APPENDIX G

Noise

REVISED COMMUNITY NOISE ANALYSIS FOR WILLOW SPRINGS PHASE II

Goleta, California

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June 2010

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This report presents the results of monitoring and computations of the outdoor noise levels at the site of the Willow Springs Phase II apartment project, in the City of Goleta, California.

The Willow Springs Phase II project site is located approximately one-half mile north of the Santa Barbara Airport (see Figure 1). The Union Pacific Railroad (UPRR) line is located adjacent to the northerly property boundary, and U.S. Highway 101 lies just to the north of the railroad. The project site includes 4.5 acres and will be developed with 100 apartments in 10 buildings.

The project is the second phase of the Willow Springs development that was originally approved under the County of Santa Barbara jurisdiction. The larger Willow Springs project area occupies about 25 acres between Hollister Avenue on the south and the Union Pacific Railroad (UPRR) tracks on the north, and generally east of Los Carneros Road. An oval shaped open area approximately 200 feet in diameter separates a portion of the proposed Phase II development from existing apartments to the south and southwest.

The City of Goleta noise standards establish a Day-Night Average Noise Level (Ldn) of 65 decibels (dBA) as the maximum noise level considered conditionally acceptable for residential development; and 60 dBA is considered normally acceptable. City of Goleta and California standards also require that the interior Ldn of multi-family residences not exceed 45 dBA. The results of this report indicate that all residences proposed for this project will comply with both the exterior and interior standards. No special setback, design, or architectural measures are necessary to mitigate noise effects within the project. The 2010 revision to this report revises the roadway noise predictions to account for potential truck traffic crossing through the project from the light manufacturing uses to the east. This addition causes a very slight increase in roadway traffic noise levels, but the exterior Ldn at all proposed residences would remain below the 60 dBA standard. Thus, there are no changes in the conclusions or recommendations from the earlier report.

Construction noise from the project represents a potential significant impact to the existing residents in the Willow Springs neighborhood. Mitigation measures including timing restrictions on construction activities and other measures to place noise generating activities as far as possible from existing residents are identified in Section 4.0.

2.1 NOISE STANDARDS

2.1.1 Residential Noise Standards

The City of Goleta Noise Element (City of Goleta 2006) provides a thorough background discussion of noise and its effects on human health and quality of life. The Noise Element provides general information about typical noise levels throughout the City, describes how noise is measured, and presents the objectives and policies of the City relative to maintaining acceptable noise levels for residents and other sensitive land uses.

The City requires that potential noise effects be evaluated in terms of either the Community Noise Equivalent Level (CNEL) or the Day-Night Average Noise Level (Ldn), and establishes maximum noise levels that are considered compatible with various land uses (City of Goleta 2006:Table 9-2). Both CNEL and Ldn are based on hourly average noise levels during different times of the day, and include an adjustment or penalty for noise during evening and/or nighttime hours. Results computed in both methods usually agree within 1-2 decibels, and the two descriptors are often used interchangeably in establishing standards and for characterizing community noise levels that originate from diverse sources. The Ldn is used in this report, and is defined more completely below. Where standards or specific measurements from other sources are based on the CNEL, that term is used. All noise levels used in the standards and measurements described in this report are expressed as decibels, using the "A" weighted frequency response that duplicates the sensitivity of the human ear (abbreviated dBA).

An additional term used in this report and in describing noise standards is "Equivalent Noise Level" or Leq. For a noise of varying loudness over a defined time period, the Leq is the constant value that represents the same amount of energy. Leq values are usually expressed for 1-hour periods, as in the hourly average noise levels that are used to define the Ldn described above. However, Leq values may be expressed for longer or shorter time periods. Noise monitoring results presented in this report (Appendix A) include Leq values for 1-minute periods, as well as for the duration of the measurement at each point.

The basic standards for residential development are described in Policy NE 1.2 of the Noise Element, which reads as follows:

> **NE 1.2 Location of New Residential Development. [GP]** Where sites, or portions of sites, designated by the land use element for residential use exceed 60 dBA CNEL, the City shall require measures to be incorporated into the design of projects that will mitigate interior noise levels and noise levels for exterior living and play areas to an acceptable level. In the event that a proposed residential or mixed-use project exceeds these standards, the project may be approved only if it would provide a substantial benefit to the City,

> including, but not limited to, provision of affordable residential units. Mitigation measures shall reduce interior noise levels to 45 dBA CNEL or less, while noise levels at exterior living areas and play areas should in general not exceed 60 dBA CNEL and 65 dBA CNEL, respectively.

The above policy and criteria in the Noise Element establish that 60 dBA is the maximum exterior CNEL (or Ldn) that is normally compatible with residential development. This limit may be extended up to 65 dBA if noise mitigation features are included within project designs (City of Goleta 2006:Table 9-2).

With respect to interior noise levels in residences, the 45 dBA threshold set forth in the above policy reflects the identical standard in the California Building Code that applies to multifamily residences (Title 24 Code of California Regulations Sections Section 1207.11.12)).

The exterior and interior noise standards are consistent with one another since normal wood frame residential construction usually provides from 12 to 18 dBA of reduction from exterior to interior areas, and 20 dBA is commonly achieved in modern structures that meet current energy conservation requirements. An older guidance document by the U.S. Environmental Protection Agency indicates a reduction ranging from 12 to 17 dBA with windows open, and 24 to 27 dBA with windows closed (U.S. EPA 1978:Table II). Recent field measurements at an apartment complex with construction very similar to Willow Springs showed an exterior-to-interior noise reduction of 19.7 dBA with windows open in an unfurnished bedroom (URS Corporation 2009:3). Thus, an exterior Ldn of 65 dBA will usually provide an interior Ldn of 45 dBA with current construction techniques and materials. The state standards also require an acoustical analysis for all multi-family units located in areas where the Ldn exceeds 60 dBA, in order to demonstrate that the interior standard will be met.

Standards for outdoor recreation areas or parks include the following:

(1) from the last sentence of Policy NE 1.2 above, exterior living areas should in general not exceed 60 dBA CNEL, and play areas should in general not exceed 65 dBA CNEL,

(2) from Table 9-2 in the City Noise Element, a CNEL ranging from 50-70 dBA is considered normally acceptable for playgrounds and neighborhood parks.

2.1.2 Construction Noise Requirements

The City of Goleta has not adopted a Noise Ordinance intended to control noise from specific uses or activities, but the City does use the Thresholds and Guidelines Manual prepared by the County of Santa Barbara (2002:133) to evaluate noise from construction activities and to identify appropriate conditions of approval to reduce construction noise effects from projects. This threshold assumes a general construction source noise of 95 dBA at a distance of 50 feet, and concludes that all locations within 1,600 feet will potentially be subject to construction noise levels in excess of 65 dBA (based on a point source noise attenuation rate of 6 dBA per doubling of distance). These guidelines also provide general direction for standard construction noise mitigation measures including:

- Construction within 1,600 feet of sensitive receptors shall be limited to weekdays between the hours of 8:00 a.m. to 5:00 p.m. only
- Noise attenuation barriers and muffling of grading equipment may also be required
- Construction equipment generating noise levels above 95 dBA may require additional mitigation

2.1.3 Industrial Zone Performance Standard

Land to the east of the Willow Springs Phase II project site is zoned M-1, Light Industry, and is currently developed with such uses. Section 35-85.7 of the City Zoning Regulations sets forth performance standards for such uses in the M-1 zone, and requires:

> The volume of sound, measured during calm air conditions, inherently and recurrently generated by or resulting from any use, other than motor vehicles, operated on any lot shall not exceed seventy (70) decibels at any point along the boundary or outside of the lot upon which such use is located.

This standard does not apply to the Willow Springs Phase II project, but does provide guidance in evaluating the effects of noise from the adjacent industrial uses to the east.

2.2 NOISE MONITORING RESULTS

2.2.1 Roadway Traffic Noise

Figure 1 shows the property location relative to the surrounding areas. The northeastern area of the larger Willow Springs property has been covered by earthen fill that raises the ground elevation by approximately 10-12 feet above adjacent land. This fill extends into the northeastern corner of the Phase II project site, but will be removed so that the Camino Vista can be extended to form the northern boundary for Phase II and the proposed apartments can be constructed at an accessible elevation.

Noise levels on the property were monitored on January 15, 2009, with a Larson-Davis Noise Level Meter. Two areas (M1 and M2) were monitored and are shown in Figure 2. M1 covered the strip of land along the eastern project boundary adjacent to existing industrial uses discussed more in Section 2.2.2 below. A second point (M2) was located near the proposed residential structure most exposed to the dominant noise sources (vehicle traffic). This second point was near the northwest corner of proposed Building 31 on top of the stockpiled fill in this part of the project site. The ground elevation of about 35 feet above mean sea level (msl) was higher than the designed finished floor elevation, and about two feet below the proposed second story floor elevation for Building 31. The noise meter microphone was mounted at a height of about 7 feet above the ground surface to provide a resulting elevation of about 42 feet msl, which is a close approximation to a person standing on a second story balcony at this location. The meter location was closer to the alignment of Camino Vista, however, being about 40 feet from the centerline of the roadway, while the nearest building (number 30) would be about 60 feet from the centerline.

Weather conditions were clear and cool, with very little wind. Following routine monitoring procedures, the noise meter was calibrated at 94 and 114 decibels before the measurements, and the calibration was confirmed after the measurements. Settings on the meter are shown in Table A-1 in Appendix A. Noise monitoring results, along with traffic counts on Los Carneros Road and other observations are shown in Appendix A. The column labeled "LVL" in Appendix A presents the Leq (defined in Section 2.1.1 above) for each one-minute interval during the measurement period. Leq values for shorter periods are also shown in Appendix A, including 6-seconds (graphed only) and 1/8-second (shown as Lmax), along with instantaneous peak values. The computed Leq values for the duration of the measurement period at each of the monitoring points are also shown. The locations of the monitoring areas, which are discussed further below, are shown in Figure 2.

The dominant noise on the property originates from vehicle traffic on Los Carneros Road and on the southbound on-ramp entering Highway 101 north of the site. The highway itself also contributes some noise. The large earthen berm supporting the southbound on-ramp blocks the line of sight to the highway and much of its vehicle noise. Other noise sources were present, including distant aircraft, local small aircraft operations, and a single audible Amtrak passenger train on the UPRR tracks.

For monitoring point M2, which was chosen to provide a characterization of roadway traffic noise, the 1-minute Leq values generally ranged between 50 and 60 dBA, and the overall Leq for the 70 minute monitoring period was 53.9 dBA.

2.2.2 Industrial Noises

The noise measurements in Appendix A for area M1 were obtained by carrying the noise meter and walking slowly along the eastern property boundary northward and southward from the existing stub-out of Camino Vista west of Aero Camino. Several light industrial uses occur in this area, including semi-enclosed machining areas and loading docks. Noise sources included a medium-duty truck entering and leaving a loading area, large fans providing building ventilation, electrically-driven fluid pumps, and one noticeable air compressor that cycled on and off one time during the measurement. The highest one-minute Leq value was 59.5 dBA from the air compressor, which was at a distance of about 15 feet when this measurement was made. The overall Leq along this property line was 52.6 dBA.

2.2.3 Railroad Noise

The UPRR line is located immediately north of the project. The Goleta Noise Element states that maximum instantaneous noise levels from passing trains range from 96 to 100 dBA at a distance of 100 feet, and that the average CNEL at this distance ranges from 70 to 75 dBA (City of Goleta 2006:9-3). Measurements of train noise nearby for the Village at Los Carneros (City of Goleta 2007:6) gave results similar to this estimate with peak noise levels at 100 feet of 93.5 dBA for an Amtrak passenger train and 99.0 dBA for a freight train.

During the noise measurements for the Willow Springs Phase II project, two Amtrak passenger trains passed the project site. The first, just at the beginning of the measurement at point M2, involved an Amtrak train moving very slowly northward, perhaps on the siding adjacent to the UPRR main line. Then the train moved slowly southward (eastward) towards the Goleta station. These very slow movements did not generate any discernable noise. Near the end of the measurement period, however, the train sounded its horn one time and then departed the Goleta station moving quickly northward on the UPRR mainline. As shown in the measurements in Appendix A, this movement resulted in a peak in the noise measurement at minute 61 with the following values:

1-minute Leq	63.0 dBA
6-sec Leq	70.0 dBA
Maximum slow meter (1/8 sec) reading during minute	72.0 dBA
Instantaneous peak noise level	83.0 dBA

The 1-minute and 6-second Leq values are graphed in Appendix A, where the peak due to the train passage is obvious, and the other values are included in the tabulated noise measurements. The monitoring point M2 is approximately 560 feet from the UPRR tracks. Adjusting for distance, the instantaneous peak noise level at 100 feet from this train passage was 98.0 dBA, which agrees well with the values cited earlier from the City Noise Element and prior measurements for the Village at Los Carneros.

Based on this result, and on the Noise Element descriptions, the distance to the CNEL 65 dBA contour would range from 178 to 316 feet.

The train noise CNEL or Ldn values along the tracks are a function not only of the peak noise level as a train passes, but also of the number of trains per day and the presence of at-grade crossings where warning horns are sounded by train operators. Other factors, such as rail condition, may also influence noise levels to a lesser degree. There are no nearby crossings, but the Goleta Amtrak station is located to the east and the single horn soundings that indicate the start of motion for each train leaving the station are audible at the project site.

The estimates and projections of train noise levels contained in the City of Goleta Noise Element are based on information in the County of Santa Barbara Noise Element (County of Santa Barbara 2009:42). The County results are based on an average of two passenger trains and 12 freight trains per day along the UPRR tracks. Amtrak currently runs four passenger trains per day along this route. The mix of train types may vary, and the number of daily freight trains has been lower in 2008 and 2009 due to the national economic downturn. For a long-term projection, however, the assumptions in the County Noise Element likely remain valid.

In summary, at a distance of 100 feet from the tracks peak train noise levels range up to about 100 dBA and CNEL (or Ldn) values range up to about 75 dBA. Adjusting these for distance only, yields a peak noise level at monitoring point M2 (also the point of development closest to the tracks) of 85 dBA (83.0 dBA was measured in this study) and a CNEL value of 60.0 dBA. Based on the standard in the City Noise Element, this CNEL value is compatible with residential uses. Actual values at the Willow Springs Phase II site may be slightly lower, since the UPRR tracks are in a depression relative to the project site and the intervening topography provides some shielding of train noise.

2.2.4 Aircraft Noise

The Santa Barbara Airport is located approximately one-half mile to the south of the project site. The departure pattern from Runway 25 (RY 25) at the airport extends westward, and is about one mile south of the property. Runway 25 is the largest runway at the airport and is used for airlines and most business jet traffic. Two shorter runways (15R and 15L) are oriented north-south, and are used predominantly for general aviation.

The project site is located north of the 60 dBA CNEL contour in the Airport Land Use Plan (ALUP, Santa Barbara County Association of Governments 1993:Map SB-1), and the City of Goleta Noise Element (City of Goleta 2006:Figure 9-2). The southernmost point of Willow Springs Phase II is approximately 500 feet north of the closest point of the current 60 dBA noise contour from the airport. The City Noise Element projects a very small reduction in future noise levels from the airport, so the future 60 dBA CNEL noise contour is farther from the project site. Using the City Noise Element standards, the airport related noise levels are compatible with the proposed residential uses.

At several points during the monitoring at point M2, aircraft noise was heard and caused small but discernable peaks in the measurements. In most instances, these aircraft were twin turbofan regional jets departing the airport westward on Runway 25 approximately one mile south of the project site. These occurrences are noted in the graph of noise levels in Appendix A, and are summarized below in Table 1.

TABLE 1
Aircraft Noise Levels Measured on the Property

Minute No.	Type Aircraft and Motion	Leq (1-min) dBA	Lmax (1/8-sec) dBA
14	Regional Jet, depart RY 25	52.0	63.5
23	Regional Jet, depart RY 25	52.0	59.5
24	Business Jet, depart RY 25	59.0	74.5
45	Regional Jet, depart RY 25	53.0	61.0
46	Regional Jet, depart RY 25	52.0	60.5
50	Cessna 172, depart right downwind RY 15R (northward over project site)	55.5	64.0
54	Regional Jet, depart RY 25	53.5	69.5
62	Regional Jet, depart RY 25	54.0	64.5

Also during the monitoring periods, several single engine piston airplanes were in the pattern of runway 15R and flew nearby the property. While the noise from these aircraft was discernable, it was much less than from the vehicle traffic on the adjacent roadways and had no appreciable effect on the noise measurements. This observation is consistent with the results from a long-term airport noise monitoring location about 2,000 feet east of the project site beneath the final approach leg to Runways 15R and 15L, where the reported CNEL value is 55.9 dBA (Santa Barbara Municipal Airport 2005:3-4).

No helicopters were observed during the monitoring period. Current helicopter operations of all types at the airport (air taxi, military/police, and general aviation) amount to about 11 flights per day out of total daily operations of about 480. This figure is expected to increase little—reaching 13 operations per day by 2025 (Santa Barbara Airport 2005:Table 3-C). The voluntary noise abatement arrival and departure procedures in use at the airport direct all helicopter traffic to arrive and depart the airport over the water to the south, except in periods of cloud cover when they should follow Highway 101 in the same pattern used by light general aviation aircraft (Santa Barbara Airport:2000).

In summary, the project site is located well outside of the 60 dBA CNEL contour of the Santa Barbara Airport. Aircraft operations, particularly westbound jets approximately one mile south of the project site, can be heard from the project site but do not generate noise levels above applicable thresholds or guidelines. As with any location in the region, occasional aircraft operations may occur directly over the property, but these are neither frequent nor loud enough to exceed applicable standards.

2.2.5 Traffic Noise Model Confirmation

The Transportation Noise Model (TNM, Version 2.5) produced by the Federal Highway Administration (Lau et al 2004) was used in this analysis. This model predicts hourly Leq values from inputs of traffic volumes and speeds for automobiles, medium duty trucks, heavy trucks, busses and motorcycles. For this analysis, since detailed vehicle type data were not available, busses and motorcycles were considered equivalent to medium duty trucks. The three dimensional lane geometry for each roadway, along with other roadway parameters, and modeled receiver locations are part of the input. For the 2010 revision of this report, the geometric inputs were updated to reflect (1) the revised site plan with slightly different proposed building elevations, (2) inclusion of Camino Vista through the project site, and (3) use of California state plane coordinates for the x and y values of all points. The model computes noise levels with adjustments for roadway grade, distance, barrier attenuation, and other items.

Before using the model to predict existing or future noise levels, information from traffic counts and observations along Los Carneros Road was used with other current data to test the accuracy of the model. Because it was not possible to observe and count traffic on Highway 101 and the southbound on-ramp at the same time as Los Carneros Road, Caltrans data for these roadways was used. The Caltrans data included Average Annual Daily Traffic (AADT) for both the highway and the on-ramp, and distribution of vehicle types for the highway itself. The traffic input data, assumptions, and sources for this model test and for the subsequent model runs are presented in Table B-1 in Appendix B. A comparison of the measured Leq at point M2 with the Leq result from TNM 2.5 is as follows:

Measured Leq:	53.9 dBA
Model Leq:	53.5dBA

The model result was almost identical to the measured Leq, being lower by less than 1 dBA. No adjustments or corrections were added to the model, and the same roadway geometry, barriers, and other conditions were used in subsequent model runs.

3.1 ROADWAY TRAFFIC NOISE

Figure 1 shows the proposed site plan on the property, and illustrates the general relationship between proposed multi-family dwelling units along the northerly boundary and the location of the highway and railroad tracks. Figure 2 shows the project site plan and the locations of noise model receiver points. Model receiver locations were selected to represent the corner of each of the northernmost buildings in the project site plan closest to the roadway noise sources. Remaining portions of these buildings, and the other buildings within the project, would all be farther from the roadways and partially shielded from that noise by structures within the project. At each modeled receiver location, two points were identified: (1) one at a height of about 5 feet above the first floor elevation, and (2) a second point five feet above the second story floor level.

Traffic noise affecting the property originates primarily from Los Carneros Road and the southbound on-ramp to Highway 101 from Los Carneros Road. The highway itself contributes a lesser amount of noise. These three sources were modeled with TNM 2.5, first with data and estimates on current hourly traffic volumes in the confirmation run discussed above in Section 2.2.5, and then with estimates of average daytime and nighttime hourly traffic volumes for both current and future conditions. For the 2010 revision of this report, Camino Vista was included in the future conditions.

Current Average Daily Traffic (ADT) volumes were obtained from Caltrans for both the highway and the southbound on-ramp. The current and future ADT values for Los Carneros Road were obtained from the project traffic report (Associated Transportation Engineers (ATE) 2009:Table 1 and Table 8). Estimates of the future traffic along Camino Vista were developed from the future cumulative traffic (ATE 2009:27), and applying percentages for truck traffic based on observations in the area to the portion of the Camino Vista traffic from the offsite development. An estimate of the future volume on the southbound on-ramp and on Highway 101 was obtained by projecting a 2.4% per year increase to the year 2024. This is the average of the annual rates of increase on the highway from 1998 through 2007.

