APPENDIX F

NOISE ASSESSMENT

NOISE ASSESSMENT STUDY
FOR
HIGH SCHOOL #5

ROGGE ROAD, SALINAS

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Project No. 43-005

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I. Executive Summary

This report presents the results of a noise assessment study, in compliance with the California Environmental Quality Act, for the proposed Salinas High School #5 along Rogge Road in Salinas. This study includes the analysis of traffic noise impacts to the school, project-generated traffic noise impacts to the existing residential area to the west of the site, school operations and activity noise impacts to the residential areas to the west, the agricultural fields to the south and east and the agricultural harvesting and packing operations across Rogge Road to the north.

The plans for the high school include a preferred "Project" plus two alternatives designated as "Alternative A" and "Alternative B". The alternatives to the project do not change the operations or activities of the school or the enrollment. The alternatives are site layout variations.

The following report includes background information on acoustics, noise standards applicable to the project, existing and future noise exposure impacts to the project, project-generated noise impacts, project construction noise impacts and mitigation measures for noise impacted receptor locations. The results of this study reveal that the noise exposures at the site under the preferred project are in compliance with the standards of the City of Salinas General Plan Noise Element, the County of Monterey General Plan Safety Element, Title 24 of the State Building Code and the American National Standards Institute. The noise exposures under Alternatives A and B are also with the limits of the standards with the exception of baseball and softball game noise impacts to the residential area to the west of the site under worst-case conditions.

The project and alternatives will not significantly increase the volumes of traffic on Rogge Road. Therefore, the project-generated traffic noise will not be significant.

In terms of the CEQA compliance checklist, the preferred project indicates the following:

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

II. Background Information on Acoustics

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

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

TABLE I

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

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

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

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

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

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

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

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

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

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

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

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

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

III. Noise Standards, Goals & Policies

A. City of Salinas

The standards of the City of Salinas General Plan Noise Element, Ref. (a), utilizes the Day-Night Level (DNL) noise descriptor. The Noise Element of the General Plan shows in Table N-3 various levels of land use compatibility. The Normally Acceptable (Zone A) exterior limit for single-family residences and schools is 60 dB DNL. Exterior noise exposures at or below 60 dB DNL do not require analysis or noise mitigation measures. However, for Zone B, which is considered Conditionally Acceptable, the exterior noise limit is 70 dB DNL, whereby, the land use may be acceptable provided that a detailed analysis of the noise levels is conducted and noise mitigation measures are included in the design of the project. The Noise Element does not contain standards of the interior spaces of schools, such as the classrooms or auditorium.

The Noise Element specifies a Normally Acceptable limit of 70 dB DNL for agricultural harvesting and packing operations (use across Rogge Road) and agricultural uses (uses adjacent to the south and east of the site).

B. County of Monterey

The project-generated noise exposures at the residential area to the west of the site were evaluated against the standards of the Monterey County Safety Element, Ref. (b), as these residences are in an unincorporated area of Monterey County. The Monterey County Safety Element also uses the DNL noise descriptor and also imposes a limit of 60 dB DNL for low density residential uses. Therefore, the Monterey County noise standards are the same as the City of Salinas noise standards.

C. State of California

The State of California Code of Regulations, Title 24, Section A5.507.5 Enhanced, Ref. (c), specifies a limit for public school classrooms of 45 dBA hourly L_{eq} ($L_{eq(h)}$). In additions to limiting sound transmission from exterior sources to classroom interiors, Title 24 also requires minimum Sound Transmission Class (STC) ratings for exterior walls and windows, given certain proximities to major noise sources and exterior noise exposures. If the exterior noise levels at the property line regularly exceed 65 decibels, the exterior walls must be rated minimum STC 50 and the windows must be rated minimum STC 30.

D. American National Standards Institute

The American National Standards Institute (ANSI) provides standards for schools contained in document S-12.60, Ref. (d). For core classroom interiors, S12.60 limits the hourly average noise levels from exterior sources during school hours to 35 dBA $L_{eq(h)}$.

In addition, ANSI S-12.60 requires minimum sound transmission ratings for walls and floor/ceiling assemblies between classrooms as well as interior acoustical requirements and HVAC system noise levels. As design details of the school are not available at this time, analyses of the classroom interiors and mechanical equipment cannot be performed and are not included in this study.

E. California Environmental Quality Act (CEQA)

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

These thresholds are:

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

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

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

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

E. Additional Noise Criteria for the Auditorium

There are no standards for the interior noise environment within the Auditorium. As an auditorium is usually considered an acoustically-critical space, we recommend an interior design goal of 15 dBA L_{eq} from exterior sources, such as traffic. This very restrictive goal would render most noise from outside to inaudibility so that disruption during quiet music or spoken work passages is minimized. The adoption of the criterion is optional.

