighborhood will be maintained and enhanced by putting the house into the existing berm and restoring the berm against the house
- Roof and surface runoff will be captured in an 18" diameter horizontal cistern (capped culvert) and used to water a vegetable garden, landscaping and fruit trees
- Native planting and refuge areas will be enhanced for wildlife habitat
- Boulders/stone on-site will be used for dry creek beds, borders and around the base of the house
- The existing garbage and recycling area will be used for both houses further reducing environmental waste
- A 70 foot diameter fire truck turnaround will allow improved fire truck access to the neighborhood and reduce the massive environmental waste associated with structure fires
- Sprinklers inside the house will reduce risks associated with structure fires thereby reducing environmental waste. Sprinklers will also reduce environmental waste associated with adding a fire hydrant that would otherwise be needed with

the furthest corner of the house approximately 570 feet from the hydrant along the road

- The house and driveway have been sited to minimize the environmental waste associated with re-grading of the site and relocation of the existing storm drain culvert

**Green Building Features:**

- Roof to be completely covered with solar panels and green (sedum) roof
- Small, efficient, green, zero net energy additional house will exceed Title 24 requirements by at least 50%
- Insulated Concrete Form (ICF) walls, triple-glazed windows and foam insulated roof panels will super insulate the building from noise and temperature extremes
- Integral color stucco will be used with no need for exterior paint
- Curved metal roof will provide extended serviceability and conservation of important construction materials (fewer materials used for construction and the longer service life will require fewer resources in the future).
- Passive solar orientation of windows will use free solar heat
- Roof overhangs will reduce solar gain during warmer times of the year
- Solar power will also be used to generate all electricity used by the house and pre-heat water for domestic hot water
- Two small instantaneous hot water heaters will be used to elevate water temperatures for domestic hot water
- Each room will have a south facing operable window to provide fresh air from the non-freeway side of the house
- Additional fresh air will be provided by an internal fresh air circulation, filtering and heat exchange ventilation unit
- A central air shaft will bring cool basement air into the living area via a dumb waiter shaft
- Interior flooring will be colored concrete with area rugs (no carpet)
- Interior walls will be integral color plaster over foam (no wallboard or paint)
- Gray water reuse will provide toilet water and landscaping water
- ICF walls and roof panels will minimize construction site waste
- Residential fire sprinklers will reduce long term waste by limiting damage from fires

A term is now emerging around the country that describes super insulated passive houses as "postgreen" homes because they go far beyond typical "green" homes.

**Neighbors:** The house is sited on the property to not only minimize environmental effects and resource use but also to minimize effects on neighbors. The proposed house is far away from neighbors on Pine Drive with the house set back approximately 208 feet from Pine Drive. The proposed house will be set back 22 feet from the 40 Pine Drive parcel. Existing trees and shrubs will be enhanced with additional plantings to create a multi-layered green screen. The taller side of the house faces the freeway but will be barely visible from freeway users through trees and other existing landscaping. Two windows face the adjoining Vista Madera housing development front yards and private road with a side yard setback of 73 feet. Large shrubbery suffering from severe leaf curl was recently removed by the Vista Madera Homeowners Association (VMHOA). This shrubbery has been replanted to some extent by the VMHOA. Continued growth of

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existing planting along with new planting by VMHOA and me will re-establish the green screen that previously existed between the two properties.

During the project concept development, each neighbor was contacted and provided concept plans along with a description of the project and my contact information. In addition each immediate neighbor was contacted to get input on the specific building site. Eight alternative sites were evaluated, compared and reviewed with the Fire Department and neighbors. The result of this effort was that site 5, the proposed site, was clearly preferred as every other site either did not meet Fire Department requirements or had one or more neighbors objecting.

With resource use and waste use minimized and no import or export of dirt, the construction impacts along Pine Drive will be minimized. With much of the work on the house and landscaping performed by me, the number of construction work trips will be minimized. The ICF and roof panels will minimize the number and duration of workers on the site.

The square footages of existing and proposed project features are detailed in the attached project statistic sheets. In summary, a small, efficient, green, passive, zero net energy additional house with 950 square foot one bedroom living space is proposed above a garage and basement. The garage and basement area will be used for vehicles, storage, gray water system, solar controls, heat exchange, air circulation, tankless hot water and filtering equipment.