Estimates of the hourly traffic volume, by each vehicle type, were made using the present and future average daily traffic (ADT) volumes, and the assumptions shown in Appendix B, Table B-1. The 24-hour day was divided into two periods: Daytime, from 7:00 a.m. to 10:00 p.m., and Nighttime, from 10:00 p.m. to 7:00 a.m. The ADT value was split as follows: 85% for the daytime, and 15% for the nighttime. The percentages for automobiles, medium duty trucks, and heavy duty trucks were determined from the traffic counts conducted during the noise monitoring for Los Carneros Road (used for that roadway and for the southbound on-ramp), or data from Caltrans for U.S. Highway 101.

The current and future roadway traffic noise levels were computed separately as Leq values for the daytime hours and for the nighttime hours. These values were then combined to yield the Day-Night Equivalent Noise Level or Ldn. In computing the Ldn, an extra 10 dBA "penalty" is added to the nighttime Leq values to account for the added nuisance of noise during this time.

The calculation uses the following equation:

$$Ldn = 10*\log\{(1/24)*[15*10^{Ld/10} + 9*10^{(Ln+10)/10}]\}$$

Where:

Ldn	=	Day-Night Average Noise Level
Ld	=	Hourly equivalent noise level for hours during the daytime
Ln	=	Hourly equivalent noise level for hours during the nighttime

Results of this computation for current and future noise levels are shown in Appendix B, Table B-2, and summarized here in Table 2 below.

TABLE 2
Summary of Traffic Noise Projections

Receiver Location	Description	Ldn (dBA) Current	Ldn (dBA) Future
27-1	Bldg. 27, NW corner, ground floor	51.1	57.3
27-2	Bldg. 27, NW corner, second story	53.5	58.1
28-1	Bldg. 28, NW corner, ground floor	51.8	57.4
28-2	Bldg. 28, NW corner, second story	54.3	58.4
29-1	Bldg. 29, NW corner, ground floor	52.8	57.8
29-2	Bldg. 29, NW corner, second story	55.3	59.0
30-1	Bldg. 30, NW corner, ground floor	52.5	57.2
30-2	Bldg. 30, NW corner, second story	55.4	58.7
M2-1	40' from Camino Santa Fe CL, ground level	52.9	59.3
M2-2	40' from Camino Santa Fe CL,, 10' above ground (Monitoring point M2)	55.9	60.5
31-1	Building 31, NE corner, ground floor	52.7	57.0
31-2	Building 31, NE corner, second story	55.6	58.6

Comparing the above results with the Noise Element standards shows that all results for roadway noise levels at the proposed building locations will remain below the 60 dBA Ldn value that is considered normally acceptable for residential uses. The only result that was very slightly above 60 dBA is at point M2-2, which was a monitoring point that was about 20 feet closer to Camino Vista than the nearest building would be. All residential buildings, outdoor living areas, trails and facilities within the boundaries of Willow Springs Phase II will have current and future noise levels that are consistent with the City guidelines. Thus, with respect to the proposed residential uses roadway noise will not represent a significant impact. The inclusion of Camino Vista and through truck traffic from the existing development east of the project site does not change this result.

3.2 RAILROAD NOISE

As discussed in Section 2.2.3 above, at its closest point the Willow Springs Phase II residential project would be about 560 feet from the UPRR tracks. Based on projections within the City Noise Element, which are consistent with measurements on and near the property, future operations along the tracks would result in a maximum CNEL of 60 dBA at this point. This CNEL is considered normally compatible with residential uses according to the City Noise Element. Railroad noise would, therefore, not represent a significant impact for the proposed residential uses.

3.3 AIRPORT NOISE

While aircraft operations are audible on the property, they are heard as distant rumbles that usually last for a short time, usually just a few seconds. The CNEL on the property from aircraft operations is about 55-57 dBA, and aircraft noise does not contribute appreciably to long-term noise levels on the property. Thus, aircraft noise does not represent a significant noise impact.

3.4 INDUSTRIAL NOISES

As discussed in Section 2.2.2 above, noise levels from the industrial uses to the east of the project site are well below the noise performance standard in the M-1 zone, and do not contribute significantly to noise on the project site. The Leq value at the property line during measurements at point M1 was 52.6 dBA (Section 2.2.2 above). This noise source does not represent a significant impact.

3.5 CUMULATIVE NOISE LEVELS

The primary sources of noise affecting the property are very different in nature. Roadway noise is generally constant in the background, while railroad noise is distinctly episodic. The difference leads to one of the dilemmas in analyzing community noise impacts, since some standards (Noise Element) are more suitable for longer-term noise while others (Zoning) are developed to address short-term and peak noise levels. The use of CNEL or Ldn to establish noise standards or thresholds is a compromise in this respect. This type of 24-hour average noise level is effective for characterizing more or less continuous noise sources, such as traffic.

When noise events are discrete and episodic in nature, it is still possible to compute a 24-hour average based on the loudness of individual events and their number of occurrences during a day. The result, however, is less accurate in predicting the response of people or the annoyance of individual noise events. Nevertheless, CNEL and Ldn have become the most widely used descriptors or metrics for community noise and they form the basis for almost all noise standards used in General Plan Noise Elements and in many other regulatory programs.

The City Noise Element suggests that the combined effect of the railroad and highway is to create a corridor up to 600 feet wide within which noise levels exceed 70 dBA, and a corridor three times that width where noise levels exceed 65 dBA (City of Goleta 2006:9-3). If true in all cases, this would mean the 65 dBA contour would extend 900 feet into the property. This generalization is overly conservative for a number of reasons, and is greatly influenced by a number of factors and uncertainties.

It is possible to add noise levels from the highway and railroad tracks mathematically, but in the real world one or the other will dominate. Because of the logarithmic definition of decibels, two identical continuous noise levels from identical sources when added together will have a result that is 3 dBA above their value. As the difference in magnitude between the two noise sources becomes greater, the louder source dominates. When the difference approaches 10 dBA, there is virtually no contribution from the smaller noise source. If one were standing at a point on the railroad 70 dBA CNEL contour (about 100 feet from the tracks), one would only hear highway noise most of the time (about 67 dBA CNEL). Then when a train passes by, the noise level would rise to a peak between 95 and 100 dBA, at which point highway noise would be indiscernible. The "sum" of the two CNEL values at this point (70 dBA plus 67 dBA) would be 72 dBA.

The roadway noise, which is more or less continuous along the linear direction of the highway, drops off at a theoretical rate of 3 dBA per doubling distance as one moves farther away from the travel corridor. The railroad noise, however, is much less "linear" and drops off at a faster rate. For a theoretical point source, the decrease is 6 dBA per doubling distance. The combination of this disparity in distance attenuation with the logarithmic nature of noise addition causes the railroad noise to dominate when close to the tracks and the highway noise to dominate when farther away from the tracks. The crossover point, where the two sources would theoretically have the greatest additive effect is about 200 feet. In reality the highway is not a perfect linear source and the railroad is not a perfect point source. Topography and the nature of the ground surface also affect the transmission of noise and pose additional uncertainties in this discussion—for the Willow Springs Phase II site, the highway itself is not the main roadway noise source. People respond differently to different types of noise sources. For these reasons, care must be exercised in any discussion that is based on a simple theoretical or mathematical analysis of diverse noise sources. With this caution in mind, the following paragraphs address the combination of noises from different sources.

Using results estimated for point 30-2 (the second story elevation at Building 30), which is the residential building most exposed to the highway and railroad tracks, the cumulative or additive effect of the railroad CNEL (60 dBA in Section 2.2.3 above) and the future Ldn for the highway (58.7 dBA in Table 2 above) gives a resulting 24-hour average noise level of 62.4 dBA. This resulting cumulative noise level from these sources is well below the 65 dBA conditionally acceptable threshold for residential uses.

If one considers an additional contribution from aircraft overflights, this conclusion will not be changed. The project is well outside of the 60 dBA CNEL contour for the Santa Barbara Airport, and a reasonable estimate for the CNEL at point 30-2 is about 55.9 (see Section 2.2.4 above). Adding this to the previous cumulative sum of 62.4 dBA yields a new cumulative total of 63.3 dBA—still comfortably below the 65 dBA threshold. As one moves south into the project site, the aircraft noise may be slightly higher (but still well below 60 dBA), but the highway and railroad noise will become lower.

Finally, even if one considers an additional contribution from the industrial uses immediately to the east, the effect is to add just a few tenths of a decibel bringing the resulting Ldn to about 63.6 dBA. The industrial activities, however, do not continue throughout the night and this result does not account for any distance attenuation.

To summarize this discussion, even if it were appropriate to add all of the different noise sources together the resulting Ldn would be below the 65 dBA conditionally acceptable threshold for residential uses. This "total" of the cumulative effects would only occur at the northeastern corner of the project site. Moving south and west into the project site, there may be a very slight increase in aircraft noise but the highway and railroad noise would drop off by greater amounts. With all exterior noise levels below 65 dBA Ldn, it should be possible to achieve the City interior standard of 45 dBA Ldn without any special design or architectural measures.

3.6 ON-SITE CONSTRUCTION NOISE

Noise levels from heavy equipment used for earth moving during construction typically range from 80-90 dBA at distances of 50 feet. An assumption of 95 dBA at 50 feet is used in the Thresholds and Guidelines Manual to define areas of potential impact. Based on this assumption, any sensitive used such as residences within 1,600 feet of a construction site may be subject to significant noise impacts.

The entire existing Willow Springs Phase I residential community is within 1,600 feet of the proposed Phase II site. Apartments and a portion of Los Carneros County Park on the north side of Highway 101 are also within this distance, but the intervening freeway represents a more dominant noise source. All remaining areas within 1,600 feet of the project site are either vacant land or developed with industrial and office uses. Thus, the major areas where construction noise may represent an impact are within the Willow Springs development itself. Residents in existing apartments, particularly those adjacent to the Phase II development, may be subject to construction noises ranging up to 95 dBA at least for short periods of time. Construction noise is a potentially significant impact that can be mitigated.

3.7 NOISE AT FUTURE PARK SITE

Although not part of the Willow Springs Phase II project, development of a city park is anticipated on the land between the project site and the UPRR tracks to the north. The southern portion of this park site, just across Camino Vista from the Phase II project, would have Ldn values ranging from about 60 dBA upwards. Based on the discussion in Section 2.2.3 above, the 65 dBA CNEL contour from the tracks would extend a maximum of 316 feet into the park site. This would leave a width of land along its southern boundary of about 150 feet where noise levels would be between 60 and 65 dBA. It is not possible to evaluate noise effects on the park in any detail since the applicable standards range from 50 to 70 dBA, but some general points can be stated:

- A narrow strip of land, about 50 feet wide, along the northern edge of the park site would have Ldn values in excess of 70 dBA – the upper limit considered compatible with park uses. This area would be suitable for parking or other uses not sensitive to noise.
- A wider portion of the site, about 150 feet on its southern side, would have Ldn values of less than 65 dBA – a reasonable noise level for most outdoor recreational uses
- The elevation of the park site, about 10-12 feet above the train tracks, is such that a berm along its northern edge would provide a reduction in noise levels from the train tracks. This and other measures can be considered at the time details for the park design are prepared.

Based on this preliminary review, it appears feasible to develop the park site with recreational uses that are compatible with the noise standards in the City Noise Element. Specific recreational uses and detailed design measures to minimize noise effects need to be considered when the park plan is developed.

4.1 CONSTRUCTION NOISE

Even though construction noise is a common and expected occurrence, the proximity of early residents in the project to ongoing construction warrants measures to help minimize the potential for noise impacts from this source. Construction noise mitigation measures that should be applied to this project include the following:

- Grading and noise-producing construction operations shall be limited to the hours of 8:00 a.m. to 5:00 p.m. on weekdays.
- The access point for construction and staging activities should be located off of Camino Vista, away from existing residences adjacent to that road.
- Stationary equipment that generates noticeable noise, such as large air compressors or generators, shall be located as far away from adjacent residences as practical. Temporary barriers or shelters may also be used. The combination of location and/or temporary barriers shall reduce noise levels from such equipment to no more than 70 dBA (one-hour Leq, similar to the performance standard in the adjacent M-1 zone) at the property lines nearest to the adjacent existing residences.

These measures will not eliminate construction noise, but will minimize its effects and help avoid a significant impact.

4.2 OUTDOOR AREAS

All proposed residences will be located in areas where the future Ldn will be below 65 dBA. No special mitigation is necessary for noise levels in these areas.

4.3 INDOOR AREAS

Assuming conventional wood frame construction consistent with current California energy conservation requirements, all interior living spaces are expected to have Ldn values of 45 dBA or less. No special noise mitigation measures are necessary for interior living areas.

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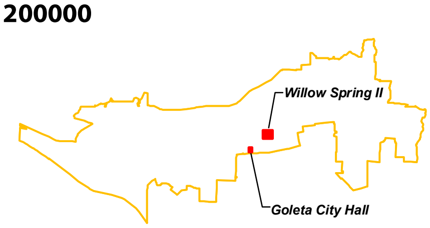
City of Goleta

Scale: 1 to 200000



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0 500 1,000
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Figure 1
Site Location Map

URS

Willow Springs Phase II

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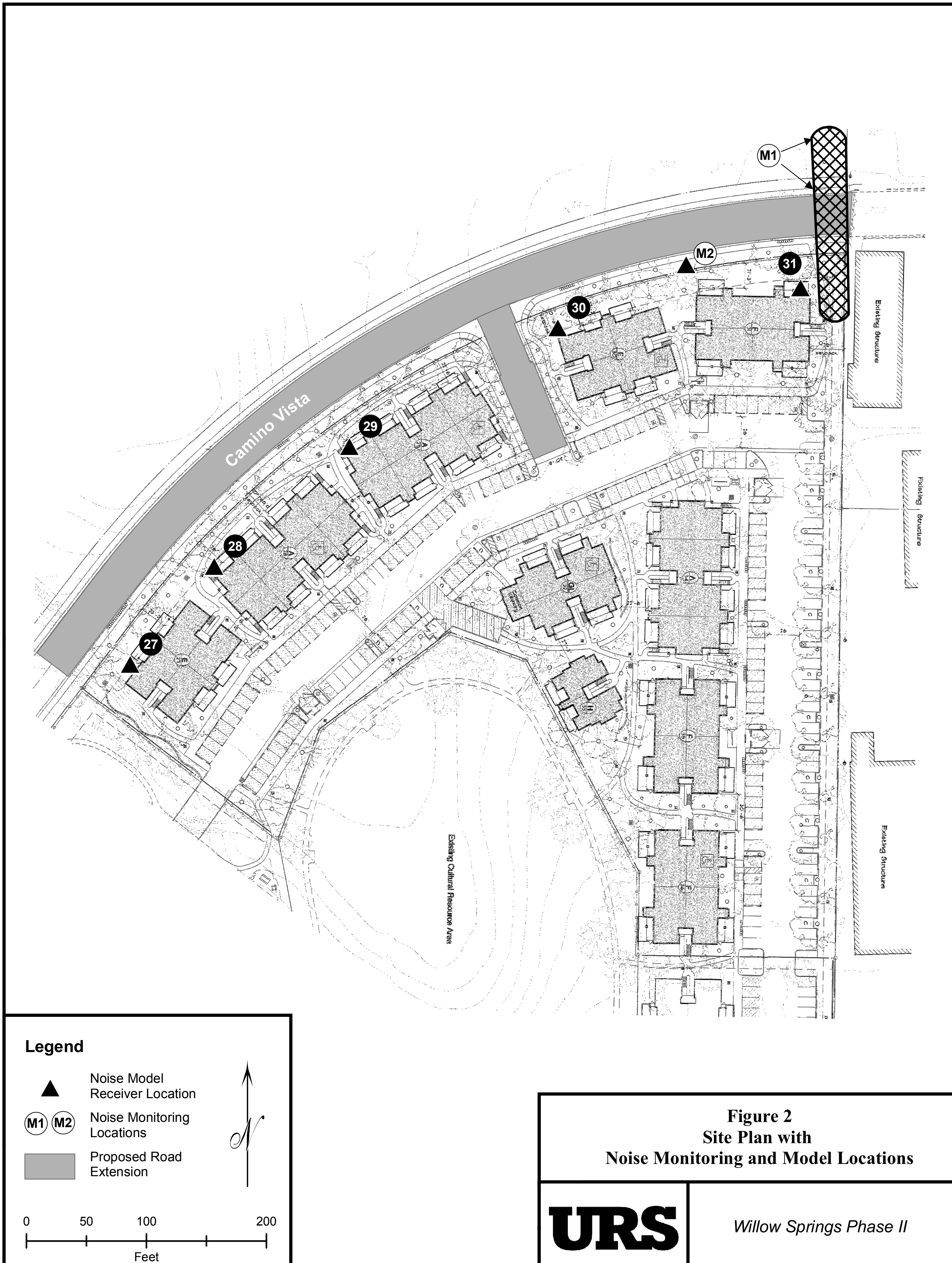

Figure 2
Site Plan with
Noise Monitoring and Model Locations

URS

Willow Springs Phase II

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APPENDIX A
NOISE MONITORING RESULTS

Table A-1: Noise Meter Settings

Noise Monitoring Results

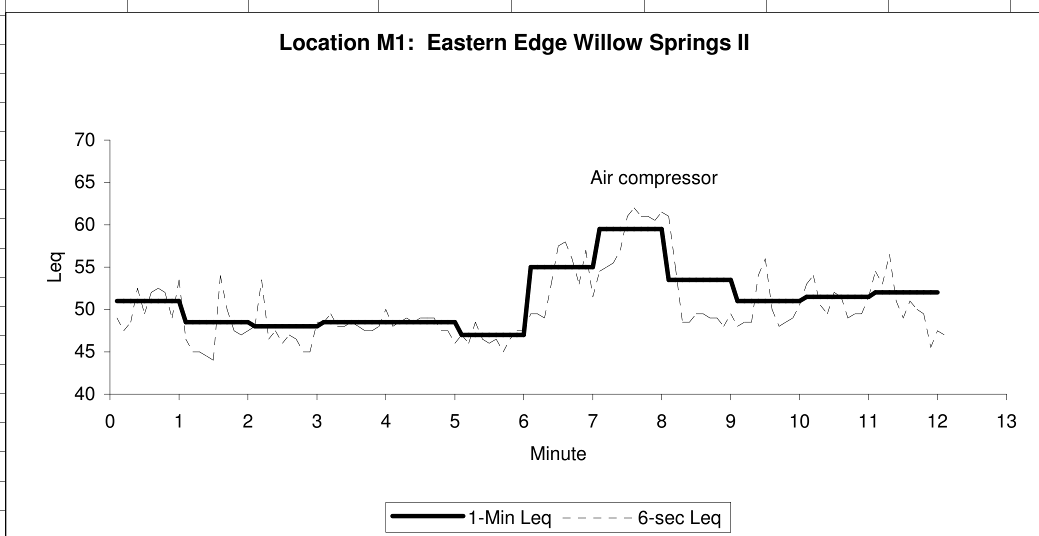
TABLE A-1
Noise Meter Settings

Meter	Larson Davis Model 700 SN B3255
Date	15-Jan-09
Time (total duration)	0001:22:37
Detector	SLOW
Weight	A
Unwgt Pk	OFF
Criterion	90
Threshold	32
Exchange rate	3
RMS Threshold	115
Pk Threshold	140
Hysteresis	2
Exceedances	0
Intervals	84
Int time	0:01
Intv Ln's	ON
History	828
Save Peaks	ON
Period	6

APPENDIX A:

Willow Springs Phase II Noise Measurements

Location	M1	Eastern Edge WS Phase II			1/15/2009				
Minute Number	Time	LVL	Lmin	Lmax	Lpk	L10	L33	L50	L90
1	11:03:58	51	43.5	65	84	54	49.5	48.5	45.5
2	11:04:58	48.5	42	70	88.5	48.5	46	45	43.5
3	11:05:58	48	42.5	65.5	93	49.5	46.5	45.5	44
4	11:06:58	48.5	44	59.5	82.5	50	48	47.5	46
5	11:07:58	48.5	43	57	73	50	48.5	48	46
6	11:08:58	47	42	59.5	77.5	48.5	46.5	46	44
7	11:09:58	55	45	73	87	58	53.5	51.5	48
8	11:10:58	59.5	49	66	79	62.5	61	59.5	53.5
9	11:11:58	53.5	44	65.5	87	59.5	49.5	48.5	47
10	11:12:58	51	44.5	64.5	82.5	53.5	50	49	47
11	11:13:58	51.5	45.5	61.5	80.5	54	51.5	50.5	47.5
12	11:14:58	52	42	67.5	82	55.5	51.5	50	45.5
13	11:15:58	47	43.5	50.5	78.5	50.5	48.5	47	45.5
Leq for Location =		52.6							