IV. Acoustical Setting

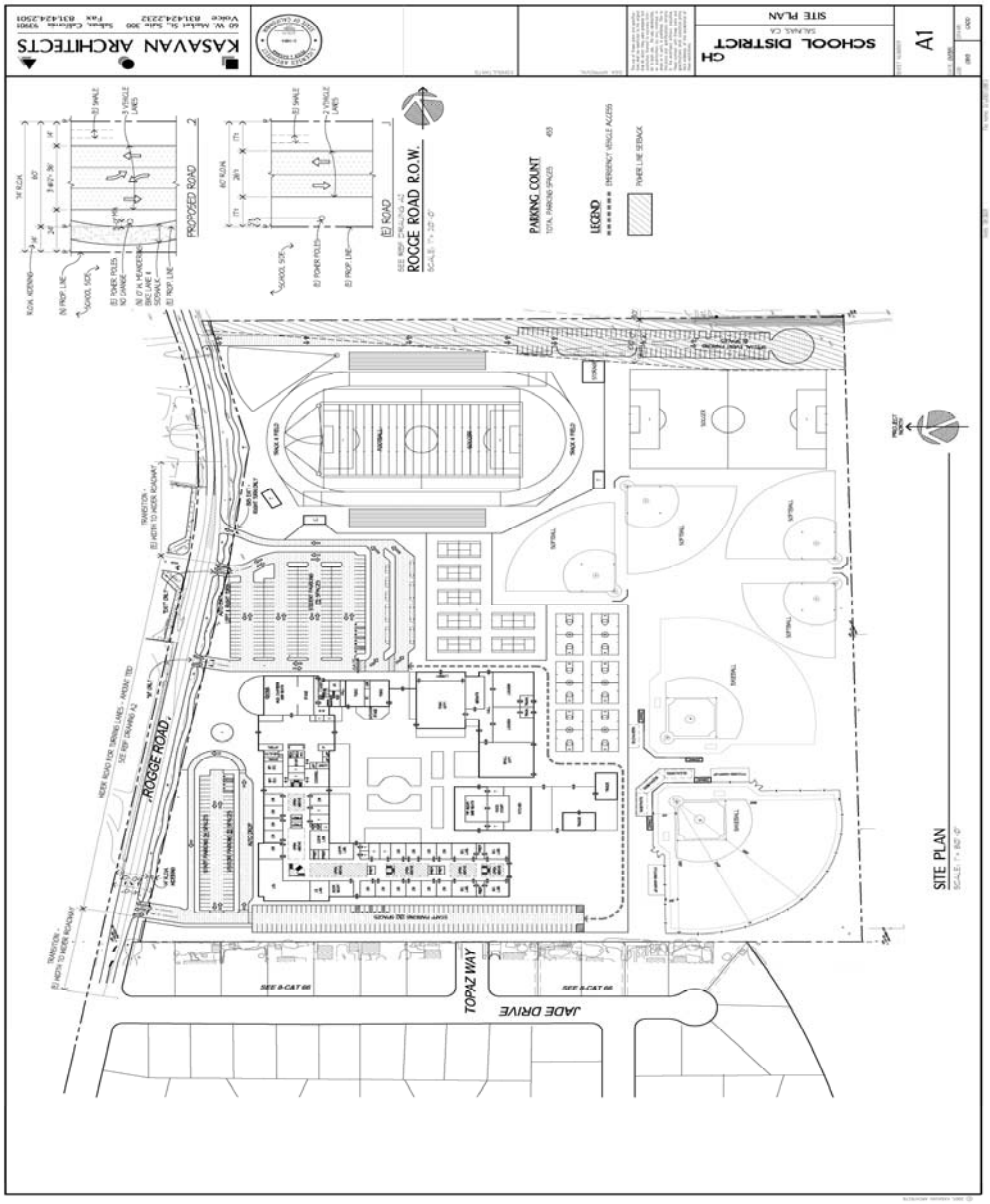
A. Site Description

The planned project site is existing agricultural land located along Rogge Road between San Juan Grade Road and Natividad Road in Salinas. One single-family home exists on the site. The site is relatively level and at-grade with the roadways and adjacent land uses. Surrounding land uses include single-family residential adjacent to the west (Jade Drive and Topaz Way), agricultural harvesting and packing operations (Oseguera) across Rogge Road to the north, and agricultural uses adjacent to the east and south.

B. Project Description

The project, as shown on the Site Plan of Scheme C, Ref. (e), includes the construction of a 1,500 student high school (9th through 12th grade) ultimately with one main classroom building, administration and arts building, an athletic building (two gymnasia, locker rooms and a weight room), a multi-purpose room/cafeteria and two trade (vocational) buildings. The plan also shows a football/soccer stadium, baseball and softball diamonds, basketball and tennis courts, a soccer field and three parking lots. The football/soccer stadium is planned to be lighted, thus, there will be evening sports events at the school. However, as the nighttime period, for acoustical purposes, commences at 10:00 p.m., we anticipate that there will be no sports activities past 10:00 p.m. and extending into the nighttime period.

A staff parking lot with 130 spaces will be located along the western boundary of the site contiguous with the existing residential area. The student parking lot will be located at the front of the site along Rogge Road. A visitors/special event parking area will be located along the eastern border of the site. Bus traffic will use the student parking lot for loading and unloading students. The Project Site Plan is shown below.