The existing house (2430 Pine Drive) and storage shed will remain. The existing house will be rented to a family that can more appropriately use the larger space. The overall parcel is 1.3 acres with a net square footage of 55,368. No existing trees will be removed for the construction.

**Access:** The proposed house is accessed from the public street portion of Pine Drive. The parcel has 120 feet of frontage along Pine Drive measured at the rear of the front yard setback. The proposed project will provide an emergency vehicle turnaround for the neighborhood.

**Zoning:** The property is within the E3/PUD zone District. The minimum lot size is 7,500 square feet with additional area required depending on average slope. The average slope of the parcel is 13% which increases the minimum lot size to 11,250 square feet. Dividing the existing lot in half for calculation purposes would result in two lots at 27,684 square feet thereby meeting the additional house lot size requirements.

**FAR:** For calculation purposes, the 27,684 square foot lot size (half the lot) was used to calculate Floor Area Ratios. The proposed additional house would have an FAR of 7% which is 37% of the FAR guideline. (Using the same calculation method would result in an FAR for the existing house of 16% or 87% of the guideline FAR).

**Drainage:** The existing drainage system will be maintained and enhanced. The front portion of the lot drains toward the bio-swale constructed parallel to Pine Drive (historical water course). The rear portion of the lot drains toward the bio-swale (more of a basin) at the rear of the lot. Water falling on the roof of the proposed small house will be filtered with some retention by the green roof. Roof runoff will be collected and placed into the existing horizontal cistern for use in garden and landscape watering. The 18 inch

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diameter horizontal cistern will hold 1,325 gallons and is equipped with a filter at the inlet and removable stops and a hose bib at the outlet. Rain water falling on the ground on the Pine Drive side of the small house will be collected through the filter on the inlet side of the horizontal cistern and retained for garden and landscape watering. The inlet filter will be enhanced using horizontal drain pipes placed in drainage rock with filter fabric. This enhanced inlet filter will allow large amounts of rain runoff to enter the horizontal cistern as clean, filtered water. Overflow from the horizontal cistern will flow down the rock creek bed and across the bio-swale/basin area before entering a culvert that takes the clean water through the lower berm. Once through the lower berm, the water is dissipated and spread on rock rip rap before entering the railroad right of way where it has historically been deposited. Heavy use of mulch, native and drought tolerant landscaping, bio-swales/basins, permeable paving, small building footprints and cistern storage all significantly reduce rain runoff, clean any runoff that does occur and facilitate groundwater recharge.

Permeable paving and landscaping areas are detailed in the attached site statistics sheets. All paving on the site will either be gravel over the appropriate amount of base or permeable pavers over base. The base will be designed and compacted to meet Fire Department requirements. The permeable paving has been minimized while still meeting Fire Department requirements for a 70 foot diameter turnaround.

**Grading:** Grading will be limited to the amount of grading required to place the proposed house in the existing noise berm and construct the driveway to the rear of the house. After construction of the house, the berm will be replaced back against the house to re-establish the effective noise screen. The earth left over from the small house footprint (approximately 380 CY) will be placed on the relatively flat lower part of the property (a little over one foot thick).

**Adjacent Uses:** The adjacent zoning on the south, east and west is E-3/PUD. On the north is the railroad and US 101 right of way. The single family lots to the west and south range in size from less than 6,000 square feet to approximately 22,000 square feet. The larger parcel to the west has an approved lot split which would reduce the lot size to approximately 11,000 square feet. The PUD condominium development to the east is accessed by a private road that serves 20 condominiums.

**Lighting:** All exterior lighting for the existing and proposed house is down lighting with no light fixtures emitting light that would shine onto neighboring properties. This down lighting is either placed in the eaves or using down light fixtures placed on walls.

No cellulose burning fireplaces exist or are proposed.