APPENDIX A:

Willow Springs Phase II Noise Measurements

Location	M2	North Edge WS Phase II			1/15/2009				
Minute Number	Time	LVL	Lmin	Lmax	Lpk	L10	L33	L50	L90
1	12:03:00	57	46.5	68	84	60	56.5	55	49.5
2									
3									
4	12:05:51	55	47.5	63.5	69.5	57.5	55.5	54	51
5	12:06:51	57.5	48.5	67.5	72.5	60.5	56.5	55.5	52
6	12:07:51	52.5	46.5	59.5	84.5	55	53	51.5	49
7	12:08:51	51	46	56.5	69.5	53	51.5	51	49
8	12:09:51	49	44.5	58	67	51	49.5	48.5	47
9	12:10:51	51.5	46	62.5	70.5	54	51	50	48
10	12:11:51	50	45	57	71	52.5	50.5	49.5	47.5
11	12:12:51	50	44	55.5	66.5	52	50	49	47
12	12:13:51	50	43.5	65.5	72	51.5	49.5	49	47
13	12:14:51	51.5	46	61.5	70	54	51	50.5	48
14	12:15:51	52	45	63.5	73	54.5	50.5	49.5	47.5
15	12:16:51	51.5	45	65.5	71.5	53.5	51	50	47.5
16	12:17:51	50.5	45	60	67	52.5	51	50	48
17	12:18:51	52.5	47	59.5	69	55.5	53	51.5	49
18	12:19:51	52	47	60.5	72	54.5	52	51	49
19	12:20:51	52	46	62.5	71	54	51.5	50.5	49
20	12:21:51	56	45.5	67.5	76	59.5	55.5	53.5	49.5
21	12:22:51	53.5	45.5	68.5	76	56.5	52	50	47
22	12:23:51	55	46	69	76.5	56.5	53	52	49.5
23	12:24:51	52	45	59.5	69.5	55.5	52	50.5	47.5
24	12:25:51	59	44.5	74.5	88.5	63	56.5	52.5	47
25	12:26:51	58.5	48	74	79.5	62.5	57	54.5	50
26	12:27:51	59	47.5	71.5	77.5	62.5	59	57	50.5
27	12:28:51	53.5	45.5	65.5	74	57	52	50.5	48
28	12:29:51	57	46.5	69.5	77.5	61	55.5	53	49
29	12:30:51	54.5	46.5	68.5	73	57.5	53.5	52	48.5
30	12:31:51	53	46	65.5	72.5	56	51	50	48
31	12:32:51	52.5	46	63.5	71	54.5	52.5	52	49.5
32	12:33:51	54	47.5	69.5	81	56	53	52	50
33	12:34:51	53.5	46	64.5	70	56.5	52.5	51.5	48.5
34	12:35:51	50.5	46.5	54.5	66	52.5	51	50	48.5
35	12:36:51	51.5	45.5	59	70	54.5	51	50	48
36	12:37:51	50.5	46	59.5	67.5	52.5	51	50	48
37	12:38:51	49	44.5	55	66	51	49.5	49	47
38	12:39:51	59.5	45	70.5	80.5	65	52	50.5	47.5
39	12:40:51	52	46.5	60	66.5	54.5	52.5	51	48.5
40	12:41:51	51.5	46	59	68.5	53	51.5	51	49
41	12:42:51	52	47	59.5	68.5	53.5	52	51	49
42	12:43:51	53.5	45	63.5	71	57	54	52	47.5
43	12:44:51	54	47.5	63	70	57.5	53	51	49
44	12:45:51	51	46.5	60.5	66	52.5	51	50.5	49
45	12:46:51	53	46.5	61	72.5	56	52	51	48.5
46	12:47:51	52	46.5	60.5	67.5	54	52	51	49
47	12:48:51	58	47.5	71	78.5	62.5	54	53	50
48	12:49:51	50.5	46	58.5	68	52.5	50.5	50	48
49	12:50:51	52	46	58.5	68.5	54.5	52	51	49
50	12:51:51	55.5	47.5	64	73	58	55.5	54	51.5

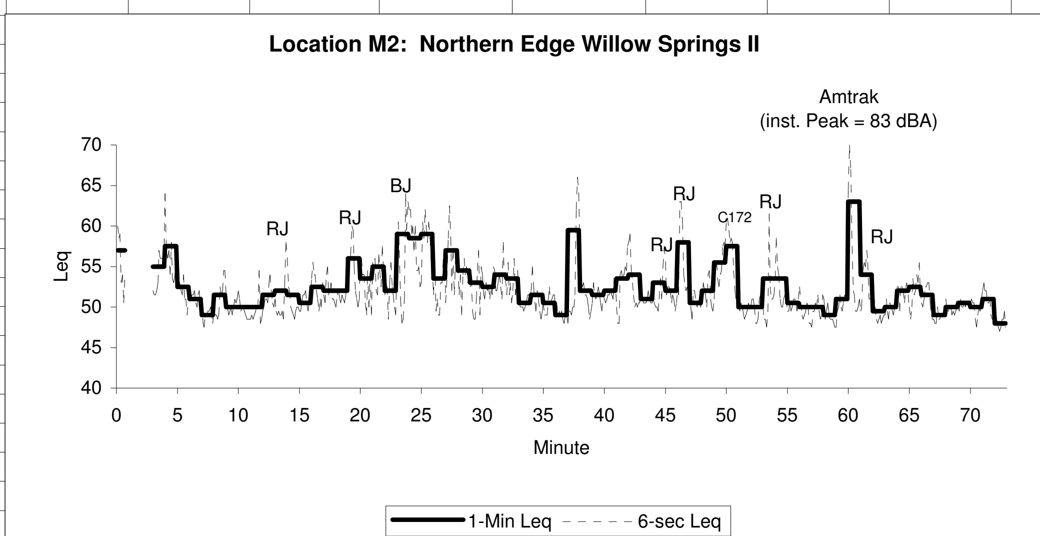
APPENDIX A:

Willow Springs Phase II Noise Measurements

Minute Number	Time	LVL	Lmin	Lmax	Lpk	L10	L33	L50	L90
51	12:52:51	57.5	46.5	66.5	76	61	58.5	57	50.5
52	12:53:51	50	45.5	54	66	51.5	50	49.5	47.5
53	12:54:51	50	44.5	55	64.5	52	50.5	49.5	47
54	12:55:51	53.5	44.5	69.5	80.5	54	51	50	47
55	12:56:51	53.5	46.5	61.5	72	56.5	53	51.5	49
56	12:57:51	50.5	46	55	65	52	50.5	50	48.5
57	12:58:51	50	45	57	65.5	52	50	49	47
58	12:59:51	50	44.5	55	65.5	52	50.5	49.5	47.5
59	13:00:51	49	44	55.5	63.5	51	49.5	48.5	46.5
60	13:01:51	51	45.5	59	67	53	51	50	47.5
61	13:02:51	63	46.5	72	83	69.5	56	52	48.5
62	13:03:51	54	47	64.5	75	57	53.5	52	49
63	13:04:51	49.5	45	54	65.5	51.5	49.5	49	47
64	13:05:51	50	45.5	54	63.5	51.5	50	49.5	47.5
65	13:06:51	52	45.5	62	70.5	54.5	52.5	51	48.5
66	13:07:51	52.5	44.5	61.5	71	55.5	52.5	51	48.5
67	13:08:51	51.5	45	60.5	70	54.5	51	50	47.5
68	13:09:51	49	44	56	67	50.5	49	48.5	46.5
69	13:10:51	50	45	56	65	52	50	49.5	47.5
70	13:11:51	50.5	45.5	55.5	66	52	50.5	50	48.5
71	13:12:51	50	45	59.5	67	52	50	49.5	47
72	13:13:51	51	45	60	72	54	51	50	47
73	13:14:51	48	43.5	56	66	50	48.5	48	46

Leq for Location = 53.9 (exclude min. 1-3)

Traffic Counts and Notes	Count Duration=			15	minutes	Speed approx. 35 mph
	Los Carneros Rd.			1,900 ft to CL road		
	For Period	**Per Hour**	%		Noise sources: very complex	
Autos	314	1256	95.2%		Los Carn. Rd.; s/b on-ramp; US 101 (partial)	
Med. Trks.	7	28	2.1%		Distant traffic (Aero Camino, Hollister Av.)	
Hvy. Trks.	2	8	0.6%		Occasional aircraft	
Busses	1	4	0.3%		Amtrak passenger train at minute 61.	
MC	6	24	1.8%		RJ, BJ = regional/business jet depart Runway 25	
Total	330	1320	100%		C172 = Cessna 172 (single engine piston airplane)	



APPENDIX B
INPUT DATA AND SOUND32 RESULTS

Table B-1: Calculations and Assumptions for TNM 2.5 Traffic Input Data
Table B-2: Model Results and Ldn Values

TNM 2.5 Input and Output Tables

TABLE B-1 (Revised)

Calculations and Assumptions for TNM 2.5 Traffic Input Data

		Assumptions for:			Daytime			Nighttime		
Street Segment	ADT	% Autos	% MT	% HT	Auto/hr	MT/hr	HT/hr	Auto/hr	MT/hr	HT/hr
Test 1										
US 101 (1)	77000	94.8%	1.7%	3.5%	4136	74	153	1217	22	45
Los Carneros Rd. (2)					1256	66	8			
LCR to 101 s/b ramp					564	30	4			
Current Conditions										
US 101 (1)	77000	94.8%	1.7%	3.5%	4136	74	153	1217	22	45
Los Carneros Rd. (3)	22050	94.4%	5.0%	0.6%	1180	62	8	347	18	2
LCR to 101 s/b ramp (4)	10542	94.4%	5.0%	0.6%	564	30	4	166	9	1
Future Conditions (2024)										
US 101 (5)	108703	94.8%	1.7%	3.5%	5840	105	216	1718	31	63
Los Carneros Rd. (3)	28500	94.4%	5.0%	0.6%	1525	80	10	449	24	3
LCR to 101 s/b ramp (4)	15087	94.4%	5.0%	0.6%	807	42	5	237	12	2
Camino Vista (project)	400	99.0%	1.0%	0.0%	22.4	0.2	0.0	6.6	0.1	0.0
(through traffic)	600	90.0%	6.0%	4.0%	20.4	1.4	0.9	6.0	0.4	0.3
Camino Vista total (6)	1000				43	2	1	13	0	0

ADT = Average Daily Traffic

Daytime = 7:00 a.m. to 10:00 p.m. 15 hours and 85% of ADT.

Nighttime = 10:00 p.m to 7:00 a.m. 9 hours and 15% of ADT.

MT = Medium duty trucks (3 axle or less)

HT = Heavy duty trucks (4 or more axles)

(1) ADT and vehiclte type distribution from Caltrans website, 2009. Most recent data from 2007.

(2) Field counts during noise measurement.

(3) Current and Future ADT from ATE 2009:Table 1 (Existing) and Table 8 (Cumulative).
Vehicle type distribution based on field counts.

(4) Ramp volumes extrapolated from Caltrans data through 2007, using growth rate of 2.4%/year,
and vehicle type distribution from surface street counts.

(5) Future highway and ramp volumes were extrapolated from 1998-2007 data, with growth rate of 2.4%/year.

(6) ADT estimated from total project traffic (ATE 2009:Table 3) using northern driveway, and
future total traffic volume (ATE 2009:27).
Nighttime values for Camino Vista were adjusted to: 9 autos, 1 MT, 1 HT and 1 bus and 1 motorcycle/hr for model purposes.

TABLE B-2 (Revised)
Model Results and Ldn Values

Model Test				
Receiver	**Description**	**Leq (dBA)**		
M2-2	near Bldg 31, NW corner, elev. 42			
	measured Leq	53.9		
	modelled Leq	53.5		
Current Traffic Volumes				
Receiver	**Description**	**LD (dBA)**	**LN (dBA)**	**Ldn (dBA)**
27-1	Bldg. 27, NW corner, ground floor	48.7	43.4	51.1
27-2	Bldg. 27, NW corner, second story	51.1	45.8	53.5
28-1	Bldg. 28, NW corner, ground floor	49.4	44.1	51.8
28-2	Bldg. 28, NW corner, second story	51.9	46.6	54.3
29-1	Bldg. 29, NW corner, ground floor	50.4	45.1	52.8
29-2	Bldg. 29, NW corner, second story	52.9	47.6	55.3
30-1	Bldg. 30, NW corner, ground floor	50.1	44.8	52.5
30-2	Bldg 30, NW corner, second story	53.0	47.7	55.4
M2-1	Bldg 31, near NW corner, ground floor	50.5	45.2	52.9
M2-2	Bldg. 31, near NW corner, second story	53.5	48.2	55.9
31-1	Bldg. 31, NE corner, ground floor	50.3	45.0	52.7
31-2	Bldg. 31, NE corner, second story	53.2	47.9	55.6
Cumulative Traffic Volumes (2024)				
Receiver	**Description**	**LD (dBA)**	**LN (dBA)**	**Ldn (dBA)**
27-1	Bldg. 27, NW corner, ground floor	53.5	50.2	57.3
27-2	Bldg. 27, NW corner, second story	54.6	50.9	58.1
28-1	Bldg. 28, NW corner, ground floor	53.7	50.3	57.4
28-2	Bldg. 28, NW corner, second story	55.0	51.2	58.4
29-1	Bldg. 29, NW corner, ground floor	54.3	50.6	57.8
29-2	Bldg. 29, NW corner, second story	55.8	51.7	59.0
30-1	Bldg. 30, NW corner, ground floor	53.7	50.0	57.2
30-2	Bldg 30, NW corner, second story	55.7	51.4	58.7
M2-1	40' from Camino Santa Fe CL, ground level	55.5	52.3	59.3
M2-2	40' from Camino Santa Fe CL, 10' above ground	57.0	53.3	60.5
31-1	Bldg. 31, NE corner, ground floor	53.6	49.8	57.0
31-2	Bldg. 31, NE corner, second story	55.6	51.3	58.6

WS II-2 - MODEL TEST											
[Revision includes USGS DEM CA State Plane Coordinates, updated site plan from MAC Design.]											
URS					7-Jun-10						
J. Larson					TNM 2.5						
INPUT: ROADWAYS							Average pavement type shall be used unless				
PROJECT/CONTRACT:	<Project Name?>						a State highway agency substantiates the use				
RUN:	**WSII-2 Model Test**						of a different type with the approval of FHWA				
Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Los Carneros Road	12	point9	9	6,002,744.00	1,985,501.00	22.9				Average	
		point10	10	6,002,944.00	1,985,861.00	32.8				Average	
		point11	11	6,002,997.00	1,986,198.00	39.4				Average	
		point12	12	6,003,002.00	1,986,396.00	43				Average	
		point13	13	6,003,006.00	1,986,534.00	46				Average	
		point14	14	6,003,005.00	1,986,680.00	54				Average	Y
		point23	23	6,003,013.00	1,986,843.00	58.4				Average	Y
		point24	24	6,003,023.00	1,986,998.00	60.7					
US Hwy 101	12	point15	15	6,002,767.00	1,986,807.00	62.3				Average	
		point16	16	6,003,091.00	1,986,847.00	54.8				Average	
		point17	17	6,003,375.00	1,986,864.00	38.7				Average	
		point18	18	6,003,564.00	1,986,873.00	29.5				Average	
		point19	19	6,003,736.00	1,986,873.00	30.3				Average	
		point20	20	6,004,012.00	1,986,872.00	29.3				Average	
		point21	21	6,004,080.00	1,986,872.00	28.9				Average	
		point22	22	6,004,244.00	1,986,872.00	29.3					
S Bound On Ramp	12	point25	25	6,003,124.00	1,986,652.00	48.4				Average	
		point26	26	6,003,270.00	1,986,670.00	39.9				Average	
		point27	27.00	6,003,528.00	1,986,704.00	39.4				Average	
		point28	28.00	6,003,826.00	1,986,739.00	29.5				Average	
		point29	29.00	6,004,121.00	1,986,764.00	29.5				Average	
		point30	30.00	6,004,285.00	1,986,773.00	29.5					
Camino Vista	12	point37	37.00	6,003,068.00	1,985,310.00	19.7				Average	
		point31	31.00	6,003,161.00	1,985,415.00	20.4				Average	
		point32	32.00	6,003,254.00	1,985,541.00	23				Average	
		point33	33.00	6,003,350.00	1,985,664.00	26.2				Average	
		point34	34	6,003,437.00	1,985,764.00	29.5				Average	
		point35	35	6,003,512.00	1,985,853.00	29.5				Average	
		point36	36	6,003,584.00	1,985,929.00	29.5				Average	
		point38	38.00	6,003,671.00	1,985,994.00	26.2				Average	
		point39	39.00	6,003,799.00	1,986,066.00	26.2				Average	
		point40	40.00	6,003,894.00	1,986,095.00	23				Average	
		point41	41.00	6,004,064.00	1,986,121.00	23				Average	
		point42	42.00	6,004,209.00	1,986,127.00	23				Average	
		point43	43.00	6,004,309.00	1,986,122.00	23					

URS					7-Jun-10								
J. Larson					TNM 2.5								
INPUT: TRAFFIC FOR LAeq1h Volumes													
RUN:	**WSII-2 Model Test**												
Roadway		Points											
Name		Name	No.	Segment									
				Autos		MTrucks		HTrucks		Buses		Motorcycles	
				V	S	V	S	V	S	V	S	V	S
				veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Los Carneros Road		point9	9	1256	35	64	35	8	30	1	30	1	35
		point10	10	1256	35	64	35	8	30	1	30	1	35
		point11	11	1256	35	64	35	8	30	1	30	1	35
		point12	12	1256	35	64	35	8	30	1	30	1	35
		point13	13	1256	35	64	35	8	30	1	30	1	35
		point14	14	1256	35	64	35	8	30	1	30	1	35
		point23	23	1256	35	64	35	8	30	1	30	1	35
		point24	24										
US Hwy 101		point15	15	4136	65	72	65	153	55	1	55	1	65
		point16	16	4136	65	72	65	153	55	1	55	1	65
		point17	17	4136	65	72	65	153	55	1	55	1	65
		point18	18	4136	65	72	65	153	55	1	55	1	65
		point19	19	4136	65	72	65	153	55	1	55	1	65
		point20	20	4136	65	72	65	153	55	1	55	1	65
		point21	21	4136	65	72	65	153	55	1	55	1	65
		point22	22										
S Bound On Ramp		point25	25	564	50	28	50	4	45	1	45	1	50
		point26	26	564	50	28	50	4	45	1	45	1	50
		point27	27	564	50	28	50	4	45	1	45	1	50
		point28	28	564	50	28	50	4	45	1	45	1	50
		point29	29	564	50	28	50	4	45	1	45	1	50
		point30	30										
Camino Vista		point37	37	0	0	0	0	0	0	0	0	0	0
		point31	31	0	0	0	0	0	0	0	0	0	0
		point32	32	0	0	0	0	0	0	0	0	0	0
		point33	33	0	0	0	0	0	0	0	0	0	0
		point34	34	0	0	0	0	0	0	0	0	0	0
		point35	35	0	0	0	0	0	0	0	0	0	0
		point36	36	0	0	0	0	0	0	0	0	0	0
		point38	38	0	0	0	0	0	0	0	0	0	0
		point39	39	0	0	0	0	0	0	0	0	0	0
		point40	40	0	0	0	0	0	0	0	0	0	0
		point41	41	0	0	0	0	0	0	0	0	0	0
		point42	42	0	0	0	0	0	0	0	0	0	0
		point43	43										

URS 7-Jun-10
J. Larson TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: <Project Name?>
RUN: **WSII-2 Model Test**

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
27-1	1	1.00	6,003,488.00	1,985,748.00	33	4.92	0	66	10	8	Y
27-2	2	1.00	6,003,489.00	1,985,748.00	43	4.92	0	66	10	8	Y
28-1	3	1.00	6,003,552.00	1,985,821.00	34	4.92	0	66	10	8	Y
28-2	4	1.00	6,003,553.00	1,985,821.00	44	4.92	0	66	10	8	Y
29-1	5	1.00	6,003,661.00	1,985,924.00	34	4.92	0	66	10	8	Y
29-2	6	1.00	6,003,662.00	1,985,924.00	44	4.92	0	66	10	8	Y
30-1	7	1.00	6,003,839.00	1,986,019.00	29.5	4.92	0	66	10	8	Y
30-2	8	1.00	6,003,840.00	1,986,019.00	39.5	4.92	0	66	10	8	Y
M2-1	9	1.00	6,003,950.00	1,986,069.00	28	4.92	0	66	10	8	Y
M2-2	10	1.00	6,003,951.00	1,986,069.00	38	4.92	0	66	10	8	Y
31-1	11	1.00	6,004,038.00	1,986,057.00	27	4.92	0	66	10	8	Y
31-2	12	1.00	6,004,039.00	1,986,057.00	37	4.92	0	66	10	8	Y