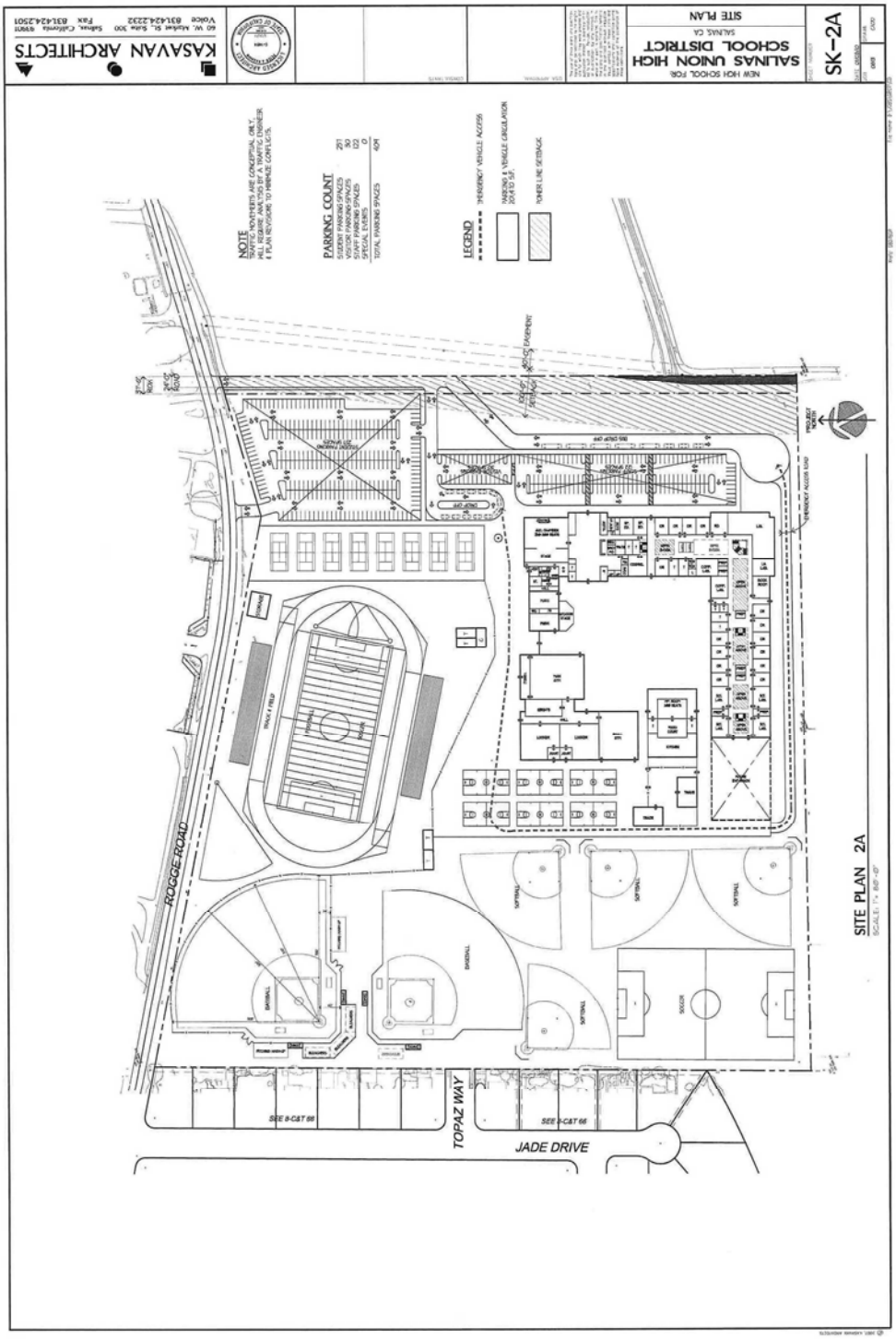


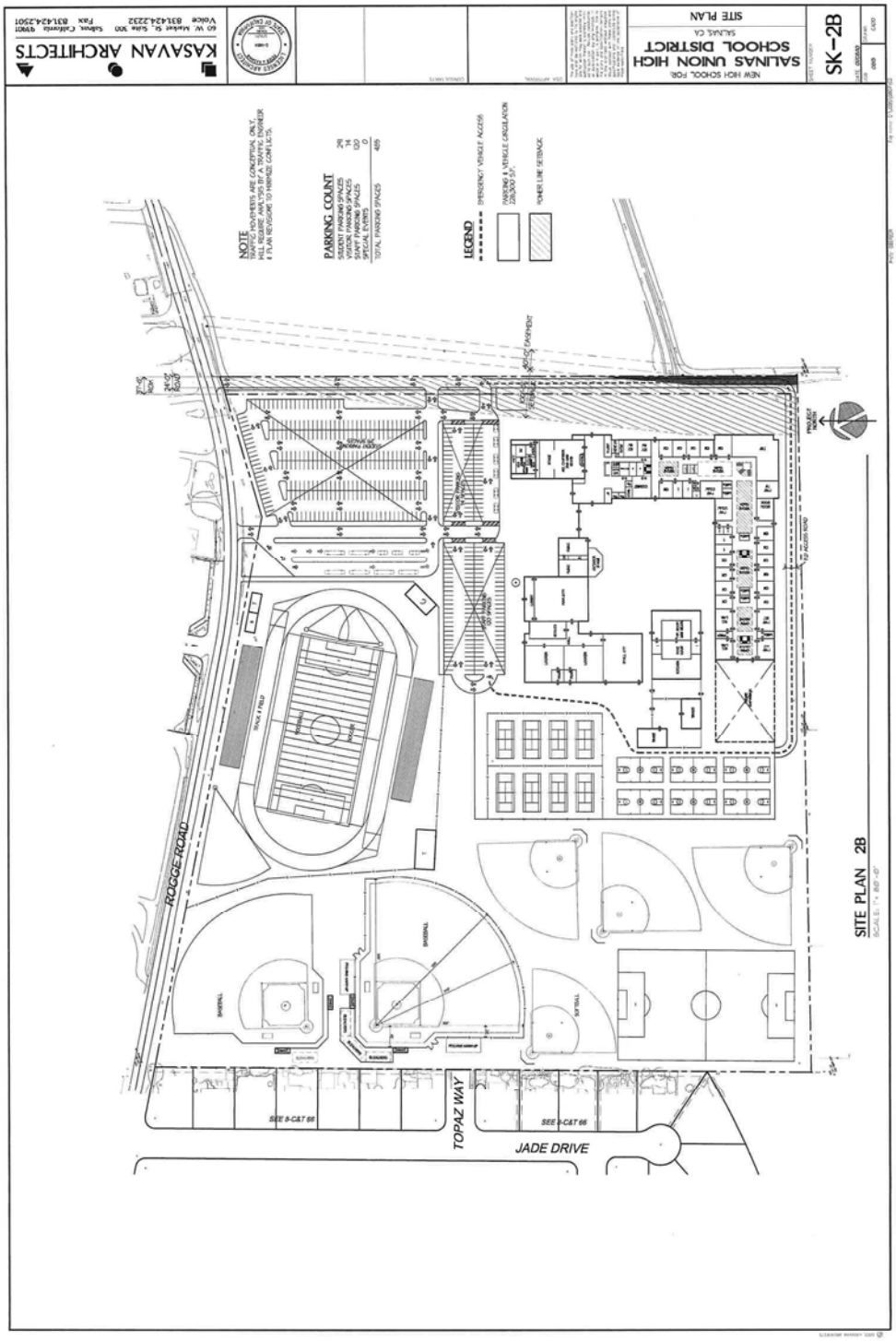
Alternative A

In addition to the proposed project site design, two alternatives have been proposed. Alternative A places the baseball and softball diamonds along the westerly portion of the site, the football/soccer stadium along Rogge Road, the classroom buildings along the southerly boundary and the parking lots along the easterly border of the site. The Alternative A site plan is shown on the following page.