**Noise:** Noise from the freeway and railroad are mitigated by the existing earth berms and timber sound wall. The following decibel readings indicate the effectiveness of the existing noise mitigations and are based on instantaneous decibel meter readings. At times the noise levels are higher and during much of the day the noise levels are lower. On a typical day the decibel readings are as follows:

Freeway side of sound wall:	75 to 80 decibels
Pine Drive side of sound wall:	70 to 75 decibels
Top of newer noise berm:	65 to 70 decibels
Pine Drive side of newer noise berm:	60 to 65 decibels

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The proposed house will further mitigate noise levels with the following features:

- Insulated Concrete Form (ICF) walls will include 5 inches of foam and 6 inches of reinforced concrete.
- Windows will be triple-glazed.
- The roof will be insulated with a combination of spray and board foam with a green roof on top.
- The existing noise berm will be re-established on the side of the house.
- Fresh air inside the house will be provided by operable windows on the south side of the house (away from the freeway) and an internal fresh air circulation, heat exchange, and air filtration unit.

The ICF walls, foam insulation, triple-glazed windows, foam ceiling insulation and green roof will make the inside of the house extremely quite. As an example of this, the house I am finishing near Bishop for my son also has ICF walls, triple-glazed windows and foam ceiling insulation. I was on one side of the wall and a worker was on the other side of the wall. I tried to communicate with the worker and was unable to get him to even hear that I was talking after yelling as loud as I could and he was only 15 inches away from me.

**Soils:** A soils report was prepared for the existing house construction and the engineered fill compaction was confirmed with numerous compaction tests.

**Natural Habitat for Wildlife:** The sloped area of the lot closest to the railroad has been landscaped to facilitate natural habitat for wildlife. Many types of wildlife have been seen in this area including skunks, raccoons, coyote, and numerous birds. This area will be maintained and enhanced with the meadow type landscaping between the base on the newer berm and the older berm.

**Duration of Construction:** Once permits are issued, it is expected that construction of the project will take approximately two years. Initially the house foundation will be dug, underground utilities placed and excess fill placed (on the lower portion of the dirt road). The Fire Department turnaround will be completed during this phase. This initial activity will take approximately three months. Then the concrete foundation and ICF walls will be poured (approximately three months). The roof panels will then be placed followed by the exterior windows and doors (approximately two months). The stucco will then be placed on the outside (approximately three months). Earth backfill will then be placed, the sandstone wall base constructed and driveway down to the garage completed (approximately three months). Finally the interior finishing of the house will be completed along with the placement of solar panels and green roof (approximately 6 months).

**Equipment:** Equipment used at the site will include a backhoe/forklift, hand compactors, and concrete truck/pump. Workers at the site will vary but most days will only include one or two workers (one being me). Special concrete pour and stucco days (about six days over about 6 months) will include approximately six workers. Adequate parking exists on-site for all construction equipment and workers.

No hazardous materials are known to exist on the site and materials such as fuel and lubricants used on the site will be carefully contained.

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September 14, 2009

The proposed small, efficient, green, zero net energy additional house will be an asset to the community and a great example of a house that minimizes its ecological and urban footprint. It will also provide me with affordable housing and low operating costs. I look forward to your questions and approval of this exciting project.

Please contact me with any questions.

Sincerely,



Bruce Burnworth  
805-403-9323

Attachments:

- Zoning Ordinance Excerpt: Additional Dwelling Units
- Plans (4 sets)
- Site Pictures
- Project Statistics Spreadsheet
- Preliminary Title Report (2 copies)
- Waiver of Hydrology Calculations
- Soils Report
- Minutes from SFDB

## 2430 PINE DRIVE – SINGLE FAMILY DESIGN BOARD REVIEW MINUTES

**July 20, 2009**

Bill Henry, Vista Madera HOA: expressed concern with two additional years of construction impacts to Vista Madera Condominiums.

Leanne Simandle, Vista Madera HOA: expressed concern for negative visual impacts to the Vista Madera.

Phyllis Raiter, Vista Madrea HOA: the project is too close to Vista Madera.

Motion: Site Concept Review is continued indefinitely to Full Board with the comment that the applicant is to restudy an alternate location for the house. The Board is not in favor of the site as presented.

Action: Woolery/Carroll, 7/0/0. Motion carried.

**August 3, 2009**

Deanna Jimenez, opposed: concerned about view and privacy impacts.