URS 7-Jun-10
J. Larson TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: <Project Name?>
RUN: **WSII-2 Model Test**

Barrier Name	Type	Points Name	No.	Coordinates (bottom) X	Y	Z	Height at Point	Segment Seg Ht Perturbs Incre-ment	#Up	#Dn	On Struct?	Important Reflec-tions?
				ft	ft	ft	ft	ft				
Northern Pad - barrier	B	point1	1	6,003,308.50	1,986,471.80	39.1	10	0	0	0		
		point2	2	6,003,594.00	1,986,496.20	36.1	10	0	0	0		
		point3	3	6,003,797.00	1,986,507.20	29.7	10	0	0	0		
		point4	4	6,004,049.50	1,986,523.20	26.2	10					

Traffic Noise Model
Input and Output Tables (Revised)

URS							7-Jun-10						
J. Larson							TNM 2.5						
							Calculated with TNM 2.5						
RESULTS: SOUND LEVELS		**MODEL TEST**											
PROJECT/CONTRACT:		<Project Name?>											
RUN:		**WSII-2 Model Test**											
BARRIER DESIGN:		INPUT HEIGHTS						Average pavement type shall be used unless					
								a State highway agency substantiates the use					
ATMOSPHERICS:		68 deg F, 50% RH						of a different type with approval of FHWA.					
Receiver													
Name	No.	#DUs	Existing	No Barrier					With Barrier				
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction			
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated	
							Sub'l Inc					minus	
												Goal	
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB	
27-1	1	1.00	0.00	48.8	66	48.8	10	----	48.8	0	8	-8	
27-2	2	1.00	0.00	51.2	66	51.2	10	----	51.2	0	8	-8	
28-1	3	1.00	0.00	49.4	66	49.4	10	----	49.4	0	8	-8	
28-2	4	1.00	0.00	51.9	66	51.9	10	----	51.9	0	8	-8	
29-1	5	1.00	0.00	50.4	66	50.4	10	----	50.4	0	8	-8	
29-2	6	1.00	0.00	53	66	53	10	----	53	0	8	-8	
30-1	7	1.00	0.00	50.1	66	50.1	10	----	50.1	0	8	-8	
30-2	8	1.00	0.00	53.1	66	53.1	10	----	53.1	0	8	-8	
M2-1	9	1.00	0.00	50.5	66	50.5	10	----	50.5	0	8	-8	
M2-2	**10**	**1.00**	**0.00**	**53.5**	66	53.5	10	----	53.5	0	8	-8	
31-1	11	1.00	0.00	50.3	66	50.3	10	----	50.3	0	8	-8	
31-2	12	1.00	0.00	53.2	66	53.2	10	----	53.2	0	8	-8	
Dwelling Units		# DUs	Noise Reduction										
			Min	Avg	Max								
			dB	dB	dB								
All Selected		12.00	0.00	0	0								
All Impacted		0.00	0.00	0	0								
All that meet NR Goal		0.00	0.00	0	0								

WS II-2 CURRENT DAY - ROADWAY GEMOETRY, RECEOVERS. AND BARROERS SAME AS MODEL TEST.													
URS					7-Jun-10								
J. Larson					TNM 2.5								
INPUT: TRAFFIC FOR LAeq1h Volumes													
PROJECT/CONTRACT:	<Project Name?>												
RUN:	WSII-2 Cur Day												
Roadway		Points											
Name		Name	No.	Segment									
				Autos		MTrucks		HTrucks		Buses		Motorcycles	
				V	S	V	S	V	S	V	S	V	S
				veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Los Carneros Road		point9	9	1180	35	60	35	8	30	1	30	1	35
		point10	10	1180	35	60	35	8	30	1	30	1	35
		point11	11	1180	35	60	35	8	30	1	30	1	35
		point12	12	1180	35	60	35	8	30	1	30	1	35
		point13	13	1180	35	60	35	8	30	1	30	1	35
		point14	14	1180	35	60	35	8	30	1	30	1	35
		point23	23	1180	35	60	35	8	30	1	30	1	35
		point24	24										
US Hwy 101		point15	15	4136	65	72	65	153	55	1	55	1	65
		point16	16	4136	65	72	65	153	55	1	55	1	65
		point17	17	4136	65	72	65	153	55	1	55	1	65
		point18	18	4136	65	72	65	153	55	1	55	1	65
		point19	19	4136	65	72	65	153	55	1	55	1	65
		point20	20	4136	65	72	65	153	55	1	55	1	65
		point21	21	4136	65	72	65	153	55	1	55	1	65
		point22	22										
S Bound On Ramp		point25	25	564	50	28	50	4	45	1	45	1	50
		point26	26	564	50	28	50	4	45	1	45	1	50
		point27	27	564	50	28	50	4	45	1	45	1	50
		point28	28	564	50	28	50	4	45	1	45	1	50
		point29	29	564	50	28	50	4	45	1	45	1	50
		point30	30										
Camino Vista		point37	37	0	0	0	0	0	0	0	0	0	0
		point31	31	0	0	0	0	0	0	0	0	0	0
		point32	32	0	0	0	0	0	0	0	0	0	0
		point33	33	0	0	0	0	0	0	0	0	0	0
		point34	34	0	0	0	0	0	0	0	0	0	0
		point35	35	0	0	0	0	0	0	0	0	0	0
		point36	36	0	0	0	0	0	0	0	0	0	0
		point38	38	0	0	0	0	0	0	0	0	0	0
		point39	39	0	0	0	0	0	0	0	0	0	0
		point40	40	0	0	0	0	0	0	0	0	0	0
		point41	41	0	0	0	0	0	0	0	0	0	0
		point42	42	0	0	0	0	0	0	0	0	0	0
		point43	43										

Traffic Noise Model
Input and Output Tables (Revised)

RESULTS: SOUND LEVELS		**CURRENT DAYTIME**										
PROJECT/CONTRACT:		<Project Name?>										
RUN:		WSII-2 Cur Day										
BARRIER DESIGN:		INPUT HEIGHTS						Average pavement type shall be used unless				
								a State highway agency substantiates the use				
ATMOSPHERICS:		68 deg F, 50% RH						of a different type with approval of FHWA.				
Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
27-1	1	1	0	48.7	66	48.7	10	----	48.7	0	8	-8
27-2	2	1	0	51.1	66	51.1	10	----	51.1	0	8	-8
28-1	3	1	0	49.4	66	49.4	10	----	49.4	0	8	-8
28-2	4	1	0	51.9	66	51.9	10	----	51.9	0	8	-8
29-1	5	1	0	50.4	66	50.4	10	----	50.4	0	8	-8
29-2	6	1	0	52.9	66	52.9	10	----	52.9	0	8	-8
30-1	7	1	0	50.1	66	50.1	10	----	50.1	0	8	-8
30-2	8	1	0	53	66	53	10	----	53	0	8	-8
M2-1	9	1	0	50.5	66	50.5	10	----	50.5	0	8	-8
M2-2	10	1	0	53.5	66	53.5	10	----	53.5	0	8	-8
31-1	11	1	0	50.3	66	50.3	10	----	50.3	0	8	-8
31-2	12	1	0	53.2	66	53.2	10	----	53.2	0	8	-8
Dwelling Units		# DUs	Noise Reduction									
			Min	Avg	Max							
			dB	dB	dB							
All Selected		12	0	0	0							
All Impacted		0	0	0	0							
All that meet NR Goal		0	0	0	0							

WS II-2 CURRENT NIGHT - ROADWAY GEOMETRY, RECEIVERS, AND BARRIER SAME AS MODEL TEST													
URS					7-Jun-10								
J. Larson					TNM 2.5								
INPUT: TRAFFIC FOR LAeq1h Volumes													
PROJECT/CONTRACT:	<Project Name?>												
RUN:	WSII-2 Cur Night												
Roadway		Points											
Name		Name	No.	Segment									
				Autos		MTrucks		HTrucks		Buses		Motorcycles	
				V	S	V	S	V	S	V	S	V	S
				veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Los Carneros Road		point9	9	347	35	16	35	2	30	1	30	1	35
		point10	10	347	35	16	35	2	30	1	30	1	35
		point11	11	347	35	16	35	2	30	1	30	1	35
		point12	12	347	35	16	35	2	30	1	30	1	35
		point13	13	347	35	16	35	2	30	1	30	1	35
		point14	14	347	35	16	35	2	30	1	30	1	35
		point23	23	347	35	16	35	2	30	1	30	1	35
		point24	24										
US Hwy 101		point15	15	1217	65	20	65	45	55	1	55	1	65
		point16	16	1217	65	20	65	45	55	1	55	1	65
		point17	17	1217	65	20	65	45	55	1	55	1	65
		point18	18	1217	65	20	65	45	55	1	55	1	65
		point19	19	1217	65	20	65	45	55	1	55	1	65
		point20	20	1217	65	20	65	45	55	1	55	1	65
		point21	21	1217	65	20	65	45	55	1	55	1	65
		point22	22										
S Bound On Ramp		point25	25	166	50	7	50	1	45	1	45	1	50
		point26	26	166	50	7	50	1	45	1	45	1	50
		point27	27	166	50	7	50	1	45	1	45	1	50
		point28	28	166	50	7	50	1	45	1	45	1	50
		point29	29	166	50	7	50	1	45	1	45	1	50
		point30	30										
Camino Vista		point37	37	0	0	0	0	0	0	0	0	0	0
		point31	31	0	0	0	0	0	0	0	0	0	0
		point32	32	0	0	0	0	0	0	0	0	0	0
		point33	33	0	0	0	0	0	0	0	0	0	0
		point34	34	0	0	0	0	0	0	0	0	0	0
		point35	35	0	0	0	0	0	0	0	0	0	0
		point36	36	0	0	0	0	0	0	0	0	0	0
		point38	38	0	0	0	0	0	0	0	0	0	0
		point39	39	0	0	0	0	0	0	0	0	0	0
		point40	40	0	0	0	0	0	0	0	0	0	0
		point41	41	0	0	0	0	0	0	0	0	0	0
		point42	42	0	0	0	0	0	0	0	0	0	0
		point43	43										

Traffic Noise Model
Input and Output Tables (Revised)

URS							7-Jun-10						
J. Larson							TNM 2.5						
							Calculated with TNM 2.5						
RESULTS: SOUND LEVELS		**CURRENT NIGHTTIME**											
PROJECT/CONTRACT:		<Project Name?>											
RUN:		WSII-2 Cur Night											
BARRIER DESIGN:		INPUT HEIGHTS						Average pavement type shall be used unless					
								a State highway agency substantiates the use					
ATMOSPHERICS:		68 deg F, 50% RH						of a different type with approval of FHWA.					
Receiver													
Name	No.	#DUs	Existing	No Barrier					With Barrier				
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction			
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated	
							Sub'l Inc					minus	
												Goal	
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB	
27-1	1	1	0	43.4	66	43.4	10	----	43.4	0	8	-8	
27-2	2	1	0	45.8	66	45.8	10	----	45.8	0	8	-8	
28-1	3	1	0	44.1	66	44.1	10	----	44.1	0	8	-8	
28-2	4	1	0	46.6	66	46.6	10	----	46.6	0	8	-8	
29-1	5	1	0	45.1	66	45.1	10	----	45.1	0	8	-8	
29-2	6	1	0	47.6	66	47.6	10	----	47.6	0	8	-8	
30-1	7	1	0	44.8	66	44.8	10	----	44.8	0	8	-8	
30-2	8	1	0	47.7	66	47.7	10	----	47.7	0	8	-8	
M2-1	9	1	0	45.2	66	45.2	10	----	45.2	0	8	-8	
M2-2	10	1	0	48.2	66	48.2	10	----	48.2	0	8	-8	
31-1	11	1	0	45	66	45	10	----	45	0	8	-8	
31-2	12	1	0	47.9	66	47.9	10	----	47.9	0	8	-8	
Dwelling Units		# DUs	Noise Reduction										
			Min	Avg	Max								
			dB	dB	dB								
All Selected		12	0	0	0								
All Impacted		0	0	0	0								
All that meet NR Goal		0	0	0	0								

WS II-2 FUTURE DAY TIME - ROADWAY GEOMETRY, RECEIVERS, AND BARRIERS SAME AS MODEL TEST

URS — 7-Jun-10
J. Larson — TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: <Project Name?>
RUN: WSII-2 Future Day

Roadway		Points											
Name		Name	No.	Segment									
				Autos		MTrucks		HTrucks		Buses		Motorcycles	
				V	S	V	S	V	S	V	S	V	S
				veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Los Carneros Road		point9	9	1525	35	78	35	10	30	1	30	1	35
		point10	10	1525	35	78	35	10	30	1	30	1	35
		point11	11	1525	35	78	35	10	30	1	30	1	35
		point12	12	1525	35	78	35	10	30	1	30	1	35
		point13	13	1525	35	78	35	10	30	1	30	1	35
		point14	14	1525	35	78	35	10	30	1	30	1	35
		point23	23	1525	35	78	35	10	30	1	30	1	35
		point24	24										
US Hwy 101		point15	15	5840	65	103	65	216	55	1	55	1	65
		point16	16	5840	65	103	65	216	55	1	55	1	65
		point17	17	5840	65	103	65	216	55	1	55	1	65
		point18	18	5840	65	103	65	216	55	1	55	1	65
		point19	19	5840	65	103	65	216	55	1	55	1	65
		point20	20	5840	65	103	65	216	55	1	55	1	65
		point21	21	5840	65	103	65	216	55	1	55	1	65
		point22	22										
S Bound On Ramp		point25	25	807	50	40	50	5	45	1	45	1	50
		point26	26	807	50	40	50	5	45	1	45	1	50
		point27	27	807	50	40	50	5	45	1	45	1	50
		point28	28	807	50	40	50	5	45	1	45	1	50
		point29	29	807	50	40	50	5	45	1	45	1	50
		point30	30										
Camino Vista		point37	37	41	30	2	30	1	30	1	30	1	30
		point31	31	41	30	2	30	1	30	1	30	1	30
		point32	32	41	30	2	30	1	30	1	30	1	30
		point33	33	41	30	2	30	1	30	1	30	1	30
		point34	34	41	30	2	30	1	30	1	30	1	30
		point35	35	41	30	2	30	1	30	1	30	1	30
		point36	36	41	30	2	30	1	30	1	30	1	30
		point38	38	41	30	2	30	1	30	1	30	1	30
		point39	39	41	30	2	30	1	30	1	30	1	30
		point40	40	41	30	2	30	1	30	1	30	1	30
		point41	41	41	30	2	30	1	30	1	30	1	30
		point42	42	41	30	2	30	1	30	1	30	1	30
		point43	43										

URS							7-Jun-10					
J. Larson							TNM 2.5					
							Calculated with TNM 2.5					
RESULTS: SOUND LEVELS		**FUTURE DAY TIME**										
PROJECT/CONTRACT:		<Project Name?>										
RUN:		WSII-2 Future Day										
BARRIER DESIGN:		INPUT HEIGHTS						Average pavement type shall be used unless				
								a State highway agency substantiates the use				
ATMOSPHERICS:		68 deg F, 50% RH						of a different type with approval of FHWA.				
Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
27-1	1	1	0	53.5	66	53.5	10	----	53.5	0	8	-8
27-2	2	1	0	54.6	66	54.6	10	----	54.6	0	8	-8
28-1	3	1	0	53.7	66	53.7	10	----	53.7	0	8	-8
28-2	4	1	0	55	66	55	10	----	55	0	8	-8
29-1	5	1	0	54.3	66	54.3	10	----	54.3	0	8	-8
29-2	6	1	0	55.8	66	55.8	10	----	55.8	0	8	-8
30-1	7	1	0	53.7	66	53.7	10	----	53.7	0	8	-8
30-2	8	1	0	55.7	66	55.7	10	----	55.7	0	8	-8
M2-1	9	1	0	55.5	66	55.5	10	----	55.5	0	8	-8
M2-2	10	1	0	57	66	57	10	----	57	0	8	-8
31-1	11	1	0	53.6	66	53.6	10	----	53.6	0	8	-8
31-2	12	1	0	55.6	66	55.6	10	----	55.6	0	8	-8
Dwelling Units		# DUs	Noise Reduction									
			Min	Avg	Max							
			dB	dB	dB							
All Selected		12	0	0	0							
All Impacted		0	0	0	0							
All that meet NR Goal		0	0	0	0							

WS II-2 FUTURE NIGHT - ROADWAY GEOMETRY, RECEIVERS, AND BARRIERS SAME AS MODEL TEST

URS					7-Jun-10								
J. Larson					TNM 2.5								
INPUT: TRAFFIC FOR LAeq1h Volumes													
PROJECT/CONTRACT:	<Project Name?>												
RUN:	WSII-2 Future Night												
Roadway		Points											
Name		Name	No.	Segment									
				Autos		MTrucks		HTrucks		Buses		Motorcycles	
				V	S	V	S	V	S	V	S	V	S
				veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Los Carneros Road		point9	9	449	35	22	35	3	30	1	30	1	35
		point10	10	449	35	22	35	3	30	1	30	1	35
		point11	11	449	35	22	35	3	30	1	30	1	35
		point12	12	449	35	22	35	3	30	1	30	1	35
		point13	13	449	35	22	35	3	30	1	30	1	35
		point14	14	449	35	22	35	3	30	1	30	1	35
		point23	23	449	35	22	35	3	30	1	30	1	35
		point24	24										
US Hwy 101		point15	15	1718	65	29	65	63	55	1	55	1	65
		point16	16	1718	65	29	65	63	55	1	55	1	65
		point17	17	1718	65	29	65	63	55	1	55	1	65
		point18	18	1718	65	29	65	63	55	1	55	1	65
		point19	19	1718	65	29	65	63	55	1	55	1	65
		point20	20	1718	65	29	65	63	55	1	55	1	65
		point21	21	1718	65	29	65	63	55	1	55	1	65
		point22	22										
S Bound On Ramp		point25	25	237	50	10	50	2	45	1	45	1	50
		point26	26	237	50	10	50	2	45	1	45	1	50
		point27	27	237	50	10	50	2	45	1	45	1	50
		point28	28	237	50	10	50	2	45	1	45	1	50
		point29	29	237	50	10	50	2	45	1	45	1	50
		point30	30										
Camino Vista		point37	37	11	30	1	30	1	30	1	30	1	30
		point31	31	11	30	1	30	1	30	1	30	1	30
		point32	32	11	30	1	30	1	30	1	30	1	30
		point33	33	11	30	1	30	1	30	1	30	1	30
		point34	34	11	30	1	30	1	30	1	30	1	30
		point35	35	11	30	1	30	1	30	1	30	1	30
		point36	36	11	30	1	30	1	30	1	30	1	30
		point38	38	11	30	1	30	1	30	1	30	1	30
		point39	39	11	30	1	30	1	30	1	30	1	30
		point40	40	11	30	1	30	1	30	1	30	1	30
		point41	41	11	30	1	30	1	30	1	30	1	30
		point42	42	11	30	1	30	1	30	1	30	1	30
		point43	43										

URS							7-Jun-10							
J. Larson							TNM 2.5							
							Calculated with TNM 2.5							
RESULTS: SOUND LEVELS		**FUTURE NIGHTTIME**												
PROJECT/CONTRACT:		<Project Name?>												
RUN:		WSII-2 Future Night												
BARRIER DESIGN:		INPUT HEIGHTS						Average pavement type shall be used unless						
								a State highway agency substantiates the use						
ATMOSPHERICS:		68 deg F, 50% RH						of a different type with approval of FHWA.						
Receiver														
Name	No.	#DUs	Existing	No Barrier					With Barrier					
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction				
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated		
							Sub'l Inc					minus		
												Goal		
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB		
27-1	1	1	0	50.2	66	50.2	10	----	50.2	0	8	-8		
27-2	2	1	0	50.9	66	50.9	10	----	50.9	0	8	-8		
28-1	3	1	0	50.3	66	50.3	10	----	50.3	0	8	-8		
28-2	4	1	0	51.2	66	51.2	10	----	51.2	0	8	-8		
29-1	5	1	0	50.6	66	50.6	10	----	50.6	0	8	-8		
29-2	6	1	0	51.7	66	51.7	10	----	51.7	0	8	-8		
30-1	7	1	0	50	66	50	10	----	50	0	8	-8		
30-2	8	1	0	51.4	66	51.4	10	----	51.4	0	8	-8		
M2-1	9	1	0	52.3	66	52.3	10	----	52.3	0	8	-8		
M2-2	10	1	0	53.3	66	53.3	10	----	53.3	0	8	-8		
31-1	11	1	0	49.8	66	49.8	10	----	49.8	0	8	-8		
31-2	12	1	0	51.3	66	51.3	10	----	51.3	0	8	-8		
Dwelling Units		# DUs	Noise Reduction											
			Min	Avg	Max									
			dB	dB	dB									
All Selected		12	0	0	0									
All Impacted		0	0	0	0									
All that meet NR Goal		0	0	0	0									

REVISED COMMUNITY NOISE ANALYSIS FOR WILLOW SPRINGS PHASE II

Goleta, California

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June 2010

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This report presents the results of monitoring and computations of the outdoor noise levels at the site of the Willow Springs Phase II apartment project, in the City of Goleta, California.