Alternative B

Alternative B shows the baseball and softball diamonds along the westerly boundary and the football/soccer stadium along Rogge Road, similar to the layout shown in Alternative A. However, Alternative B places the classroom buildings closer to the southeast are of the site and the parking lots at the northeast corner of the site. The Alternative B site plan is shown on page 13.


KASAVAN ARCHITECTS
SALINAS UNION HIGH SCHOOL DISTRICT
SITE PLAN
SK-2A
NOTE
PARKING COUNT
LEGEND
ROGGE ROAD
TOPAZ WAY
JADE DRIVE
SITE PLAN 2A


SK-2B
SITE PLAN
SALINAS UNION HIGH SCHOOL DISTRICT
NEW HIGH SCHOOL FOR
SALINAS, CA
KASAVAN ARCHITECTS
NOTE
PARKING COUNT
LEGEND
SITE PLAN 2B
ROGGE ROAD
TOPAZ WAY
JADE DRIVE
SEE S-C&T 66
SEE S-C&T 66

V. Existing and Future Noise Environments (Without the Project)

To determine the existing noise environment at the site, continuous recordings of the sound levels were made at two locations, as shown on the satellite image below. Location 1 was 45 ft. from the existing centerline of Rogge Road. Location 2 was at the west property line of the site at the terminus of Topaz Way, 670 ft. from the centerline of Rogge Road. The measurements were made for a continuous 24-hour period on March 28-29, 2011 using Larson-Davis 812 Precision Integrating Sound Level Meters. The meters yield, by direct readout, a series of the sound levels versus time, which include the L_1, L_{10}, L_{50} and L_{90}, i.e., those levels of noise exceeded 1%, 10%, 50% and 90% of the time. Also measured were the minimum and maximum levels, and the continuous equivalent-energy levels (L_{eq}), which are used to calculate the DNL.

The existing L_{eq}'s at Location 1, 45 ft. from the centerline of Rogge Road ranged from 55.9 to 66.4 dBA during the daytime and from 47.6 to 66.8 dBA at night. The L_{eq}'s at Location 2, the western property line, ranged from 40.8 to 54.9 dBA during the daytime and from 37.2 to 50.7 dBA at night. During school hours of 8:00 a.m. to 3:00 p.m., the highest hourly L_{eq} at Location 1 was 66.4 dBA.

The DNL's for the survey locations were calculated by decibel averaging of the L_{eq}'s as they apply to the various time periods of the DNL index. A 10 decibel nighttime weighting factor was applied and the DNL's were calculated using the formula shown in Appendix B. Adjustments were made to the measured noise levels to account for the increased setback of the school buildings from the measurement locations using methods established by the Highway Research Board, Ref. (f). Traffic noise diminishes at the rate of 3-6 decibels for every doubling of the distance from the source to the receiver. Thus, other locations on the site at greater distances from Rogge Road will have lower noise levels. The measured L_{eq}'s and DNL calculations are shown in the data tables in Appendix C.

Future traffic volume for Rogge Road, under the worst-case General Plan buildout condition, is expected to increase from the existing 5,880 vehicles ADT to 11,090 vehicles ADT, as reported by Hatch, Mott, McDonald, Ref. (g). This increase in traffic volume yields a 3 decibel increase in the traffic noise levels.

The existing and future noise contours are shown in Table II, below. Note that the noise exposures along the westerly property line and in the rear yards of the Jade Drive residences are approximately 3 dB lower than those away from the property line. This reduction is due to partial shielding of Rogge Road traffic by the houses and rear yards fences.

TABLE II				
Existing and Future Noise Contours, dB DNL				
	Main Area of Site		Jade Dr. Residences	
Distance to Rogge Rd. $C_{L,}$ ft.	Existing	Future	Existing	Future
45	67	70	65	68
71	64	67	62	65
97	62	65	60	63
154	59	62	57	60
209	57	60	55	58
331	54	57	52	55
450	53	55	50	53
713	49	52	47	50
969	47	50	45	48

VI. Impacts

A. Impacts to the Project

The noise standards of the City of Salinas identify a noise limit of 60 dB DNL for school land use. The standards do not differentiate various uses of the school. Thus, using 60 dB DNL as a noise goal design criterion may not be effective for the active areas of the project, such as the soccer fields, football fields, baseball diamonds, or tennis and basketball courts. Thus, the 60 dB DNL criterion should not be applied to these areas.

The 60 dB DNL limit is better served as a limit for the area containing the school buildings. However, there will be no noise sensitive exterior areas exposed to traffic as the quad/outdoor stage area will be surrounded by buildings which will adequately shield this area under the Project, Alternative A and Alternative B scenarios.

Title 24 specifies a short-term noise limit of 45 dBA $L_{eq(h)}$ at the classroom interiors.

ANSI S12.60 specifies a limit of 35 dBA $L_{eq(h)}$ at classroom interiors.

Since the Auditorium is considered an acoustically-critical space, the background noise level should not exceed 15 dBA $L_{eq(h)}$, which would render nearly all exterior noise inaudible and would not add to the background interior sound level limits required of the HVAC system.