Bill Henry, opposed: concerned about the proximity to Vista Madera, prefers proposed location #5.

Two letters in opposition from Matt Kourakis and board of Vista Madera HOA, and from Paula Westbury were acknowledged.

Motion: Approval of location #5 as the appropriate site location.

Action: Zink/Deisler. 4/2/0. (Carroll and Mosel opposed. Bernstein stated that she will only support a single-story project on the site.)

Deanna Jimenez: requested clarification of the floor to lot area ratio; style and metal roof not compatible for the site.

Motion: Continued indefinitely to the Full Board with the following comments:

1) Restudy the architecture for location #5, give special consideration to the problems associated with digging down of the garage.

2) Show the pre-grade and finished grade on sections and elevations.

Action: Zink/Bernstein, 5/1/0. Motion carried. (Mosel opposed. Woolery absent.)

**August 17, 2009**

Motion: Continued indefinitely to the Full Board carrying forward the comments from August 3, 2009

**August 31, 2009**

Motion: Continued to the Staff Hearing Officer for approval of a Performance Standard Permit and return on Full Board with the following comments:

- 1) Eliminate the uncovered parking in front of the house.
- 2) Show finished grade contour lines around the house, particularly at the property line and driveway.
- 3) Show that grading will not negatively impact Oak trees on the site.
- 4) Restudy the architecture of the front porch.
- 5) Provide a color board.
- 6) Provide information about the green roof.

Action: Zink/Deisler, 5/0/1. Motion approved. (Bernstein abstained, Carroll absent.)

2430 Pine Drive  
Santa Barbara, CA 93105  
October 5, 2009

City of Santa Barbara Planning Division  
Attn: Roxanne Milano

Subject: Acoustical Analysis for Additional Unit at 2430 Pine Drive  
APN 049-100-021

Dear Roxanne:

The California Administrative Code (Title 24) as enforced by the City of Santa Barbara specifies maximum allowable interior noise levels of CNEL 45 for all habitable spaces in residential buildings where exterior noise from transportation sources exceeds CNEL 60. Noise levels in all habitable rooms will be less than CNEL 45 for the project with the mitigation recommended below.

#### Comparison of 40 Pine Drive to Proposed Additional Unit at 2430 Pine Drive

The attached Acoustical Analysis performed for 40 Pine Drive (Davy & Associates, March 2005) measured existing noise levels and estimated future noise levels. The study also calculated interior noise levels. The conclusion reached was that standard 2x4 stud walls with Batt insulation, exterior stucco, 5/8" gypboard and dual glazed windows would reduce future estimated noise levels of 71.2 CNEL down to 37.2 CNEL well below the required 45 CNEL.

The following factors associated with the proposed additional unit at 2430 Pine Drive will all result in further reducing interior noise levels:

- Additional unit at 2430 Pine will be further from the freeway than the house analyzed at 40 Pine Drive
- Additional unit at 2430 Pine will be located behind the existing berm and sound wall (none included in 40 Pine Drive analysis)
- Additional unit at 2430 Pine will have Insulated Concrete Form (ICF) walls which have a Sound Transmission Class (STC) Rating of 50 which corresponds to a reduction in over two thirds of transmitted noise (<http://www.amvicsystems.com/ICFWallSystem/ArchitectEngineerDesigningwithAmvicICF/tabid/62/Default.aspx>). ICF with stucco on the exterior and plaster inside would likely have an STC Rating of 55 to 60 ([http://www.toolbase.org/PDF/CaseStudies/stc\\_icc\\_ratings.pdf](http://www.toolbase.org/PDF/CaseStudies/stc_icc_ratings.pdf)). The wall system analyzed for 40 Pine Drive has a STC rating of less than 50 ([http://en.wikipedia.org/wiki/Sound\\_transmission\\_class](http://en.wikipedia.org/wiki/Sound_transmission_class))
- Additional unit at 2430 Pine will have an insulated green roof that will further reduce interior noise levels when compared to the standard roof construction analyzed for 40 Pine Drive
- Additional unit at 2430 Pine will have triple glazed windows that will further reduce interior noise levels when compared to the dual glazed windows analyzed for 40 Pine Drive
- Additional unit at 2430 Pine will have a heat recovery ventilation system that will provide fresh air to the interior spaces without opening windows (exchange unit transfers the warmth or coolness in the stale air leaving the house to the fresh air entering the house)