The Willow Springs Phase II project site is located approximately one-half mile north of the Santa Barbara Airport (see Figure 1). The Union Pacific Railroad (UPRR) line is located adjacent to the northerly property boundary, and U.S. Highway 101 lies just to the north of the railroad. The project site includes 4.5 acres and will be developed with 100 apartments in 10 buildings.

The project is the second phase of the Willow Springs development that was originally approved under the County of Santa Barbara jurisdiction. The larger Willow Springs project area occupies about 25 acres between Hollister Avenue on the south and the Union Pacific Railroad (UPRR) tracks on the north, and generally east of Los Carneros Road. An oval shaped open area approximately 200 feet in diameter separates a portion of the proposed Phase II development from existing apartments to the south and southwest.

The City of Goleta noise standards establish a Day-Night Average Noise Level (Ldn) of 65 decibels (dBA) as the maximum noise level considered conditionally acceptable for residential development; and 60 dBA is considered normally acceptable. City of Goleta and California standards also require that the interior Ldn of multi-family residences not exceed 45 dBA. The results of this report indicate that all residences proposed for this project will comply with both the exterior and interior standards. No special setback, design, or architectural measures are necessary to mitigate noise effects within the project. The 2010 revision to this report revises the roadway noise predictions to account for potential truck traffic crossing through the project from the light manufacturing uses to the east. This addition causes a very slight increase in roadway traffic noise levels, but the exterior Ldn at all proposed residences would remain below the 60 dBA standard. Thus, there are no changes in the conclusions or recommendations from the earlier report.

Construction noise from the project represents a potential significant impact to the existing residents in the Willow Springs neighborhood. Mitigation measures including timing restrictions on construction activities and other measures to place noise generating activities as far as possible from existing residents are identified in Section 4.0.

2.1 NOISE STANDARDS

2.1.1 Residential Noise Standards

The City of Goleta Noise Element (City of Goleta 2006) provides a thorough background discussion of noise and its effects on human health and quality of life. The Noise Element provides general information about typical noise levels throughout the City, describes how noise is measured, and presents the objectives and policies of the City relative to maintaining acceptable noise levels for residents and other sensitive land uses.

The City requires that potential noise effects be evaluated in terms of either the Community Noise Equivalent Level (CNEL) or the Day-Night Average Noise Level (Ldn), and establishes maximum noise levels that are considered compatible with various land uses (City of Goleta 2006:Table 9-2). Both CNEL and Ldn are based on hourly average noise levels during different times of the day, and include an adjustment or penalty for noise during evening and/or nighttime hours. Results computed in both methods usually agree within 1-2 decibels, and the two descriptors are often used interchangeably in establishing standards and for characterizing community noise levels that originate from diverse sources. The Ldn is used in this report, and is defined more completely below. Where standards or specific measurements from other sources are based on the CNEL, that term is used. All noise levels used in the standards and measurements described in this report are expressed as decibels, using the "A" weighted frequency response that duplicates the sensitivity of the human ear (abbreviated dBA).

An additional term used in this report and in describing noise standards is "Equivalent Noise Level" or Leq. For a noise of varying loudness over a defined time period, the Leq is the constant value that represents the same amount of energy. Leq values are usually expressed for 1-hour periods, as in the hourly average noise levels that are used to define the Ldn described above. However, Leq values may be expressed for longer or shorter time periods. Noise monitoring results presented in this report (Appendix A) include Leq values for 1-minute periods, as well as for the duration of the measurement at each point.

The basic standards for residential development are described in Policy NE 1.2 of the Noise Element, which reads as follows:

> **NE 1.2 Location of New Residential Development. [GP]** Where sites, or portions of sites, designated by the land use element for residential use exceed 60 dBA CNEL, the City shall require measures to be incorporated into the design of projects that will mitigate interior noise levels and noise levels for exterior living and play areas to an acceptable level. In the event that a proposed residential or mixed-use project exceeds these standards, the project may be approved only if it would provide a substantial benefit to the City,

> including, but not limited to, provision of affordable residential units. Mitigation measures shall reduce interior noise levels to 45 dBA CNEL or less, while noise levels at exterior living areas and play areas should in general not exceed 60 dBA CNEL and 65 dBA CNEL, respectively.

The above policy and criteria in the Noise Element establish that 60 dBA is the maximum exterior CNEL (or Ldn) that is normally compatible with residential development. This limit may be extended up to 65 dBA if noise mitigation features are included within project designs (City of Goleta 2006:Table 9-2).

With respect to interior noise levels in residences, the 45 dBA threshold set forth in the above policy reflects the identical standard in the California Building Code that applies to multifamily residences (Title 24 Code of California Regulations Sections Section 1207.11.12)).

The exterior and interior noise standards are consistent with one another since normal wood frame residential construction usually provides from 12 to 18 dBA of reduction from exterior to interior areas, and 20 dBA is commonly achieved in modern structures that meet current energy conservation requirements. An older guidance document by the U.S. Environmental Protection Agency indicates a reduction ranging from 12 to 17 dBA with windows open, and 24 to 27 dBA with windows closed (U.S. EPA 1978:Table II). Recent field measurements at an apartment complex with construction very similar to Willow Springs showed an exterior-to-interior noise reduction of 19.7 dBA with windows open in an unfurnished bedroom (URS Corporation 2009:3). Thus, an exterior Ldn of 65 dBA will usually provide an interior Ldn of 45 dBA with current construction techniques and materials. The state standards also require an acoustical analysis for all multi-family units located in areas where the Ldn exceeds 60 dBA, in order to demonstrate that the interior standard will be met.

Standards for outdoor recreation areas or parks include the following:

(1) from the last sentence of Policy NE 1.2 above, exterior living areas should in general not exceed 60 dBA CNEL, and play areas should in general not exceed 65 dBA CNEL,

(2) from Table 9-2 in the City Noise Element, a CNEL ranging from 50-70 dBA is considered normally acceptable for playgrounds and neighborhood parks.

2.1.2 Construction Noise Requirements

The City of Goleta has not adopted a Noise Ordinance intended to control noise from specific uses or activities, but the City does use the Thresholds and Guidelines Manual prepared by the County of Santa Barbara (2002:133) to evaluate noise from construction activities and to identify appropriate conditions of approval to reduce construction noise effects from projects. This threshold assumes a general construction source noise of 95 dBA at a distance of 50 feet, and concludes that all locations within 1,600 feet will potentially be subject to construction noise levels in excess of 65 dBA (based on a point source noise attenuation rate of 6 dBA per doubling of distance). These guidelines also provide general direction for standard construction noise mitigation measures including:

- Construction within 1,600 feet of sensitive receptors shall be limited to weekdays between the hours of 8:00 a.m. to 5:00 p.m. only
- Noise attenuation barriers and muffling of grading equipment may also be required
- Construction equipment generating noise levels above 95 dBA may require additional mitigation

2.1.3 Industrial Zone Performance Standard

Land to the east of the Willow Springs Phase II project site is zoned M-1, Light Industry, and is currently developed with such uses. Section 35-85.7 of the City Zoning Regulations sets forth performance standards for such uses in the M-1 zone, and requires:

> The volume of sound, measured during calm air conditions, inherently and recurrently generated by or resulting from any use, other than motor vehicles, operated on any lot shall not exceed seventy (70) decibels at any point along the boundary or outside of the lot upon which such use is located.

This standard does not apply to the Willow Springs Phase II project, but does provide guidance in evaluating the effects of noise from the adjacent industrial uses to the east.

2.2 NOISE MONITORING RESULTS

2.2.1 Roadway Traffic Noise

Figure 1 shows the property location relative to the surrounding areas. The northeastern area of the larger Willow Springs property has been covered by earthen fill that raises the ground elevation by approximately 10-12 feet above adjacent land. This fill extends into the northeastern corner of the Phase II project site, but will be removed so that the Camino Vista can be extended to form the northern boundary for Phase II and the proposed apartments can be constructed at an accessible elevation.

Noise levels on the property were monitored on January 15, 2009, with a Larson-Davis Noise Level Meter. Two areas (M1 and M2) were monitored and are shown in Figure 2. M1 covered the strip of land along the eastern project boundary adjacent to existing industrial uses discussed more in Section 2.2.2 below. A second point (M2) was located near the proposed residential structure most exposed to the dominant noise sources (vehicle traffic). This second point was near the northwest corner of proposed Building 31 on top of the stockpiled fill in this part of the project site. The ground elevation of about 35 feet above mean sea level (msl) was higher than the designed finished floor elevation, and about two feet below the proposed second story floor elevation for Building 31. The noise meter microphone was mounted at a height of about 7 feet above the ground surface to provide a resulting elevation of about 42 feet msl, which is a close approximation to a person standing on a second story balcony at this location. The meter location was closer to the alignment of Camino Vista, however, being about 40 feet from the centerline of the roadway, while the nearest building (number 30) would be about 60 feet from the centerline.

Weather conditions were clear and cool, with very little wind. Following routine monitoring procedures, the noise meter was calibrated at 94 and 114 decibels before the measurements, and the calibration was confirmed after the measurements. Settings on the meter are shown in Table A-1 in Appendix A. Noise monitoring results, along with traffic counts on Los Carneros Road and other observations are shown in Appendix A. The column labeled “LVL” in Appendix A presents the Leq (defined in Section 2.1.1 above) for each one-minute interval during the measurement period. Leq values for shorter periods are also shown in Appendix A, including 6-seconds (graphed only) and 1/8-second (shown as Lmax), along with instantaneous peak values. The computed Leq values for the duration of the measurement period at each of the monitoring points are also shown. The locations of the monitoring areas, which are discussed further below, are shown in Figure 2.

The dominant noise on the property originates from vehicle traffic on Los Carneros Road and on the southbound on-ramp entering Highway 101 north of the site. The highway itself also contributes some noise. The large earthen berm supporting the southbound on-ramp blocks the line of sight to the highway and much of its vehicle noise. Other noise sources were present, including distant aircraft, local small aircraft operations, and a single audible Amtrak passenger train on the UPRR tracks.

For monitoring point M2, which was chosen to provide a characterization of roadway traffic noise, the 1-minute Leq values generally ranged between 50 and 60 dBA, and the overall Leq for the 70 minute monitoring period was 53.9 dBA.

2.2.2 Industrial Noises

The noise measurements in Appendix A for area M1 were obtained by carrying the noise meter and walking slowly along the eastern property boundary northward and southward from the existing stub-out of Camino Vista west of Aero Camino. Several light industrial uses occur in this area, including semi-enclosed machining areas and loading docks. Noise sources included a medium-duty truck entering and leaving a loading area, large fans providing building ventilation, electrically-driven fluid pumps, and one noticeable air compressor that cycled on and off one time during the measurement. The highest one-minute Leq value was 59.5 dBA from the air compressor, which was at a distance of about 15 feet when this measurement was made. The overall Leq along this property line was 52.6 dBA.

2.2.3 Railroad Noise

The UPRR line is located immediately north of the project. The Goleta Noise Element states that maximum instantaneous noise levels from passing trains range from 96 to 100 dBA at a distance of 100 feet, and that the average CNEL at this distance ranges from 70 to 75 dBA (City of Goleta 2006:9-3). Measurements of train noise nearby for the Village at Los Carneros (City of Goleta 2007:6) gave results similar to this estimate with peak noise levels at 100 feet of 93.5 dBA for an Amtrak passenger train and 99.0 dBA for a freight train.

During the noise measurements for the Willow Springs Phase II project, two Amtrak passenger trains passed the project site. The first, just at the beginning of the measurement at point M2, involved an Amtrak train moving very slowly northward, perhaps on the siding adjacent to the UPRR main line. Then the train moved slowly southward (eastward) towards the Goleta station. These very slow movements did not generate any discernable noise. Near the end of the measurement period, however, the train sounded its horn one time and then departed the Goleta station moving quickly northward on the UPRR mainline. As shown in the measurements in Appendix A, this movement resulted in a peak in the noise measurement at minute 61 with the following values:

1-minute Leq	63.0 dBA
6-sec Leq	70.0 dBA
Maximum slow meter (1/8 sec) reading during minute	72.0 dBA
Instantaneous peak noise level	83.0 dBA

The 1-minute and 6-second Leq values are graphed in Appendix A, where the peak due to the train passage is obvious, and the other values are included in the tabulated noise measurements. The monitoring point M2 is approximately 560 feet from the UPRR tracks. Adjusting for distance, the instantaneous peak noise level at 100 feet from this train passage was 98.0 dBA, which agrees well with the values cited earlier from the City Noise Element and prior measurements for the Village at Los Carneros.

Based on this result, and on the Noise Element descriptions, the distance to the CNEL 65 dBA contour would range from 178 to 316 feet.

The train noise CNEL or Ldn values along the tracks are a function not only of the peak noise level as a train passes, but also of the number of trains per day and the presence of at-grade crossings where warning horns are sounded by train operators. Other factors, such as rail condition, may also influence noise levels to a lesser degree. There are no nearby crossings, but the Goleta Amtrak station is located to the east and the single horn soundings that indicate the start of motion for each train leaving the station are audible at the project site.

The estimates and projections of train noise levels contained in the City of Goleta Noise Element are based on information in the County of Santa Barbara Noise Element (County of Santa Barbara 2009:42). The County results are based on an average of two passenger trains and 12 freight trains per day along the UPRR tracks. Amtrak currently runs four passenger trains per day along this route. The mix of train types may vary, and the number of daily freight trains has been lower in 2008 and 2009 due to the national economic downturn. For a long-term projection, however, the assumptions in the County Noise Element likely remain valid.

In summary, at a distance of 100 feet from the tracks peak train noise levels range up to about 100 dBA and CNEL (or Ldn) values range up to about 75 dBA. Adjusting these for distance only, yields a peak noise level at monitoring point M2 (also the point of development closest to the tracks) of 85 dBA (83.0 dBA was measured in this study) and a CNEL value of 60.0 dBA. Based on the standard in the City Noise Element, this CNEL value is compatible with residential uses. Actual values at the Willow Springs Phase II site may be slightly lower, since the UPRR tracks are in a depression relative to the project site and the intervening topography provides some shielding of train noise.

2.2.4 Aircraft Noise

The Santa Barbara Airport is located approximately one-half mile to the south of the project site. The departure pattern from Runway 25 (RY 25) at the airport extends westward, and is about one mile south of the property. Runway 25 is the largest runway at the airport and is used for airlines and most business jet traffic. Two shorter runways (15R and 15L) are oriented north-south, and are used predominantly for general aviation.

The project site is located north of the 60 dBA CNEL contour in the Airport Land Use Plan (ALUP, Santa Barbara County Association of Governments 1993:Map SB-1), and the City of Goleta Noise Element (City of Goleta 2006:Figure 9-2). The southernmost point of Willow Springs Phase II is approximately 500 feet north of the closest point of the current 60 dBA noise contour from the airport. The City Noise Element projects a very small reduction in future noise levels from the airport, so the future 60 dBA CNEL noise contour is farther from the project site. Using the City Noise Element standards, the airport related noise levels are compatible with the proposed residential uses.

At several points during the monitoring at point M2, aircraft noise was heard and caused small but discernable peaks in the measurements. In most instances, these aircraft were twin turbofan regional jets departing the airport westward on Runway 25 approximately one mile south of the project site. These occurrences are noted in the graph of noise levels in Appendix A, and are summarized below in Table 1.

TABLE 1
Aircraft Noise Levels Measured on the Property

Minute No.	Type Aircraft and Motion	Leq (1-min) dBA	Lmax (1/8-sec) dBA
14	Regional Jet, depart RY 25	52.0	63.5
23	Regional Jet, depart RY 25	52.0	59.5
24	Business Jet, depart RY 25	59.0	74.5
45	Regional Jet, depart RY 25	53.0	61.0
46	Regional Jet, depart RY 25	52.0	60.5
50	Cessna 172, depart right downwind RY 15R (northward over project site)	55.5	64.0
54	Regional Jet, depart RY 25	53.5	69.5
62	Regional Jet, depart RY 25	54.0	64.5

Also during the monitoring periods, several single engine piston airplanes were in the pattern of runway 15R and flew nearby the property. While the noise from these aircraft was discernable, it was much less than from the vehicle traffic on the adjacent roadways and had no appreciable effect on the noise measurements. This observation is consistent with the results from a long-term airport noise monitoring location about 2,000 feet east of the project site beneath the final approach leg to Runways 15R and 15L, where the reported CNEL value is 55.9 dBA (Santa Barbara Municipal Airport 2005:3-4).

No helicopters were observed during the monitoring period. Current helicopter operations of all types at the airport (air taxi, military/police, and general aviation) amount to about 11 flights per day out of total daily operations of about 480. This figure is expected to increase little—reaching 13 operations per day by 2025 (Santa Barbara Airport 2005:Table 3-C). The voluntary noise abatement arrival and departure procedures in use at the airport direct all helicopter traffic to arrive and depart the airport over the water to the south, except in periods of cloud cover when they should follow Highway 101 in the same pattern used by light general aviation aircraft (Santa Barbara Airport:2000).

In summary, the project site is located well outside of the 60 dBA CNEL contour of the Santa Barbara Airport. Aircraft operations, particularly westbound jets approximately one mile south of the project site, can be heard from the project site but do not generate noise levels above applicable thresholds or guidelines. As with any location in the region, occasional aircraft operations may occur directly over the property, but these are neither frequent nor loud enough to exceed applicable standards.

2.2.5 Traffic Noise Model Confirmation

The Transportation Noise Model (TNM, Version 2.5) produced by the Federal Highway Administration (Lau et al 2004) was used in this analysis. This model predicts hourly Leq values from inputs of traffic volumes and speeds for automobiles, medium duty trucks, heavy trucks, busses and motorcycles. For this analysis, since detailed vehicle type data were not available, busses and motorcycles were considered equivalent to medium duty trucks. The three dimensional lane geometry for each roadway, along with other roadway parameters, and modeled receiver locations are part of the input. For the 2010 revision of this report, the geometric inputs were updated to reflect (1) the revised site plan with slightly different proposed building elevations, (2) inclusion of Camino Vista through the project site, and (3) use of California state plane coordinates for the x and y values of all points. The model computes noise levels with adjustments for roadway grade, distance, barrier attenuation, and other items.

Before using the model to predict existing or future noise levels, information from traffic counts and observations along Los Carneros Road was used with other current data to test the accuracy of the model. Because it was not possible to observe and count traffic on Highway 101 and the southbound on-ramp at the same time as Los Carneros Road, Caltrans data for these roadways was used. The Caltrans data included Average Annual Daily Traffic (AADT) for both the highway and the on-ramp, and distribution of vehicle types for the highway itself. The traffic input data, assumptions, and sources for this model test and for the subsequent model runs are presented in Table B-1 in Appendix B. A comparison of the measured Leq at point M2 with the Leq result from TNM 2.5 is as follows:

Measured Leq:	53.9 dBA
Model Leq:	53.5dBA

The model result was almost identical to the measured Leq, being lower by less than 1 dBA. No adjustments or corrections were added to the model, and the same roadway geometry, barriers, and other conditions were used in subsequent model runs.

3.1 ROADWAY TRAFFIC NOISE

Figure 1 shows the proposed site plan on the property, and illustrates the general relationship between proposed multi-family dwelling units along the northerly boundary and the location of the highway and railroad tracks. Figure 2 shows the project site plan and the locations of noise model receiver points. Model receiver locations were selected to represent the corner of each of the northernmost buildings in the project site plan closest to the roadway noise sources. Remaining portions of these buildings, and the other buildings within the project, would all be farther from the roadways and partially shielded from that noise by structures within the project. At each modeled receiver location, two points were identified: (1) one at a height of about 5 feet above the first floor elevation, and (2) a second point five feet above the second story floor level.

Traffic noise affecting the property originates primarily from Los Carneros Road and the southbound on-ramp to Highway 101 from Los Carneros Road. The highway itself contributes a lesser amount of noise. These three sources were modeled with TNM 2.5, first with data and estimates on current hourly traffic volumes in the confirmation run discussed above in Section 2.2.5, and then with estimates of average daytime and nighttime hourly traffic volumes for both current and future conditions. For the 2010 revision of this report, Camino Vista was included in the future conditions.

Current Average Daily Traffic (ADT) volumes were obtained from Caltrans for both the highway and the southbound on-ramp. The current and future ADT values for Los Carneros Road were obtained from the project traffic report (Associated Transportation Engineers (ATE) 2009:Table 1 and Table 8). Estimates of the future traffic along Camino Vista were developed from the future cumulative traffic (ATE 2009:27), and applying percentages for truck traffic based on observations in the area to the portion of the Camino Vista traffic from the offsite development. An estimate of the future volume on the southbound on-ramp and on Highway 101 was obtained by projecting a 2.4% per year increase to the year 2024. This is the average of the annual rates of increase on the highway from 1998 through 2007.