The noise exposures and noise levels shown below are without the application of mitigation measures.

B. Exterior Noise Exposures and Noise Levels

The exterior noise exposures and hourly noise levels at the most impacted setbacks of the classrooms and Auditorium are shown in Tables III and IV, respectively, for the Project, Alternative A and Alternative B scenarios.

TABLE III

Noise Exposures, dB DNL

	Classrooms			Auditorium		
	Dist. to C_L	Existing	Future	Dist. to C_L	Existing	Future
Project	194 ft.	57	60	160 ft.	59	62
Alternative A	840 ft.	47	50	610 ft.	49	52
Alternative B	770 ft.	48	51	630 ft.	49	52

TABLE IV

Hourly Noise Levels, dBA $L_{eq(h)}$

	Classrooms			Auditorium		
	Dist. to C_L	Existing	Future	Dist. to C_L	Existing	Future
Project	194 ft.	56	59	160 ft.	58	61
Alternative A	840 ft.	46	49	610 ft.	48	51
Alternative B	770 ft.	47	50	630 ft.	48	51

As shown in the above tables, the noise exposures at the site will be within the "Normally Acceptable" limit of the City of Salinas General Plan Noise Element, with the exception of a 2 decibel excess at the front exterior of the Auditorium. However, the noise exposures at the front of the Auditorium are within the "Conditionally Acceptable" limit and, therefore, are acceptable as there is no exterior noise sensitive area within this noise impacted location. Exterior noise impacts to the planned project under the Project, Alternative A and Alternative B are less than significant.

Noise from the Oseguera harvest and packing equipment facility across Rogge Road from the site is intermittent and does significantly impact the classroom and arts building.

- Noise levels from equipment cleaning and maintenance activity ranged from 44 to 50 dBA maximum at the planned setback of the school buildings under the Project scenario.

- Noise levels from equipment cleaning and maintenance activity ranged from 34 to 40 dBA maximum at the planned setback of the school buildings under the Alternative A scenario.

- Noise levels from equipment cleaning and maintenance activity ranged from 34 to 40 dBA maximum at the planned setback of the school buildings under the Alternative B scenario.

C. Interior Noise Levels

To determine the interior noise levels inside the classroom buildings, a 25 dB reduction factor was applied to the exterior noise levels to account for the attenuation provided by the classroom building shell under a closed window condition. The closed window condition assumes that the classroom windows will be maintained closed during school hours, mechanical ventilation will be provided and that the windows will be fitted with standard dual-pane thermal insulating glass.

Table V provides the interior hourly average noise levels in the most impacted classroom and Auditorium spaces.

TABLE V				
Hourly Noise Levels, dBA $L_{eq(h)}$				
	Classrooms		Auditorium	
	Existing	Future	Existing	Future
Project	31	34	33	36
Alternative A	21	24	23	26
Alternative B	22	25	23	26

- The expected interior noise levels from traffic on Rogge Road will be within the 45 dBA $L_{eq(h)}$ standard of Title 24 and within the 35 dBA $L_{eq(h)}$ standard of ANSI S12.60 for classroom interiors.

- Although there are no standards for the Auditorium interior, the interior noise levels in the Auditorium will be higher than the 15 dBA $L_{eq(h)}$ design goal recommended in this study. It is possible that traffic noise could be audible during performances, and may ultimately be disruptive during quiet passages of music or spoken word.

CEQA Checklist

Noise Impacts to the Project – Less Than Significant

Noise Impacts to the Project Alternative A – Less Than Significant

Noise Impacts to the Project Alternative B – Less Than Significant

D. Project-Generated Noise Impacts

Noise impacts from the project to the area surrounding the proposed high school will include project-generated traffic and school activities, such as football/soccer games, marching bands, basketball games, baseball games, tennis court activity and outdoor stage performance activity.

The project-generated noise exposures at the property line to the west generated by the school will be in compliance with the 60 dB DNL limits of the City of Salinas Noise Element and Monterey County Safety Element standards, with the exception of competitive baseball games and softball games on the diamonds closest to the west property line under Alternative and/or Alternative B.

The project-generated noise exposures at the agricultural use to the south of the project site will be in compliance the 70 dB DNL limit of the City of Salinas Noise Element.

The project-generated noise exposures at the agricultural use to the east of the project site will be in compliance the 70 dB DNL limit of the City of Salinas Noise Element.

The project-generated noise exposures at the agricultural operations across Rogge Road to the north of the project site will be in compliance the 70 dB DNL limit of the City of Salinas Noise Element.

Traffic Noise

To evaluate project-generated traffic noise, the Project (and Alternative A and Alternative B) under the Phase I scenario of a 900 student enrollment traffic volumes were compared to the existing traffic volumes along Rogge Road in the vicinity of the site. The project buildout scenario of a 1,500 student enrollment was compared to the General Plan buildout conditions and not the existing conditions as the project buildout scenario could occur only with the General Plan buildout. Note that the traffic volumes on Rogge Road under the Project, Alternative A and Alternative B scenarios are the same, therefore, there will be no difference between the various alternatives.

This analysis includes evaluations of the project-generated traffic noise impacts to the existing residential area along Rogge Road at Jade Drive and to the classroom building under the Project scenario. The classroom building under Alternatives A and B will be too from Rogge Road to be considered.

Table VI, below, provides the existing, project Phase I, project buildout and General Plan buildout (with and without the project) traffic volumes and the change in the noise environment at the two receptor locations defined above. The contribution of school related traffic to the existing and future traffic volumes in the vicinity of the school will be less than significant.