**Recommended Mitigation for Additional Unit at 2430 Pine**

- Walls: Insulated Concrete Form (ICF)
- Roof: Insulated Green Roof
- Entry Door to Living Space: South side of house
- Windows: Triple Glazed
- Ventilation: Heat Exchange Unit
- Exterior Living: South side of proposed building and flat area south of existing berm with sound wall

With the implementation of these recommended mitigation measures, interior noise levels will not exceed CNEL 45 and the proposed additional unit will comply with the California Noise Insulation Standards as enforced by the City of Santa Barbara.

Please let me know if you have any questions regarding this acoustical analysis or the recommendations.

Sincerely,



Bruce Burnworth



Davy

**&** Associates, Inc.  
*Consultants in Acoustics*

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JN2004-153

## **ACOUSTICAL ANALYSIS**

40 Pine Drive  
Santa Barbara, California

**FOR**

Mr. Justin Pawl  
Santa Barbara, California

March, 2005

## 1.0 Introduction

At the direction of **Mr. Justin Pawl, Davy & Associates, Inc.** has completed an acoustical analysis of 40 Pine Drive in Santa Barbara, California.

The California Administrative Code (Title 24) as enforced by the City of Santa Barbara specifies maximum allowable interior noise levels of CNEL 45 for all habitable spaces in residential buildings where exterior noise from transportation sources exceeds CNEL 60. Interior noise levels were calculated. Noise levels in all habitable rooms will be less than CNEL 45 for the project with the mitigation recommended in Section 4.0 of this report.

Section 2.0 of this report contains the results of measurements and calculations of the future exterior noise environment at the site to determine compliance with these requirements.

Section 3.0 of this report discusses railroad noise impacts.

Section 4.0 contains the assumptions for the interior noise level projections.

Section 5.0 discusses the requirements of the City of Santa Barbara for allowable noise levels in exterior living space.

Section 6.0 of this report contains the requirements of the State Building Code concerning ventilation.

It should be emphasized that construction practices may degrade the calculated acoustical performance of walls or wall/window assemblies, thereby resulting in higher interior noise levels. Additionally, calculations included in this report are based on acoustical performance data published by independent testing laboratories. Interior noise levels have been predicted in accordance with generally accepted acoustical consulting practice, good construction techniques, and available transmission loss data. The calculated results are also based on strict compliance with all assumptions listed in Section 4.0 of this report.

## 2.0 Exterior and Future Acoustical Environment

Environmental noise levels were monitored at the north building line of the proposed new Building on March 7, 2005 between the hours of 12:00 p.m. and 2:00 p.m. The location of the site is shown in Figure 1.

Noise levels at the site are dominated by freeway traffic on Route 101 to the north. There is also a Union Pacific Railroad that carries Amtrak trains to the north of the site on the south side of Route 101. No other significant sources of noise were noted during the site visit.

Environmental noise levels were measured with a precision integrating LD 820 sound level meter that had been calibrated with a B&K 4230 Acoustical Calibrator immediately prior to use. The sound level meter measures and displays the equivalent noise level (LEQ), as well as the maximum and the minimum noise levels during the measurement period. A copy of the analysis of the acoustical data is attached to this report.

The data thus collected were analyzed to determine the CNEL level at the measurement location. The CNEL value was determined by measuring the equivalent noise level (LEQ) directly, and then calculating CNEL values from automatic 24-hour measurements at similar Freeway locations<sup>1</sup>. The procedure has always been within acceptable accuracy limits. The results of the monitoring and calculations are summarized below in Table 1.

Table 1

### Measured Ambient Noise Levels in dB

<u>Location</u>	<u>Peak Hour LEQ</u>	<u>CNEL</u>
N. Building Line	64.6 dB	70.3 dB

<sup>1</sup> See, for example, "Insulation of Buildings Against Highway Noise," Bruce Davy and Steven Skale, Federal Highway Administration FHWA-TS-77-202.