Estimates of the hourly traffic volume, by each vehicle type, were made using the present and future average daily traffic (ADT) volumes, and the assumptions shown in Appendix B, Table B-1. The 24-hour day was divided into two periods: Daytime, from 7:00 a.m. to 10:00 p.m., and Nighttime, from 10:00 p.m. to 7:00 a.m. The ADT value was split as follows: 85% for the daytime, and 15% for the nighttime. The percentages for automobiles, medium duty trucks, and heavy duty trucks were determined from the traffic counts conducted during the noise monitoring for Los Carneros Road (used for that roadway and for the southbound on-ramp), or data from Caltrans for U.S. Highway 101.

The current and future roadway traffic noise levels were computed separately as Leq values for the daytime hours and for the nighttime hours. These values were then combined to yield the Day-Night Equivalent Noise Level or Ldn. In computing the Ldn, an extra 10 dBA “penalty” is added to the nighttime Leq values to account for the added nuisance of noise during this time.

The calculation uses the following equation:

$$Ldn = 10*\log\{(1/24)*[15*10^{Ld/10} + 9*10^{(Ln+10)/10}]\}$$

Where:

Ldn	=	Day-Night Average Noise Level
Ld	=	Hourly equivalent noise level for hours during the daytime
Ln	=	Hourly equivalent noise level for hours during the nighttime

Results of this computation for current and future noise levels are shown in Appendix B, Table B-2, and summarized here in Table 2 below.

TABLE 2
Summary of Traffic Noise Projections

Receiver Location	Description	Ldn (dBA) Current	Ldn (dBA) Future
27-1	Bldg. 27, NW corner, ground floor	51.1	57.3
27-2	Bldg. 27, NW corner, second story	53.5	58.1
28-1	Bldg. 28, NW corner, ground floor	51.8	57.4
28-2	Bldg. 28, NW corner, second story	54.3	58.4
29-1	Bldg. 29, NW corner, ground floor	52.8	57.8
29-2	Bldg. 29, NW corner, second story	55.3	59.0
30-1	Bldg. 30, NW corner, ground floor	52.5	57.2
30-2	Bldg. 30, NW corner, second story	55.4	58.7
M2-1	40’ from Camino Santa Fe CL, ground level	52.9	59.3
M2-2	40’ from Camino Santa Fe CL,, 10’ above ground (Monitoring point M2)	55.9	60.5
31-1	Building 31, NE corner, ground floor	52.7	57.0
31-2	Building 31, NE corner, second story	55.6	58.6

Comparing the above results with the Noise Element standards shows that all results for roadway noise levels at the proposed building locations will remain below the 60 dBA Ldn value that is considered normally acceptable for residential uses. The only result that was very slightly above 60 dBA is at point M2-2, which was a monitoring point that was about 20 feet closer to Camino Vista than the nearest building would be. All residential buildings, outdoor living areas, trails and facilities within the boundaries of Willow Springs Phase II will have current and future noise levels that are consistent with the City guidelines. Thus, with respect to the proposed residential uses roadway noise will not represent a significant impact. The inclusion of Camino Vista and through truck traffic from the existing development east of the project site does not change this result.

3.2 RAILROAD NOISE

As discussed in Section 2.2.3 above, at its closest point the Willow Springs Phase II residential project would be about 560 feet from the UPRR tracks. Based on projections within the City Noise Element, which are consistent with measurements on and near the property, future operations along the tracks would result in a maximum CNEL of 60 dBA at this point. This CNEL is considered normally compatible with residential uses according to the City Noise Element. Railroad noise would, therefore, not represent a significant impact for the proposed residential uses.

3.3 AIRPORT NOISE

While aircraft operations are audible on the property, they are heard as distant rumbles that usually last for a short time, usually just a few seconds. The CNEL on the property from aircraft operations is about 55-57 dBA, and aircraft noise does not contribute appreciably to long-term noise levels on the property. Thus, aircraft noise does not represent a significant noise impact.

3.4 INDUSTRIAL NOISES

As discussed in Section 2.2.2 above, noise levels from the industrial uses to the east of the project site are well below the noise performance standard in the M-1 zone, and do not contribute significantly to noise on the project site. The Leq value at the property line during measurements at point M1 was 52.6 dBA (Section 2.2.2 above). This noise source does not represent a significant impact.

3.5 CUMULATIVE NOISE LEVELS

The primary sources of noise affecting the property are very different in nature. Roadway noise is generally constant in the background, while railroad noise is distinctly episodic. The difference leads to one of the dilemmas in analyzing community noise impacts, since some standards (Noise Element) are more suitable for longer-term noise while others (Zoning) are developed to address short-term and peak noise levels. The use of CNEL or Ldn to establish noise standards or thresholds is a compromise in this respect. This type of 24-hour average noise level is effective for characterizing more or less continuous noise sources, such as traffic.

When noise events are discrete and episodic in nature, it is still possible to compute a 24-hour average based on the loudness of individual events and their number of occurrences during a day. The result, however, is less accurate in predicting the response of people or the annoyance of individual noise events. Nevertheless, CNEL and Ldn have become the most widely used descriptors or metrics for community noise and they form the basis for almost all noise standards used in General Plan Noise Elements and in many other regulatory programs.

The City Noise Element suggests that the combined effect of the railroad and highway is to create a corridor up to 600 feet wide within which noise levels exceed 70 dBA, and a corridor three times that width where noise levels exceed 65 dBA (City of Goleta 2006:9-3). If true in all cases, this would mean the 65 dBA contour would extend 900 feet into the property. This generalization is overly conservative for a number of reasons, and is greatly influenced by a number of factors and uncertainties.

It is possible to add noise levels from the highway and railroad tracks mathematically, but in the real world one or the other will dominate. Because of the logarithmic definition of decibels, two identical continuous noise levels from identical sources when added together will have a result that is 3 dBA above their value. As the difference in magnitude between the two noise sources becomes greater, the louder source dominates. When the difference approaches 10 dBA, there is virtually no contribution from the smaller noise source. If one were standing at a point on the railroad 70 dBA CNEL contour (about 100 feet from the tracks), one would only hear highway noise most of the time (about 67 dBA CNEL). Then when a train passes by, the noise level would rise to a peak between 95 and 100 dBA, at which point highway noise would be indiscernible. The "sum" of the two CNEL values at this point (70 dBA plus 67 dBA) would be 72 dBA.

The roadway noise, which is more or less continuous along the linear direction of the highway, drops off at a theoretical rate of 3 dBA per doubling distance as one moves farther away from the travel corridor. The railroad noise, however, is much less "linear" and drops off at a faster rate. For a theoretical point source, the decrease is 6 dBA per doubling distance. The combination of this disparity in distance attenuation with the logarithmic nature of noise addition causes the railroad noise to dominate when close to the tracks and the highway noise to dominate when farther away from the tracks. The crossover point, where the two sources would theoretically have the greatest additive effect is about 200 feet. In reality the highway is not a perfect linear source and the railroad is not a perfect point source. Topography and the nature of the ground surface also affect the transmission of noise and pose additional uncertainties in this discussion—for the Willow Springs Phase II site, the highway itself is not the main roadway noise source. People respond differently to different types of noise sources. For these reasons, care must be exercised in any discussion that is based on a simple theoretical or mathematical analysis of diverse noise sources. With this caution in mind, the following paragraphs address the combination of noises from different sources.

Using results estimated for point 30-2 (the second story elevation at Building 30), which is the residential building most exposed to the highway and railroad tracks, the cumulative or additive effect of the railroad CNEL (60 dBA in Section 2.2.3 above) and the future Ldn for the highway (58.7 dBA in Table 2 above) gives a resulting 24-hour average noise level of 62.4 dBA. This resulting cumulative noise level from these sources is well below the 65 dBA conditionally acceptable threshold for residential uses.

If one considers an additional contribution from aircraft overflights, this conclusion will not be changed. The project is well outside of the 60 dBA CNEL contour for the Santa Barbara Airport, and a reasonable estimate for the CNEL at point 30-2 is about 55.9 (see Section 2.2.4 above). Adding this to the previous cumulative sum of 62.4 dBA yields a new cumulative total of 63.3 dBA—still comfortably below the 65 dBA threshold. As one moves south into the project site, the aircraft noise may be slightly higher (but still well below 60 dBA), but the highway and railroad noise will become lower.

Finally, even if one considers an additional contribution from the industrial uses immediately to the east, the effect is to add just a few tenths of a decibel bringing the resulting Ldn to about 63.6 dBA. The industrial activities, however, do not continue throughout the night and this result does not account for any distance attenuation.

To summarize this discussion, even if it were appropriate to add all of the different noise sources together the resulting Ldn would be below the 65 dBA conditionally acceptable threshold for residential uses. This "total" of the cumulative effects would only occur at the northeastern corner of the project site. Moving south and west into the project site, there may be a very slight increase in aircraft noise but the highway and railroad noise would drop off by greater amounts. With all exterior noise levels below 65 dBA Ldn, it should be possible to achieve the City interior standard of 45 dBA Ldn without any special design or architectural measures.

3.6 ON-SITE CONSTRUCTION NOISE

Noise levels from heavy equipment used for earth moving during construction typically range from 80-90 dBA at distances of 50 feet. An assumption of 95 dBA at 50 feet is used in the Thresholds and Guidelines Manual to define areas of potential impact. Based on this assumption, any sensitive used such as residences within 1,600 feet of a construction site may be subject to significant noise impacts.

The entire existing Willow Springs Phase I residential community is within 1,600 feet of the proposed Phase II site. Apartments and a portion of Los Carneros County Park on the north side of Highway 101 are also within this distance, but the intervening freeway represents a more dominant noise source. All remaining areas within 1,600 feet of the project site are either vacant land or developed with industrial and office uses. Thus, the major areas where construction noise may represent an impact are within the Willow Springs development itself. Residents in existing apartments, particularly those adjacent to the Phase II development, may be subject to construction noises ranging up to 95 dBA at least for short periods of time. Construction noise is a potentially significant impact that can be mitigated.

3.7 NOISE AT FUTURE PARK SITE

Although not part of the Willow Springs Phase II project, development of a city park is anticipated on the land between the project site and the UPRR tracks to the north. The southern portion of this park site, just across Camino Vista from the Phase II project, would have Ldn values ranging from about 60 dBA upwards. Based on the discussion in Section 2.2.3 above, the 65 dBA CNEL contour from the tracks would extend a maximum of 316 feet into the park site. This would leave a width of land along its southern boundary of about 150 feet where noise levels would be between 60 and 65 dBA. It is not possible to evaluate noise effects on the park in any detail since the applicable standards range from 50 to 70 dBA, but some general points can be stated:

- A narrow strip of land, about 50 feet wide, along the northern edge of the park site would have Ldn values in excess of 70 dBA – the upper limit considered compatible with park uses. This area would be suitable for parking or other uses not sensitive to noise.
- A wider portion of the site, about 150 feet on its southern side, would have Ldn values of less than 65 dBA – a reasonable noise level for most outdoor recreational uses
- The elevation of the park site, about 10-12 feet above the train tracks, is such that a berm along its northern edge would provide a reduction in noise levels from the train tracks. This and other measures can be considered at the time details for the park design are prepared.

Based on this preliminary review, it appears feasible to develop the park site with recreational uses that are compatible with the noise standards in the City Noise Element. Specific recreational uses and detailed design measures to minimize noise effects need to be considered when the park plan is developed.

4.1 CONSTRUCTION NOISE

Even though construction noise is a common and expected occurrence, the proximity of early residents in the project to ongoing construction warrants measures to help minimize the potential for noise impacts from this source. Construction noise mitigation measures that should be applied to this project include the following:

- Grading and noise-producing construction operations shall be limited to the hours of 8:00 a.m. to 5:00 p.m. on weekdays.
- The access point for construction and staging activities should be located off of Camino Vista, away from existing residences adjacent to that road.
- Stationary equipment that generates noticeable noise, such as large air compressors or generators, shall be located as far away from adjacent residences as practical. Temporary barriers or shelters may also be used. The combination of location and/or temporary barriers shall reduce noise levels from such equipment to no more than 70 dBA (one-hour Leq, similar to the performance standard in the adjacent M-1 zone) at the property lines nearest to the adjacent existing residences.

These measures will not eliminate construction noise, but will minimize its effects and help avoid a significant impact.

4.2 OUTDOOR AREAS

All proposed residences will be located in areas where the future Ldn will be below 65 dBA. No special mitigation is necessary for noise levels in these areas.

4.3 INDOOR AREAS

Assuming conventional wood frame construction consistent with current California energy conservation requirements, all interior living spaces are expected to have Ldn values of 45 dBA or less. No special noise mitigation measures are necessary for interior living areas.

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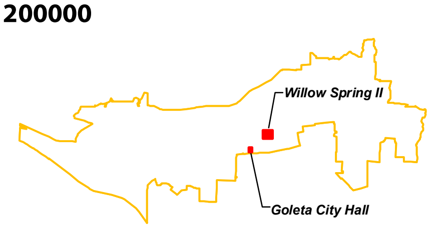
City of Goleta

Scale: 1 to 200000



N

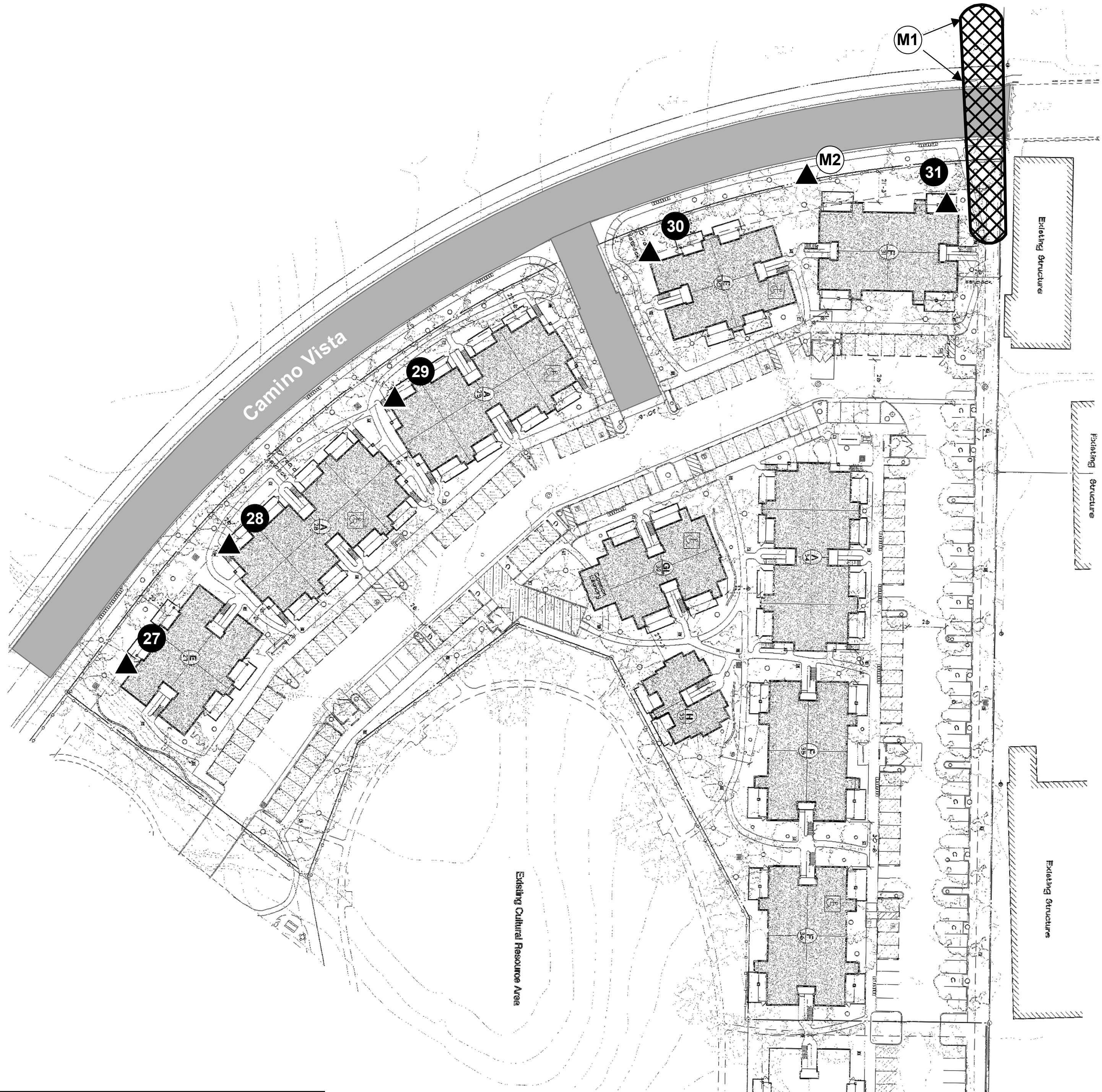
0 500 1,000
Feet

Figure 1
Site Location Map

URS

Willow Springs Phase II

T:\PROJECTS\Willow Springs\Maps\Figure 1 Site Location MapRev1.mxd



Legend

Noise Model Receiver Location

M1 M2 Noise Monitoring Locations

Proposed Road Extension

0 50 100 200

Feet

Figure 2
Site Plan with
Noise Monitoring and Model Locations

URS

Willow Springs Phase II

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APPENDIX A
NOISE MONITORING RESULTS

Table A-1: Noise Meter Settings

Noise Monitoring Results

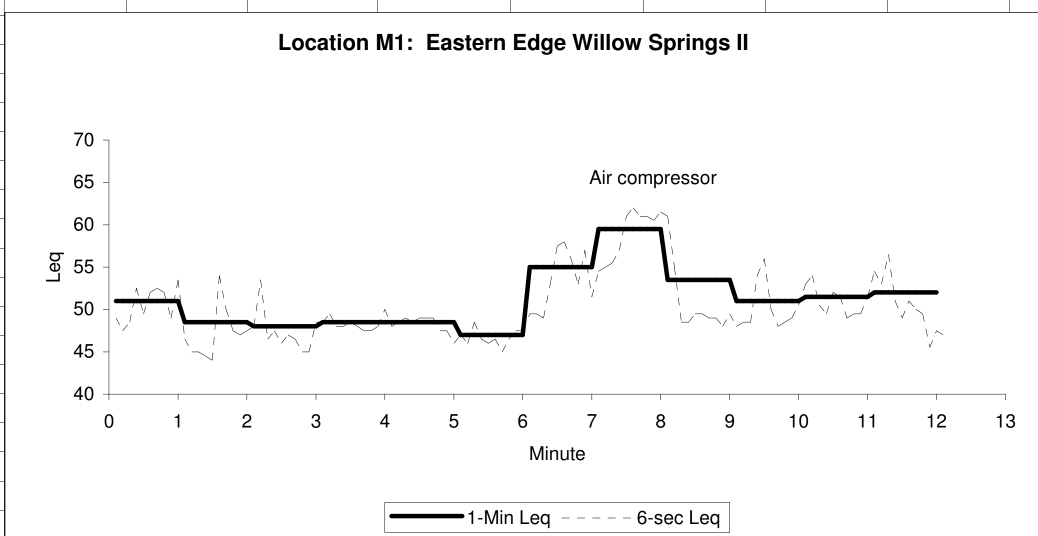
TABLE A-1
Noise Meter Settings

Meter	Larson Davis Model 700 SN B3255
Date	15-Jan-09
Time (total duration)	0001:22:37
Detector	SLOW
Weight	A
Unwgt Pk	OFF
Criterion	90
Threshold	32
Exchange rate	3
RMS Threshold	115
Pk Threshold	140
Hysteresis	2
Exceedances	0
Intervals	84
Int time	0:01
Intv Ln's	ON
History	828
Save Peaks	ON
Period	6

APPENDIX A:

Willow Springs Phase II Noise Measurements

Location	M1	Eastern Edge WS Phase II			1/15/2009				
Minute Number	Time	LVL	Lmin	Lmax	Lpk	L10	L33	L50	L90
1	11:03:58	51	43.5	65	84	54	49.5	48.5	45.5
2	11:04:58	48.5	42	70	88.5	48.5	46	45	43.5
3	11:05:58	48	42.5	65.5	93	49.5	46.5	45.5	44
4	11:06:58	48.5	44	59.5	82.5	50	48	47.5	46
5	11:07:58	48.5	43	57	73	50	48.5	48	46
6	11:08:58	47	42	59.5	77.5	48.5	46.5	46	44
7	11:09:58	55	45	73	87	58	53.5	51.5	48
8	11:10:58	59.5	49	66	79	62.5	61	59.5	53.5
9	11:11:58	53.5	44	65.5	87	59.5	49.5	48.5	47
10	11:12:58	51	44.5	64.5	82.5	53.5	50	49	47
11	11:13:58	51.5	45.5	61.5	80.5	54	51.5	50.5	47.5
12	11:14:58	52	42	67.5	82	55.5	51.5	50	45.5
13	11:15:58	47	43.5	50.5	78.5	50.5	48.5	47	45.5
Leq for Location =		52.6							