TABLE VI

Project-Generated Traffic Noise Analysis

Rogge Road/Jade Drive Residences					
Scenario	AM Peak	Mid-day Peak	PM Peak	24-hour volume	Δ dB (DNL)
Existing	561	507	342	5610	
Proj. Phase I	342	211	113	1,148	
Exist. + Proj. Phase I	903	718	455	6,758	+0.81
Gen. Plan Buildout w/o Project	1,194	629	540	12,754	
Project Buildout	123	76	42	416	
Gen. Plan Buildout w/Project.	1,317	705	582	13,170	+0.14
School Classroom Building					
Existing	608	528	356	6,080	
Proj. Phase I	138	81	75	507	
Exist. + Proj. Phase I	746	609	431	6,587	+0.35
Gen. Plan Buildout w/o Project	555	319	144	1,755	
Project Buildout	233	672	568	8,155	
Gen. Plan Buildout w/Project	788	991	712	9,9910	+0.85

As shown, the project will add less than 1 decibel to the overall noise environment at the existing residential area to the west under the Phase I scenario. However, as the area builds out the contribution of project traffic (under the buildout scenario) will be lower. Likewise, the project traffic contribution to the background traffic volumes as it travels in front of the school classrooms will add less than 1 decibel to the existing volumes and as the area builds out, the addition of project traffic noise to the background traffic noise levels will remain less than 1 decibel. Project-generated traffic noise from Rogge Road at the existing residential area and at the project classroom building will be **Less Than Significant.**

In addition to school traffic on local surface streets, noise from project traffic using the school parking lots was analyzed. For the Project scenario, the staff parking lot will be located along the westerly border of the site contiguous with the Jade Drive and Topaz Way residences. The noise exposures will vary as fewer cars will travel in the parking lot toward the southerly end. Under the Alternative A and Alternative B scenarios, the parking lots are located along the easterly border of the site and far removed from the existing residential area.

Table VII, provides the project-generated traffic noise analysis for the Jade Drive and Topaz Way residences along the westerly border of the site, the agricultural use to the south and the agricultural use to the east under the Project, Alternative A and Alternative B scenarios.

TABLE VII				
School Parking Lot Noise				
Receptor	Existing DNL	Future DNL	Project DNL	Δ dB
Jade Dr. (Project)	52-67	55-70	9-37	0
East Prop. Line (Alt. A)	49-67	52-70	10-34	0
East Prop. Line (Alt. B)	52-67	55-70	8-26	0

As shown in the Table, noise from parking lot traffic will be in compliance with the City of Salinas Noise Element standards, the County of Monterey Safety Element standards (for the Jade Drive/Topaz Way residences) and will not add to the background noise environment at the respective receptor locations.

Project-generated traffic result: **Less Than Significant Impact**.

Football Game Noise

The noise generated by a high school football game includes PA system announcements, play-by-play calls, a half-time show with both school marching bands and cheering and band playing during the game, all typical of a high school football game. The hourly L_{eq} noise measurements recorded at the Milpitas Sports Center, Ref. (h), and at Serra High School, Ref. (i), ranged from 73-74 dBA during the first hour, 77-81 dBA during the second hour, which included half-time, and 72-75 dBA during the third hour. Maximum noise levels ranged from 81 to 88 dBA.

Games are typically three hours in length. Noise before and after the game is inconsequential in relation to game noise. The measurements were recorded at 40 ft. behind open style bleachers, equivalent to 240 ft. from the center of the field. The results of the football game noise analysis are shown in Table VIII, below. The football stadium layout is the same for Alternatives A and B.

TABLE VIII

Football Game Noise Analysis

Project	Test Dist. = 240 ft.	West PL Dist. =1,140 ft	East PL Dist. = 270 ft.	South PL Dist. = 540 ft.	Oseguera Co. PL Dist. = 410 ft.
1st Hour	74 dBA	47 dBA	69 dBA	69 dBA	60 dBA
2nd Hour	81 dBA	54 dBA	77 dBA	77 dBA	67 dBA
3rd Hour	75 dBA	48 dBA	70 dBA	70 dBA	61 dBA
DNL		**42**	**64**	**64 dB**	**55 dB**
Alternatives A & B	Test Dist. = 240 ft.	West PL Dist. = 700 ft.	East PL Dist. = 71 ft.	South PL Dist. = 950 ft	Oseguera Co. PL Dist. = 290 ft.
1st Hour	74 dBA	52 dBA	52 dBA	52 dBA	67 dBA
2nd Hour	81 dBA	59 dBA	59 dBA	59 dBA	74 dBA
3rd Hour	75 dBA	53 dBA	53 dBA	53 dBA	68 dBA
DNL		**47**	**47**	**47**	**62**

The results of the football game noise analysis reveals that noise exposures will be within the 60 dB DNL limits of the City of Salinas Noise Element and County of Monterey Safety Element at the Jade Drive/Topaz Way residences under the Project, Alternative A and Alternative B scenarios. The noise exposures at the east and south property lines and the property line of the Oseguera Company will be within the 70 dB DNL limit of the City of Salinas Noise Element standard for agricultural uses. Football games will not add significantly to the existing background noise environment. **Less Than Significant Impact.**

Soccer Game Noise

Noise data of high school soccer are unavailable at this time. However, our experience with youth soccer games, Ref. (j), and community college ladies soccer games, Ref. (k), indicates that at 210 ft. from the center of the field, with varying numbers of spectators, generate average sound levels of 49-52 dBA L_{eq}. Soccer game noise is created primarily by the shouts of spectators and referee whistles.

Table IX, below, provides soccer game noise levels and noise exposures under a worst-case game scenario of nine hours of continuous play on both the practice field and on the stadium field indicative of weekend soccer leagues.

The soccer practice field and the stadium will identical locations under Alternatives A and B. Therefore, the analysis for both scenarios yields identical results.