Figure 1. Site Location

Section 3501.(c) of the State Building Code states the following:

Worst-case noise levels either existing or future, shall be used as the basis for determining compliance with this Section. Future noise levels shall be predicted for period of at least 10 years from the time of building permit application.

CALTRANS, Division of Traffic Operations publishes an annual traffic volume book that contains previous traffic trends. The 2000 traffic volumes on the California State Highway System Book (the latest edition available) lists an average annual increase of 1.9% per year in annual traffic volumes for the last 5 years. Assuming that this annual growth of 1.9% would hold for this site, it was projected that traffic volumes would increase by a factor 1.1 by the year 2015. This traffic volume increase over the next 10 years would result in a 0.9 dB traffic noise increase. Therefore, the projected future year noise levels would increase to the values listed in Table 2.

Table 2

**2015 Exterior Noise Levels in dB**

<u>Location</u>	<u>CNEL</u>
N. Building Line	71.2 dB

With an exterior noise level of CNEL 71.2, the building must provide an A-weighted noise reduction value of at least 26.2 dB to achieve an interior CNEL 45 value.

Standard construction consisting of 2x4 studs with R-11 insulation, exterior stucco, interior gypboard, and standard glazing provides a minimum A-weighted noise reduction of 20 dB.

If all north, east, and west facing windows and glass doors in the proposed Building are glazed with STC 34 glazing, the A-weighted noise reduction of the buildings will increase to approximately 34 dB.

This means that with the use of standard construction and STC 34 glazing in all north, east, and west windows and glass doors in the proposed building, interior noise levels should not exceed CNEL 45. Therefore, the building will comply with the California Noise Insulation Standards as enforced by the City of Santa Barbara.

The STC 34 rating can be provided with either dual glazing with a 1/2" air space or 1/4" laminated glass. In either case, the glazing supplier should submit test reports documenting the minimum STC rating for the complete glazing assembly. The test report should be done in an independent, accredited testing laboratory in accordance with ASTM E-90.

If STC 34 glazing is utilized in the first row of buildings as discussed above, maximum noise levels from the Amtrak trains approximately will be 55 dBA. This should be reasonably acceptable for most people. The most sensitive residents may still be annoyed.

#### **4.0 Construction Recommendations**

- 4.1 Roof ceiling construction will be roofing on 1/2" plywood. Batt insulation will be installed in joist spaces. The ceilings will be one layer of 5/8" gypboard nailed direct.
- 4.2 All exterior walls will be 2x4 studs 16" o.c. with Batt insulation in the stud spaces. Exteriors will be exterior plaster or stucco. The interiors will be 5/8" gypboard.
- 4.3 All north, east and west facing windows and glass doors in the proposed Building will be glazed with STC 34 glazing. The STC 34 rating can be provided with either dual glazing with a 1/2" air space or 1/4" laminated glass. In either case, the glazing supplier should submit test reports documenting the minimum STC rating for the complete glazing assembly. The test report should be done in an independent, accredited testing laboratory in accordance with ASTM E-90.
- 4.4 All other windows and glass doors may be standard glazing.
- 4.5 All entry doors should be 1-3/4" solid core flush wood doors with vinyl bulb weatherstripping on the sides and top. Panel doors with panels less than 1-3/4" should not be accepted. Glazing in entry doors should not be accepted.

## 5.0 Exterior Living Requirements

The City of Santa Barbara has established criteria for exterior living space. Noise levels in exterior living space cannot exceed CNEL 60. We recommend that all exterior living spaces including balconies and decks be located on the south side of the proposed building.

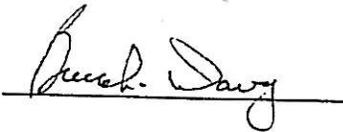
An analysis of exterior living spaces may be required once building plans are completed.

## 6.0 Ventilation Requirements

The California Noise Insulation Standards (Title 24) states the following paragraph concerning ventilation:

"If interior allowable noise levels are met by requiring that windows be unopenable or closed, the design for 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."

With windows open, typical noise reduction values will be in the 12 dB range. This means that a ventilation system must be provided for all habitable rooms. This can normally be supplied with an FAU (forced air unit) with a summer switch. Outside air intake must be in compliance with the Uniform Building Code.



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