APPENDIX A:

Willow Springs Phase II Noise Measurements

Location	M2	North Edge WS Phase II			1/15/2009				
Minute Number	Time	LVL	Lmin	Lmax	Lpk	L10	L33	L50	L90
1	12:03:00	57	46.5	68	84	60	56.5	55	49.5
2									
3									
4	12:05:51	55	47.5	63.5	69.5	57.5	55.5	54	51
5	12:06:51	57.5	48.5	67.5	72.5	60.5	56.5	55.5	52
6	12:07:51	52.5	46.5	59.5	84.5	55	53	51.5	49
7	12:08:51	51	46	56.5	69.5	53	51.5	51	49
8	12:09:51	49	44.5	58	67	51	49.5	48.5	47
9	12:10:51	51.5	46	62.5	70.5	54	51	50	48
10	12:11:51	50	45	57	71	52.5	50.5	49.5	47.5
11	12:12:51	50	44	55.5	66.5	52	50	49	47
12	12:13:51	50	43.5	65.5	72	51.5	49.5	49	47
13	12:14:51	51.5	46	61.5	70	54	51	50.5	48
14	12:15:51	52	45	63.5	73	54.5	50.5	49.5	47.5
15	12:16:51	51.5	45	65.5	71.5	53.5	51	50	47.5
16	12:17:51	50.5	45	60	67	52.5	51	50	48
17	12:18:51	52.5	47	59.5	69	55.5	53	51.5	49
18	12:19:51	52	47	60.5	72	54.5	52	51	49
19	12:20:51	52	46	62.5	71	54	51.5	50.5	49
20	12:21:51	56	45.5	67.5	76	59.5	55.5	53.5	49.5
21	12:22:51	53.5	45.5	68.5	76	56.5	52	50	47
22	12:23:51	55	46	69	76.5	56.5	53	52	49.5
23	12:24:51	52	45	59.5	69.5	55.5	52	50.5	47.5
24	12:25:51	59	44.5	74.5	88.5	63	56.5	52.5	47
25	12:26:51	58.5	48	74	79.5	62.5	57	54.5	50
26	12:27:51	59	47.5	71.5	77.5	62.5	59	57	50.5
27	12:28:51	53.5	45.5	65.5	74	57	52	50.5	48
28	12:29:51	57	46.5	69.5	77.5	61	55.5	53	49
29	12:30:51	54.5	46.5	68.5	73	57.5	53.5	52	48.5
30	12:31:51	53	46	65.5	72.5	56	51	50	48
31	12:32:51	52.5	46	63.5	71	54.5	52.5	52	49.5
32	12:33:51	54	47.5	69.5	81	56	53	52	50
33	12:34:51	53.5	46	64.5	70	56.5	52.5	51.5	48.5
34	12:35:51	50.5	46.5	54.5	66	52.5	51	50	48.5
35	12:36:51	51.5	45.5	59	70	54.5	51	50	48
36	12:37:51	50.5	46	59.5	67.5	52.5	51	50	48
37	12:38:51	49	44.5	55	66	51	49.5	49	47
38	12:39:51	59.5	45	70.5	80.5	65	52	50.5	47.5
39	12:40:51	52	46.5	60	66.5	54.5	52.5	51	48.5
40	12:41:51	51.5	46	59	68.5	53	51.5	51	49
41	12:42:51	52	47	59.5	68.5	53.5	52	51	49
42	12:43:51	53.5	45	63.5	71	57	54	52	47.5
43	12:44:51	54	47.5	63	70	57.5	53	51	49
44	12:45:51	51	46.5	60.5	66	52.5	51	50.5	49
45	12:46:51	53	46.5	61	72.5	56	52	51	48.5
46	12:47:51	52	46.5	60.5	67.5	54	52	51	49
47	12:48:51	58	47.5	71	78.5	62.5	54	53	50
48	12:49:51	50.5	46	58.5	68	52.5	50.5	50	48
49	12:50:51	52	46	58.5	68.5	54.5	52	51	49
50	12:51:51	55.5	47.5	64	73	58	55.5	54	51.5

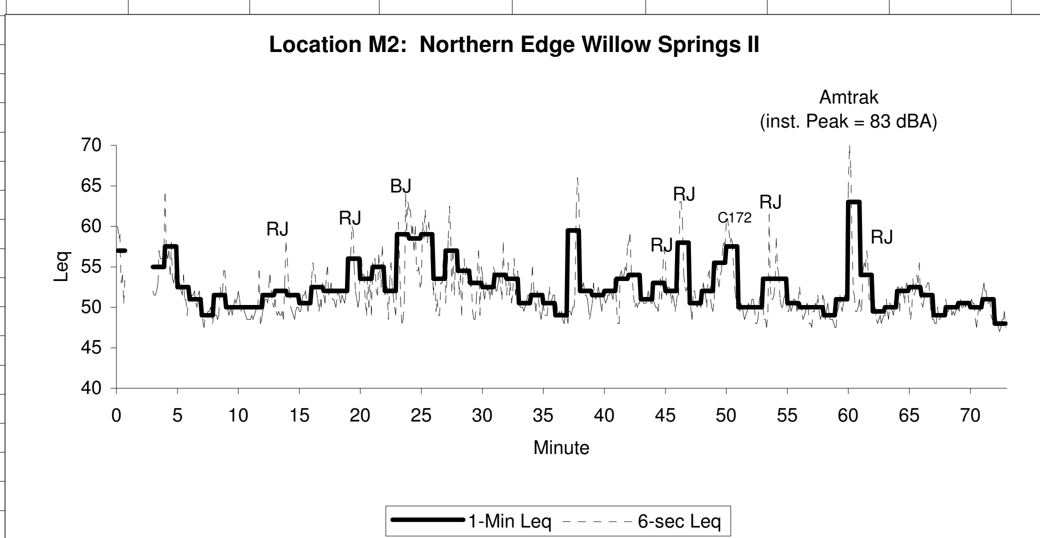
APPENDIX A:

Willow Springs Phase II Noise Measurements

Minute Number	Time	LVL	Lmin	Lmax	Lpk	L10	L33	L50	L90
51	12:52:51	57.5	46.5	66.5	76	61	58.5	57	50.5
52	12:53:51	50	45.5	54	66	51.5	50	49.5	47.5
53	12:54:51	50	44.5	55	64.5	52	50.5	49.5	47
54	12:55:51	53.5	44.5	69.5	80.5	54	51	50	47
55	12:56:51	53.5	46.5	61.5	72	56.5	53	51.5	49
56	12:57:51	50.5	46	55	65	52	50.5	50	48.5
57	12:58:51	50	45	57	65.5	52	50	49	47
58	12:59:51	50	44.5	55	65.5	52	50.5	49.5	47.5
59	13:00:51	49	44	55.5	63.5	51	49.5	48.5	46.5
60	13:01:51	51	45.5	59	67	53	51	50	47.5
61	13:02:51	63	46.5	72	83	69.5	56	52	48.5
62	13:03:51	54	47	64.5	75	57	53.5	52	49
63	13:04:51	49.5	45	54	65.5	51.5	49.5	49	47
64	13:05:51	50	45.5	54	63.5	51.5	50	49.5	47.5
65	13:06:51	52	45.5	62	70.5	54.5	52.5	51	48.5
66	13:07:51	52.5	44.5	61.5	71	55.5	52.5	51	48.5
67	13:08:51	51.5	45	60.5	70	54.5	51	50	47.5
68	13:09:51	49	44	56	67	50.5	49	48.5	46.5
69	13:10:51	50	45	56	65	52	50	49.5	47.5
70	13:11:51	50.5	45.5	55.5	66	52	50.5	50	48.5
71	13:12:51	50	45	59.5	67	52	50	49.5	47
72	13:13:51	51	45	60	72	54	51	50	47
73	13:14:51	48	43.5	56	66	50	48.5	48	46

Leq for Location = 53.9 (exclude min. 1-3)

Traffic Counts and Notes		Count Duration=		15	minutes	Speed approx. 35 mph
	Los Carneros Rd.			1,900 ft to CL road		
	For Period	**Per Hour**	**%**		Noise sources: very complex	
Autos	314	1256	95.2%		Los Carn. Rd.; s/b on-ramp; US 101 (partial)	
Med. Trks.	7	28	2.1%		Distant traffic (Aero Camino, Hollister Av.)	
Hvy. Trks.	2	8	0.6%		Occasional aircraft	
Busses	1	4	0.3%		Amtrak passenger train at minute 61.	
MC	6	24	1.8%		RJ, BJ = regional/business jet depart Runway 25	
Total	330	1320	100%		C172 = Cessna 172 (single engine piston airplane)	



APPENDIX B
INPUT DATA AND SOUND32 RESULTS

Table B-1: Calculations and Assumptions for TNM 2.5 Traffic Input Data
Table B-2: Model Results and Ldn Values

TNM 2.5 Input and Output Tables

TABLE B-1 (Revised)
Calculations and Assumptions for TNM 2.5 Traffic Input Data

		Assumptions for:			Daytime			Nighttime		
Street Segment	ADT	% Autos	% MT	% HT	Auto/hr	MT/hr	HT/hr	Auto/hr	MT/hr	HT/hr
Test 1										
US 101 (1)	77000	94.8%	1.7%	3.5%	4136	74	153	1217	22	45
Los Carneros Rd. (2)					1256	66	8			
LCR to 101 s/b ramp					564	30	4			
Current Conditions										
US 101 (1)	77000	94.8%	1.7%	3.5%	4136	74	153	1217	22	45
Los Carneros Rd. (3)	22050	94.4%	5.0%	0.6%	1180	62	8	347	18	2
LCR to 101 s/b ramp (4)	10542	94.4%	5.0%	0.6%	564	30	4	166	9	1
Future Conditions (2024)										
US 101 (5)	108703	94.8%	1.7%	3.5%	5840	105	216	1718	31	63
Los Carneros Rd. (3)	28500	94.4%	5.0%	0.6%	1525	80	10	449	24	3
LCR to 101 s/b ramp (4)	15087	94.4%	5.0%	0.6%	807	42	5	237	12	2
Camino Vista (project)	400	99.0%	1.0%	0.0%	22.4	0.2	0.0	6.6	0.1	0.0
(through traffic)	600	90.0%	6.0%	4.0%	20.4	1.4	0.9	6.0	0.4	0.3
Camino Vista total (6)	1000				43	2	1	13	0	0

ADT = Average Daily Traffic
Daytime = 7:00 a.m. to 10:00 p.m. 15 hours and 85% of ADT.
Nighttime = 10:00 p.m to 7:00 a.m. 9 hours and 15% of ADT.
MT = Medium duty trucks (3 axle or less)
HT = Heavy duty trucks (4 or more axles)

(1) ADT and vehiclte type distribution from Caltrans website, 2009. Most recent data from 2007.
(2) Field counts during noise measurement.
(3) Current and Future ADT from ATE 2009:Table 1 (Existing) and Table 8 (Cumulative).
Vehicle type distribution based on field counts.
(4) Ramp volumes extrapolated from Caltrans data through 2007, using growth rate of 2.4%/year,
and vehicle type distribution from surface street counts.
(5) Future highway and ramp volumes were extrapolated from 1998-2007 data, with growth rate of 2.4%/year.
(6) ADT estimated from total project traffic (ATE 2009:Table 3) using northern driveway, and
future total traffic volume (ATE 2009:27).
Nighttime values for Camino Vista were adjusted to: 9 autos, 1 MT, 1 HT and 1 bus and 1 motorcycle/hr for model purposes.

TABLE B-2 (Revised)
Model Results and Ldn Values

Model Test				
Receiver	**Description**	**Leq (dBA)**		
M2-2	near Bldg 31, NW corner, elev. 42			
	measured Leq	53.9		
	modelled Leq	53.5		
Current Traffic Volumes				
Receiver	**Description**	**LD (dBA)**	**LN (dBA)**	**Ldn (dBA)**
27-1	Bldg. 27, NW corner, ground floor	48.7	43.4	51.1
27-2	Bldg. 27, NW corner, second story	51.1	45.8	53.5
28-1	Bldg. 28, NW corner, ground floor	49.4	44.1	51.8
28-2	Bldg. 28, NW corner, second story	51.9	46.6	54.3
29-1	Bldg. 29, NW corner, ground floor	50.4	45.1	52.8
29-2	Bldg. 29, NW corner, second story	52.9	47.6	55.3
30-1	Bldg. 30, NW corner, ground floor	50.1	44.8	52.5
30-2	Bldg 30, NW corner, second story	53.0	47.7	55.4
M2-1	Bldg 31, near NW corner, ground floor	50.5	45.2	52.9
M2-2	Bldg. 31, near NW corner, second story	53.5	48.2	55.9
31-1	Bldg. 31, NE corner, ground floor	50.3	45.0	52.7
31-2	Bldg. 31, NE corner, second story	53.2	47.9	55.6
Cumulative Traffic Volumes (2024)				
Receiver	**Description**	**LD (dBA)**	**LN (dBA)**	**Ldn (dBA)**
27-1	Bldg. 27, NW corner, ground floor	53.5	50.2	57.3
27-2	Bldg. 27, NW corner, second story	54.6	50.9	58.1
28-1	Bldg. 28, NW corner, ground floor	53.7	50.3	57.4
28-2	Bldg. 28, NW corner, second story	55.0	51.2	58.4
29-1	Bldg. 29, NW corner, ground floor	54.3	50.6	57.8
29-2	Bldg. 29, NW corner, second story	55.8	51.7	59.0
30-1	Bldg. 30, NW corner, ground floor	53.7	50.0	57.2
30-2	Bldg 30, NW corner, second story	55.7	51.4	58.7
M2-1	40' from Camino Santa Fe CL, ground level	55.5	52.3	59.3
M2-2	40' from Camino Santa Fe CL, 10' above ground	57.0	53.3	60.5
31-1	Bldg. 31, NE corner, ground floor	53.6	49.8	57.0
31-2	Bldg. 31, NE corner, second story	55.6	51.3	58.6

Traffic Noise Model
Input and Output Tables (Revised)

WS II-2 - MODEL TEST													
[Revision includes USGS DEM CA State Plane Coordinates, updated site plan from MAC Design.]													
URS						7-Jun-10							
J. Larson						TNM 2.5							
INPUT: ROADWAYS								Average pavement type shall be used unless					
PROJECT/CONTRACT:	<Project Name?>							a State highway agency substantiates the use					
RUN:	**WSII-2 Model Test**							of a different type with the approval of FHWA					
Roadway			Points										
Name	Width		Name	No.	Coordinates (pavement)			Flow Control			Segment		
					X	Y	Z	Control	Speed	Percent	Pvmt	On	
								Device	Constraint	Vehicles	Type	Struct?	
										Affected			
	ft				ft	ft	ft		mph	%			
Los Carneros Road	12		point9	9	6,002,744.00	1,985,501.00	22.9				Average		
			point10	10	6,002,944.00	1,985,861.00	32.8				Average		
			point11	11	6,002,997.00	1,986,198.00	39.4				Average		
			point12	12	6,003,002.00	1,986,396.00	43				Average		
			point13	13	6,003,006.00	1,986,534.00	46				Average		
			point14	14	6,003,005.00	1,986,680.00	54				Average	Y	
			point23	23	6,003,013.00	1,986,843.00	58.4				Average	Y	
			point24	24	6,003,023.00	1,986,998.00	60.7						
US Hwy 101	12		point15	15	6,002,767.00	1,986,807.00	62.3				Average		
			point16	16	6,003,091.00	1,986,847.00	54.8				Average		
			point17	17	6,003,375.00	1,986,864.00	38.7				Average		
			point18	18	6,003,564.00	1,986,873.00	29.5				Average		
			point19	19	6,003,736.00	1,986,873.00	30.3				Average		
			point20	20	6,004,012.00	1,986,872.00	29.3				Average		
			point21	21	6,004,080.00	1,986,872.00	28.9				Average		
			point22	22	6,004,244.00	1,986,872.00	29.3						
S Bound On Ramp	12		point25	25	6,003,124.00	1,986,652.00	48.4				Average		
			point26	26	6,003,270.00	1,986,670.00	39.9				Average		
			point27	27.00	6,003,528.00	1,986,704.00	39.4				Average		
			point28	28.00	6,003,826.00	1,986,739.00	29.5				Average		
			point29	29.00	6,004,121.00	1,986,764.00	29.5				Average		
			point30	30.00	6,004,285.00	1,986,773.00	29.5						
Camino Vista	12		point37	37.00	6,003,068.00	1,985,310.00	19.7				Average		
			point31	31.00	6,003,161.00	1,985,415.00	20.4				Average		
			point32	32.00	6,003,254.00	1,985,541.00	23				Average		
			point33	33.00	6,003,350.00	1,985,664.00	26.2				Average		
			point34	34	6,003,437.00	1,985,764.00	29.5				Average		
			point35	35	6,003,512.00	1,985,853.00	29.5				Average		
			point36	36	6,003,584.00	1,985,929.00	29.5				Average		
			point38	38.00	6,003,671.00	1,985,994.00	26.2				Average		
			point39	39.00	6,003,799.00	1,986,066.00	26.2				Average		
			point40	40.00	6,003,894.00	1,986,095.00	23				Average		
			point41	41.00	6,004,064.00	1,986,121.00	23				Average		
			point42	42.00	6,004,209.00	1,986,127.00	23				Average		
			point43	43.00	6,004,309.00	1,986,122.00	23						

Traffic Noise Model
Input and Output Tables (Revised)

URS					7-Jun-10								
J. Larson					TNM 2.5								
INPUT: TRAFFIC FOR LAeq1h Volumes													
RUN:	**WSII-2 Model Test**												
Roadway		Points											
Name		Name	No.	Segment									
				Autos		MTrucks		HTrucks		Buses		Motorcycles	
				V	S	V	S	V	S	V	S	V	S
				veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Los Carneros Road		point9	9	1256	35	64	35	8	30	1	30	1	35
		point10	10	1256	35	64	35	8	30	1	30	1	35
		point11	11	1256	35	64	35	8	30	1	30	1	35
		point12	12	1256	35	64	35	8	30	1	30	1	35
		point13	13	1256	35	64	35	8	30	1	30	1	35
		point14	14	1256	35	64	35	8	30	1	30	1	35
		point23	23	1256	35	64	35	8	30	1	30	1	35
		point24	24										
US Hwy 101		point15	15	4136	65	72	65	153	55	1	55	1	65
		point16	16	4136	65	72	65	153	55	1	55	1	65
		point17	17	4136	65	72	65	153	55	1	55	1	65
		point18	18	4136	65	72	65	153	55	1	55	1	65
		point19	19	4136	65	72	65	153	55	1	55	1	65
		point20	20	4136	65	72	65	153	55	1	55	1	65
		point21	21	4136	65	72	65	153	55	1	55	1	65
		point22	22										
S Bound On Ramp		point25	25	564	50	28	50	4	45	1	45	1	50
		point26	26	564	50	28	50	4	45	1	45	1	50
		point27	27	564	50	28	50	4	45	1	45	1	50
		point28	28	564	50	28	50	4	45	1	45	1	50
		point29	29	564	50	28	50	4	45	1	45	1	50
		point30	30										
Camino Vista		point37	37	0	0	0	0	0	0	0	0	0	0
		point31	31	0	0	0	0	0	0	0	0	0	0
		point32	32	0	0	0	0	0	0	0	0	0	0
		point33	33	0	0	0	0	0	0	0	0	0	0
		point34	34	0	0	0	0	0	0	0	0	0	0
		point35	35	0	0	0	0	0	0	0	0	0	0
		point36	36	0	0	0	0	0	0	0	0	0	0
		point38	38	0	0	0	0	0	0	0	0	0	0
		point39	39	0	0	0	0	0	0	0	0	0	0
		point40	40	0	0	0	0	0	0	0	0	0	0
		point41	41	0	0	0	0	0	0	0	0	0	0
		point42	42	0	0	0	0	0	0	0	0	0	0
		point43	43										

URS | 7-Jun-10
J. Larson | TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: <Project Name?>
RUN: **WSII-2 Model Test**