Soccer game noise under a worst-case scenario will be within the limits of the City of Salinas Noise Element and Monterey County Safety Element standards at the existing residential area to the west, and within the City of Salinas Noise Element standards at the agricultural uses and operations to the east, south and north. Soccer playing under the project and Alternatives A and B will not add significantly to the noise environment at the residential area to the west of the site with the exception of the practice field under Alternatives A and B and only under existing traffic conditions. The soccer practice field will add 8 dB to the existing noise environment near the southwest corner of the site. This will be a significant impact. However, under future buildout conditions, the background sound levels will increase such that the contribution of soccer game noise will be lowered to a less than significant impact.

Significant impact under existing traffic conditions, less than significant impact under future build out traffic conditions.

TABLE IX					
Soccer Game Noise Levels and Noise Exposures					
Project	Ref. Values	West PL	East PL	South PL	North PL
Dist. Practice Field	210 ft.	1,190 ft.	230 ft.	220 ft.	974 ft.
Dist. Stadium Field	210 ft.	1,280 ft.	270 ft.	780 ft.	412 ft.
Sound Level Practice Field	52 dBA	37 dBA	51 dBA	52 dBA	39 dBA
Sound Level Stadium Field	52 dBA	36 dBA	50 dBA	41 dBA	46 dBA
DNL total		36	50	48	43
Alternatives A and B					
Dist. Practice Field	210 ft.	120 ft.	1,160 ft.	190 ft.	1,020 ft.
Dist. Stadium Field	210 ft.	630 ft.	650 ft.	920 ft.	260 ft.
Sound Level Practice Field	52 dBA	57 dBA	37 dBA	53 dBA	38 dBA
Sound Level Stadium Field	52 dBA	42 dBA	42 dBA	39 dBA	50 dBA
DNL total		53	39	49	46

Marching Band Noise

Noise from a marching band will vary greatly, depending upon the size of the band, the instrumentation, the locations of rehearsals and performances, the styles of the music played and the intensity with which the band plays any particular piece of music.

High school marching bands will usually be comprised of a drum line, brass and woodwinds. The drums are usually played fairly constantly during parade, formation and concert rehearsals and are usually the instruments most audible at significant distances. However, the horn sections can also be very audible at great distances when the horns are facing the receptor location due to the high directionality of the instruments. The worst-case noise levels from a marching band would be created during a concert formation that faces a given receptor location. We assume that parade and half-time show rehearsals would take place on the football field. Half-time shows would also take place on the football field.

During a concert formation on the football field, the performance sound level would typically be 90 dBA L_{eq} at a distance of 40 ft. from the front line at the center of the formation, Ref. (h).

Table X below provides the marching band noise level and noise exposure at the most impacted property lines to the west, south, east and across Rogge Road to the north. The noise exposures were calculated under the assumption that the marching band would play up to two hours of music on any given day, which includes football games. As with football games, since the football field layout is the same for Alternatives A and B, we are assuming that the marching band formations under Alternatives A and B will be the same.

TABLE X					
Marching Band Noise Analysis					
Project	Reference Value	West PL	East PL	South PL	Oseguera PL
Distance	40 ft.	1,060 ft.	210 ft.	680 ft.	320 ft.
Sound Level	90 dBA	62 dBA	76 dBA	65 dBA	72 dBA
DNL		**51 dB**	**65 dB**	**54 dB**	**61 dB**
Alternatives A and B					
Distance	40 ft.	600 ft.	600 ft.	840 ft.	170 ft.
Sound Level	90 dBA	66 dBA	66 dBA	64 dBA	77 dBA
DNL		**55 dB**	**55 dB**	**53 dB**	**66 dB**

Noise from marching band practice, concerts on the football field or during football games will be within the 60 dB DNL limits of the City of Salinas Noise Element and Monterey County Safety Element at the residential uses to the west, within the 70 dB DNL limit of the City of Salinas Noise Element standard for the agricultural uses to the east and south and the agricultural operations to the north, under the Project, Alternative A and Alternative B scenarios. Marching band activities will not increase the background noise environment by a substantial amount at the residential area to the west of the site. **Less Than Significant Impact.**

Basketball Court Noise

A typical recreational game of high school aged boys will generate an average sound level of 64 dBA at 40 ft. from the center of the court, Ref. (l). With a grouping of six courts, as shown on the plans for the Project and Alternatives A and B, this is equivalent to 72 dBA at 40 ft. from the center of the court group. This sound level includes ball dribbling, shots against the backboard and shouts from the players. The outdoor courts will be for recreational play and P.E., thus, spectator noise should not be an issue. Using the center of the court group as the source location, the results of the basketball court analysis is shown in Table XI, below. To calculate the DNL, we are also assuming that the courts will be in use for up to five hours per day with all courts being used.

TABLE XI

Basketball Court Analysis

Project	West PL	East PL	South PL	Oseguera PL
Ref. Dist. = 40 ft.	586 ft.	828 ft.	490 ft.	760 ft.
Ref. Sound Level = 72 dBA	49 dBA	46 dBA	50 dBA	47 dBA
DNL	**42 dB**	**39 dB**	**43 dB**	**40 dB**
Alternative A				
Ref. Dist. = 40 ft.	554 ft.	868 ft.	543 ft.	730 ft.
Ref. Sound Level = 72 dBA	49 dBA	45 dBA	49 dBA	47 dBA
DNL	**42 dB**	**38 dB**	**42 dB**	**40 dB**
Alternative B				
Ref. Dist. = 40 ft.	583 ft.	988 ft.	227 ft.	1,024 ft.
Ref. Sound Level = 72 dBA	49 dBA	44 dBA	57 dBA	44 dBA
DNL	**42 dB**	**37 dB**	**50 dB**	**37 dB**

Noise from the basketball courts will be within the limits of the City of Salinas Noise Element and Monterey County Safety Element at the Jade Drive/Topaz Way residences, and within the limits of the City of Salinas Noise Element at the agricultural uses and operations to the east, south and north. Basketball court activities under the project, Alternative A and Alternative B will not add significantly to the noise environment at the residential area to the west of the site. **Less Than Significant Impact.**

Tennis Court Noise

A tournament level match of high school aged boys will generate an average sound level of 56 dBA at 80 ft. from the center of the court, Ref. (m). The noise associated with tennis playing is primarily from balls being hit, shoes squeaking on the court and vocal sound from the players. The tennis courts will have no stands or bleachers, thus, spectator noise should not be an issue.