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
27-1	1	1.00	6,003,488.00	1,985,748.00	33	4.92	0	66	10	8	Y
27-2	2	1.00	6,003,489.00	1,985,748.00	43	4.92	0	66	10	8	Y
28-1	3	1.00	6,003,552.00	1,985,821.00	34	4.92	0	66	10	8	Y
28-2	4	1.00	6,003,553.00	1,985,821.00	44	4.92	0	66	10	8	Y
29-1	5	1.00	6,003,661.00	1,985,924.00	34	4.92	0	66	10	8	Y
29-2	6	1.00	6,003,662.00	1,985,924.00	44	4.92	0	66	10	8	Y
30-1	7	1.00	6,003,839.00	1,986,019.00	29.5	4.92	0	66	10	8	Y
30-2	8	1.00	6,003,840.00	1,986,019.00	39.5	4.92	0	66	10	8	Y
M2-1	9	1.00	6,003,950.00	1,986,069.00	28	4.92	0	66	10	8	Y
M2-2	10	1.00	6,003,951.00	1,986,069.00	38	4.92	0	66	10	8	Y
31-1	11	1.00	6,004,038.00	1,986,057.00	27	4.92	0	66	10	8	Y
31-2	12	1.00	6,004,039.00	1,986,057.00	37	4.92	0	66	10	8	Y

URS | 7-Jun-10
J. Larson | TNM 2.5

INPUT: BARRIERS
PROJECT/CONTRACT: <Project Name?>
RUN: **WSII-2 Model Test**

Barrier Name	Type	Points Name	No.	Coordinates (bottom) X	Y	Z	Height at Point	Segment Seg Ht Perturbs Incre-ment	#Up	#Dn	On Struct?	Important Reflec-tions?
				ft	ft	ft	ft	ft				
Northern Pad - barrier	B	point1	1	6,003,308.50	1,986,471.80	39.1	10	0	0	0		
		point2	2	6,003,594.00	1,986,496.20	36.1	10	0	0	0		
		point3	3	6,003,797.00	1,986,507.20	29.7	10	0	0	0		
		point4	4	6,004,049.50	1,986,523.20	26.2	10					

Traffic Noise Model
Input and Output Tables (Revised)

URS							7-Jun-10						
J. Larson							TNM 2.5						
							Calculated with TNM 2.5						
RESULTS: SOUND LEVELS		**MODEL TEST**											
PROJECT/CONTRACT:		<Project Name?>											
RUN:		**WSII-2 Model Test**											
BARRIER DESIGN:		INPUT HEIGHTS						Average pavement type shall be used unless					
								a State highway agency substantiates the use					
ATMOSPHERICS:		68 deg F, 50% RH						of a different type with approval of FHWA.					
Receiver													
Name	No.	#DUs	Existing	No Barrier					With Barrier				
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction			
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated	
							Sub'l Inc					minus	
												Goal	
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB	
27-1	1	1.00	0.00	48.8	66	48.8	10	----	48.8	0	8	-8	
27-2	2	1.00	0.00	51.2	66	51.2	10	----	51.2	0	8	-8	
28-1	3	1.00	0.00	49.4	66	49.4	10	----	49.4	0	8	-8	
28-2	4	1.00	0.00	51.9	66	51.9	10	----	51.9	0	8	-8	
29-1	5	1.00	0.00	50.4	66	50.4	10	----	50.4	0	8	-8	
29-2	6	1.00	0.00	53	66	53	10	----	53	0	8	-8	
30-1	7	1.00	0.00	50.1	66	50.1	10	----	50.1	0	8	-8	
30-2	8	1.00	0.00	53.1	66	53.1	10	----	53.1	0	8	-8	
M2-1	9	1.00	0.00	50.5	66	50.5	10	----	50.5	0	8	-8	
M2-2	**10**	**1.00**	**0.00**	**53.5**	66	53.5	10	----	53.5	0	8	-8	
31-1	11	1.00	0.00	50.3	66	50.3	10	----	50.3	0	8	-8	
31-2	12	1.00	0.00	53.2	66	53.2	10	----	53.2	0	8	-8	
Dwelling Units		# DUs	Noise Reduction										
			Min	Avg	Max								
			dB	dB	dB								
All Selected		12.00	0.00	0	0								
All Impacted		0.00	0.00	0	0								
All that meet NR Goal		0.00	0.00	0	0								

Traffic Noise Model
Input and Output Tables (Revised)

WS II-2 CURRENT DAY - ROADWAY GEMOETRY, RECEOVERS. AND BARROERS SAME AS MODEL TEST.													
URS					7-Jun-10								
J. Larson					TNM 2.5								
INPUT: TRAFFIC FOR LAeq1h Volumes													
PROJECT/CONTRACT:	<Project Name?>												
RUN:	WSII-2 Cur Day												
Roadway		Points											
Name		Name	No.	Segment									
				Autos		MTrucks		HTrucks		Buses		Motorcycles	
				V	S	V	S	V	S	V	S	V	S
				veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Los Carneros Road		point9	9	1180	35	60	35	8	30	1	30	1	35
		point10	10	1180	35	60	35	8	30	1	30	1	35
		point11	11	1180	35	60	35	8	30	1	30	1	35
		point12	12	1180	35	60	35	8	30	1	30	1	35
		point13	13	1180	35	60	35	8	30	1	30	1	35
		point14	14	1180	35	60	35	8	30	1	30	1	35
		point23	23	1180	35	60	35	8	30	1	30	1	35
		point24	24										
US Hwy 101		point15	15	4136	65	72	65	153	55	1	55	1	65
		point16	16	4136	65	72	65	153	55	1	55	1	65
		point17	17	4136	65	72	65	153	55	1	55	1	65
		point18	18	4136	65	72	65	153	55	1	55	1	65
		point19	19	4136	65	72	65	153	55	1	55	1	65
		point20	20	4136	65	72	65	153	55	1	55	1	65
		point21	21	4136	65	72	65	153	55	1	55	1	65
		point22	22										
S Bound On Ramp		point25	25	564	50	28	50	4	45	1	45	1	50
		point26	26	564	50	28	50	4	45	1	45	1	50
		point27	27	564	50	28	50	4	45	1	45	1	50
		point28	28	564	50	28	50	4	45	1	45	1	50
		point29	29	564	50	28	50	4	45	1	45	1	50
		point30	30										
Camino Vista		point37	37	0	0	0	0	0	0	0	0	0	0
		point31	31	0	0	0	0	0	0	0	0	0	0
		point32	32	0	0	0	0	0	0	0	0	0	0
		point33	33	0	0	0	0	0	0	0	0	0	0
		point34	34	0	0	0	0	0	0	0	0	0	0
		point35	35	0	0	0	0	0	0	0	0	0	0
		point36	36	0	0	0	0	0	0	0	0	0	0
		point38	38	0	0	0	0	0	0	0	0	0	0
		point39	39	0	0	0	0	0	0	0	0	0	0
		point40	40	0	0	0	0	0	0	0	0	0	0
		point41	41	0	0	0	0	0	0	0	0	0	0
		point42	42	0	0	0	0	0	0	0	0	0	0
		point43	43										

Traffic Noise Model
Input and Output Tables (Revised)

RESULTS: SOUND LEVELS		**CURRENT DAYTIME**										
PROJECT/CONTRACT:		<Project Name?>										
RUN:		WSII-2 Cur Day										
BARRIER DESIGN:		INPUT HEIGHTS						Average pavement type shall be used unless				
								a State highway agency substantiates the use				
ATMOSPHERICS:		68 deg F, 50% RH						of a different type with approval of FHWA.				
Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
27-1	1	1	0	48.7	66	48.7	10	----	48.7	0	8	-8
27-2	2	1	0	51.1	66	51.1	10	----	51.1	0	8	-8
28-1	3	1	0	49.4	66	49.4	10	----	49.4	0	8	-8
28-2	4	1	0	51.9	66	51.9	10	----	51.9	0	8	-8
29-1	5	1	0	50.4	66	50.4	10	----	50.4	0	8	-8
29-2	6	1	0	52.9	66	52.9	10	----	52.9	0	8	-8
30-1	7	1	0	50.1	66	50.1	10	----	50.1	0	8	-8
30-2	8	1	0	53	66	53	10	----	53	0	8	-8
M2-1	9	1	0	50.5	66	50.5	10	----	50.5	0	8	-8
M2-2	10	1	0	53.5	66	53.5	10	----	53.5	0	8	-8
31-1	11	1	0	50.3	66	50.3	10	----	50.3	0	8	-8
31-2	12	1	0	53.2	66	53.2	10	----	53.2	0	8	-8
Dwelling Units		# DUs	Noise Reduction									
			Min	Avg	Max							
			dB	dB	dB							
All Selected		12	0	0	0							
All Impacted		0	0	0	0							
All that meet NR Goal		0	0	0	0							

WS II-2 CURRENT NIGHT - ROADWAY GEOMETRY, RECEIVERS, AND BARRIER SAME AS MODEL TEST

URS		7-Jun-10
J. Larson		TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes

PROJECT/CONTRACT: <Project Name?>
RUN: WSII-2 Cur Night

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Los Carneros Road	point9	9	347	35	16	35	2	30	1	30	1	35
	point10	10	347	35	16	35	2	30	1	30	1	35
	point11	11	347	35	16	35	2	30	1	30	1	35
	point12	12	347	35	16	35	2	30	1	30	1	35
	point13	13	347	35	16	35	2	30	1	30	1	35
	point14	14	347	35	16	35	2	30	1	30	1	35
	point23	23	347	35	16	35	2	30	1	30	1	35
	point24	24										
US Hwy 101	point15	15	1217	65	20	65	45	55	1	55	1	65
	point16	16	1217	65	20	65	45	55	1	55	1	65
	point17	17	1217	65	20	65	45	55	1	55	1	65
	point18	18	1217	65	20	65	45	55	1	55	1	65
	point19	19	1217	65	20	65	45	55	1	55	1	65
	point20	20	1217	65	20	65	45	55	1	55	1	65
	point21	21	1217	65	20	65	45	55	1	55	1	65
	point22	22										
S Bound On Ramp	point25	25	166	50	7	50	1	45	1	45	1	50
	point26	26	166	50	7	50	1	45	1	45	1	50
	point27	27	166	50	7	50	1	45	1	45	1	50
	point28	28	166	50	7	50	1	45	1	45	1	50
	point29	29	166	50	7	50	1	45	1	45	1	50
	point30	30										
Camino Vista	point37	37	0	0	0	0	0	0	0	0	0	0
	point31	31	0	0	0	0	0	0	0	0	0	0
	point32	32	0	0	0	0	0	0	0	0	0	0
	point33	33	0	0	0	0	0	0	0	0	0	0
	point34	34	0	0	0	0	0	0	0	0	0	0
	point35	35	0	0	0	0	0	0	0	0	0	0
	point36	36	0	0	0	0	0	0	0	0	0	0
	point38	38	0	0	0	0	0	0	0	0	0	0
	point39	39	0	0	0	0	0	0	0	0	0	0
	point40	40	0	0	0	0	0	0	0	0	0	0
	point41	41	0	0	0	0	0	0	0	0	0	0
	point42	42	0	0	0	0	0	0	0	0	0	0
	point43	43										

URS							7-Jun-10					
J. Larson							TNM 2.5					
							Calculated with TNM 2.5					
RESULTS: SOUND LEVELS		**CURRENT NIGHTTIME**										
PROJECT/CONTRACT:		<Project Name?>										
RUN:		WSII-2 Cur Night										
BARRIER DESIGN:		INPUT HEIGHTS						Average pavement type shall be used unless				
								a State highway agency substantiates the use				
ATMOSPHERICS:		68 deg F, 50% RH						of a different type with approval of FHWA.				
Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
27-1	1	1	0	43.4	66	43.4	10	----	43.4	0	8	-8
27-2	2	1	0	45.8	66	45.8	10	----	45.8	0	8	-8
28-1	3	1	0	44.1	66	44.1	10	----	44.1	0	8	-8
28-2	4	1	0	46.6	66	46.6	10	----	46.6	0	8	-8
29-1	5	1	0	45.1	66	45.1	10	----	45.1	0	8	-8
29-2	6	1	0	47.6	66	47.6	10	----	47.6	0	8	-8
30-1	7	1	0	44.8	66	44.8	10	----	44.8	0	8	-8
30-2	8	1	0	47.7	66	47.7	10	----	47.7	0	8	-8
M2-1	9	1	0	45.2	66	45.2	10	----	45.2	0	8	-8
M2-2	10	1	0	48.2	66	48.2	10	----	48.2	0	8	-8
31-1	11	1	0	45	66	45	10	----	45	0	8	-8
31-2	12	1	0	47.9	66	47.9	10	----	47.9	0	8	-8
Dwelling Units		# DUs	Noise Reduction									
			Min	Avg	Max							
			dB	dB	dB							
All Selected		12	0	0	0							
All Impacted		0	0	0	0							
All that meet NR Goal		0	0	0	0							

WS II-2 FUTURE DAY TIME - ROADWAY GEOMETRY, RECEIVERS, AND BARRIERS SAME AS MODEL TEST

URS					7-Jun-10								
J. Larson					TNM 2.5								
INPUT: TRAFFIC FOR LAeq1h Volumes													
PROJECT/CONTRACT:	<Project Name?>												
RUN:	WSII-2 Future Day												
Roadway		Points											
Name		Name	No.	Segment									
				Autos		MTrucks		HTrucks		Buses		Motorcycles	
				V	S	V	S	V	S	V	S	V	S
				veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Los Carneros Road		point9	9	1525	35	78	35	10	30	1	30	1	35
		point10	10	1525	35	78	35	10	30	1	30	1	35
		point11	11	1525	35	78	35	10	30	1	30	1	35
		point12	12	1525	35	78	35	10	30	1	30	1	35
		point13	13	1525	35	78	35	10	30	1	30	1	35
		point14	14	1525	35	78	35	10	30	1	30	1	35
		point23	23	1525	35	78	35	10	30	1	30	1	35
		point24	24										
US Hwy 101		point15	15	5840	65	103	65	216	55	1	55	1	65
		point16	16	5840	65	103	65	216	55	1	55	1	65
		point17	17	5840	65	103	65	216	55	1	55	1	65
		point18	18	5840	65	103	65	216	55	1	55	1	65
		point19	19	5840	65	103	65	216	55	1	55	1	65
		point20	20	5840	65	103	65	216	55	1	55	1	65
		point21	21	5840	65	103	65	216	55	1	55	1	65
		point22	22										
S Bound On Ramp		point25	25	807	50	40	50	5	45	1	45	1	50
		point26	26	807	50	40	50	5	45	1	45	1	50
		point27	27	807	50	40	50	5	45	1	45	1	50
		point28	28	807	50	40	50	5	45	1	45	1	50
		point29	29	807	50	40	50	5	45	1	45	1	50
		point30	30										
Camino Vista		point37	37	41	30	2	30	1	30	1	30	1	30
		point31	31	41	30	2	30	1	30	1	30	1	30
		point32	32	41	30	2	30	1	30	1	30	1	30
		point33	33	41	30	2	30	1	30	1	30	1	30
		point34	34	41	30	2	30	1	30	1	30	1	30
		point35	35	41	30	2	30	1	30	1	30	1	30
		point36	36	41	30	2	30	1	30	1	30	1	30
		point38	38	41	30	2	30	1	30	1	30	1	30
		point39	39	41	30	2	30	1	30	1	30	1	30
		point40	40	41	30	2	30	1	30	1	30	1	30
		point41	41	41	30	2	30	1	30	1	30	1	30
		point42	42	41	30	2	30	1	30	1	30	1	30
		point43	43										

URS							7-Jun-10					
J. Larson							TNM 2.5					
							Calculated with TNM 2.5					
RESULTS: SOUND LEVELS		**FUTURE DAY TIME**										
PROJECT/CONTRACT:		<Project Name?>										
RUN:		WSII-2 Future Day										
BARRIER DESIGN:		INPUT HEIGHTS						Average pavement type shall be used unless				
								a State highway agency substantiates the use				
ATMOSPHERICS:		68 deg F, 50% RH						of a different type with approval of FHWA.				
Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over existing		Type	Calculated	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
27-1	1	1	0	53.5	66	53.5	10	----	53.5	0	8	-8
27-2	2	1	0	54.6	66	54.6	10	----	54.6	0	8	-8
28-1	3	1	0	53.7	66	53.7	10	----	53.7	0	8	-8
28-2	4	1	0	55	66	55	10	----	55	0	8	-8
29-1	5	1	0	54.3	66	54.3	10	----	54.3	0	8	-8
29-2	6	1	0	55.8	66	55.8	10	----	55.8	0	8	-8
30-1	7	1	0	53.7	66	53.7	10	----	53.7	0	8	-8
30-2	8	1	0	55.7	66	55.7	10	----	55.7	0	8	-8
M2-1	9	1	0	55.5	66	55.5	10	----	55.5	0	8	-8
M2-2	10	1	0	57	66	57	10	----	57	0	8	-8
31-1	11	1	0	53.6	66	53.6	10	----	53.6	0	8	-8
31-2	12	1	0	55.6	66	55.6	10	----	55.6	0	8	-8
Dwelling Units		# DUs	Noise Reduction									
			Min	Avg	Max							
			dB	dB	dB							
All Selected		12	0	0	0							
All Impacted		0	0	0	0							
All that meet NR Goal		0	0	0	0							

WS II-2 FUTURE NIGHT - ROADWAY GEOMETRY, RECEIVERS, AND BARRIERS SAME AS MODEL TEST

URS 7-Jun-10
J. Larson TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: <Project Name?>
RUN: WSII-2 Future Night

Roadway		Points											
Name		Name	No.	Segment									
				Autos		MTrucks		HTrucks		Buses		Motorcycles	
				V	S	V	S	V	S	V	S	V	S
				veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Los Carneros Road		point9	9	449	35	22	35	3	30	1	30	1	35
		point10	10	449	35	22	35	3	30	1	30	1	35
		point11	11	449	35	22	35	3	30	1	30	1	35
		point12	12	449	35	22	35	3	30	1	30	1	35
		point13	13	449	35	22	35	3	30	1	30	1	35
		point14	14	449	35	22	35	3	30	1	30	1	35
		point23	23	449	35	22	35	3	30	1	30	1	35
		point24	24										
US Hwy 101		point15	15	1718	65	29	65	63	55	1	55	1	65
		point16	16	1718	65	29	65	63	55	1	55	1	65
		point17	17	1718	65	29	65	63	55	1	55	1	65
		point18	18	1718	65	29	65	63	55	1	55	1	65
		point19	19	1718	65	29	65	63	55	1	55	1	65
		point20	20	1718	65	29	65	63	55	1	55	1	65
		point21	21	1718	65	29	65	63	55	1	55	1	65
		point22	22										
S Bound On Ramp		point25	25	237	50	10	50	2	45	1	45	1	50
		point26	26	237	50	10	50	2	45	1	45	1	50
		point27	27	237	50	10	50	2	45	1	45	1	50
		point28	28	237	50	10	50	2	45	1	45	1	50
		point29	29	237	50	10	50	2	45	1	45	1	50
		point30	30										
Camino Vista		point37	37	11	30	1	30	1	30	1	30	1	30
		point31	31	11	30	1	30	1	30	1	30	1	30
		point32	32	11	30	1	30	1	30	1	30	1	30
		point33	33	11	30	1	30	1	30	1	30	1	30
		point34	34	11	30	1	30	1	30	1	30	1	30
		point35	35	11	30	1	30	1	30	1	30	1	30
		point36	36	11	30	1	30	1	30	1	30	1	30
		point38	38	11	30	1	30	1	30	1	30	1	30
		point39	39	11	30	1	30	1	30	1	30	1	30
		point40	40	11	30	1	30	1	30	1	30	1	30
		point41	41	11	30	1	30	1	30	1	30	1	30
		point42	42	11	30	1	30	1	30	1	30	1	30
		point43	43										

URS							7-Jun-10						
J. Larson							TNM 2.5						
							Calculated with TNM 2.5						
RESULTS: SOUND LEVELS		**FUTURE NIGHTTIME**											
PROJECT/CONTRACT:		<Project Name?>											
RUN:		WSII-2 Future Night											
BARRIER DESIGN:		INPUT HEIGHTS						Average pavement type shall be used unless					
								a State highway agency substantiates the use					
ATMOSPHERICS:		68 deg F, 50% RH						of a different type with approval of FHWA.					

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
27-1	1	1	0	50.2	66	50.2	10	----	50.2	0	8	-8
27-2	2	1	0	50.9	66	50.9	10	----	50.9	0	8	-8
28-1	3	1	0	50.3	66	50.3	10	----	50.3	0	8	-8
28-2	4	1	0	51.2	66	51.2	10	----	51.2	0	8	-8
29-1	5	1	0	50.6	66	50.6	10	----	50.6	0	8	-8
29-2	6	1	0	51.7	66	51.7	10	----	51.7	0	8	-8
30-1	7	1	0	50	66	50	10	----	50	0	8	-8
30-2	8	1	0	51.4	66	51.4	10	----	51.4	0	8	-8
M2-1	9	1	0	52.3	66	52.3	10	----	52.3	0	8	-8
M2-2	10	1	0	53.3	66	53.3	10	----	53.3	0	8	-8
31-1	11	1	0	49.8	66	49.8	10	----	49.8	0	8	-8
31-2	12	1	0	51.3	66	51.3	10	----	51.3	0	8	-8

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	12	0	0	0
All Impacted	0	0	0	0
All that meet NR Goal	0	0	0	0