Table XII, below, provides the noise exposures at the west, south, east and north property lines generated by tennis court activity under a worst-case scenario of all courts in operation continuously for eight hours.

TABLE XII

Tennis Court Noise Levels

Project	Ref. Values	West PL	East PL	South PL	Oseguera PL
Sound Level	56 dBA Leq	45	46	46	48
DNL		40	41	41	43
Alternative A					
Sound Level	56 dBA Leq	43	52	45	57
DNL		38	47	40	52
Alternative B					
Sound Level	56 dBA Leq	48	43	49	47
DNL		43	38	44	42

Tennis activity will be in compliance with the standards of the City of Salinas Noise Element and Monterey County Safety Element at the residential uses to the west of the site. Tennis activity will also be in compliance with the City of Salinas Noise Element standards at the agricultural uses and operations to the east, south and north. Tennis court noise will not add significantly to the background noise environment at the residential area to the west of the site. **Less Than Significant Impact.**

Baseball/Softball Game Noise

Noise from a baseball or softball game is typically the bat striking the ball and shouts from spectators. The average sound level at the backstop behind home plate (25 ft.) of a championship baseball game of 18 year old boys, with approximately 100 people in the stands is 84 dBA, Ref. (n). Although noise data of Jr. Varsity baseball game are unavailable, we expect that the noise levels during a Jr. Varsity game or Major Little League would be approximately 78 dBA at 25 ft. from home plate based on approximately 2 spectators per player and no public address system. Similarly, girls softball games typically do not generate the same sound levels as baseball games. Based on 2 spectators per player, we expect softball games to generate sound levels of up to 75 dBA at 25 ft. from home plate.

High school baseball and softball field usage is typically restricted to extracurricular afternoon games and P.E. classes. Therefore, the amount of usage of fields would be limited to approximately 8 hours per day, with no crowd noise during P.E. classes. The worst-case conditions would likely be created by weekend high school games scheduled in conjunction with Little League games when the maximum number of spectators would be present. For the purposes of this study, we are assuming a worst-case scenario of all fields being used with a high capacity of spectators and continuous play for nine hours during the day.

Tables XIII, XIV and XV, below, provide the baseball/softball game noise levels under a worst-case scenario for the Project, Alternative A and Alternative B, respectively.

TABLE XIII					
Project Scenario Baseball and Softball Game Noise Levels					
Varsity Field	Ref. Value	West PL	East PL	South PL	North PL
Dist	25 ft.	320 ft.	1,096 ft.	330 ft.	980 ft.
Leq	84 dBA	62 dBA	51 dBA	62 dBA	52 dBA
DNL	9 hrs.	58	48	58	39
Jr. Varsity Field					
Dist.	25 ft.	460 ft.	950 ft.	346 ft.	940 ft.
Leq	78 dBA	53 dBA	46 dBA	55 dBA	46 dBA
DNL	9 hrs.	50 dB	43 dB	52 dB	35 dB
Softball 1					
Dist.	25 ft.	820 ft.	610 ft.	30 ft.	1,180 ft.
Leq	75 dBA	45 dBA	47 dBA	73 dBA	42 dBA
DNL	9 hrs.	42 dB	44 dB	70 dB	39 dB
Softball 2					
Dist	25 ft.	880 ft.	550 ft.	30 ft.	1,170 ft.
Leq	75 dBA	44 dBA	48 dBA	73 dBA	42 dBA
DNL	9 hrs.	41 dB	45 dB	70 dB	39 dB
Softball 3					
Dist.	25 ft.	1,030 ft.	450 ft.	400 ft.	790 ft.
Leq	75 dBA	43 dBA	50 dBA	51 dBA	45 dBA
DNL	9 hrs.	40 dB	47 dB	48 dB	42 dB
Softball 4					
Dist.	25 ft.	80	620	440	870
Leq	75 dBA	45 dBA	47 dBA	50 dBA	44 dBA
DNL	9 hrs.	42 dB	44 dB	47 dB	41 dB

TABLE XIV					
Alternative A Scenario Baseball and Softball Game Noise Levels					
Varsity Field	Ref. Value	West PL	East PL	South PL	North PL
Dist	25 ft.	89 ft.	1,317 ft.	997 ft.	365 ft.
Leq	84 dBA	73 dBA	50 dBA	52 dBA	61 dBA
DNL	9 hrs.	**70 dB**	47 dB	49 dB	58 dB
Jr. Varsity Field					
Dist.	25 ft.	93 ft.	1,313 ft.	862 ft.	507 ft.
Leq	78 dBA	67 dBA	44 dBA	47 dBA	52 dBA
DNL	9 hrs.	**64 dB**	41 dB	44 dB	49 dB
Softball 1					
Dist.	25 ft.	45 ft.	1,1317 ft.	574 ft.	788 ft.
Leq	75 dBA	70 dBA	41 dBA	48 dBA	45 dBA
DNL	9 hrs.	**67 dB**	38 dB	45 dB	42 dB
Softball 2					
Dist	25 ft.	445 ft.	975 ft.	507 ft.	774 ft.
Leq	75 dBA	50 dBA	43 dBA	49 dBA	45 dBA
DNL	9 hrs.	47 dB	40 dB	46 dB	42 dB
Softball 3					
Dist.	25 ft.	445 ft.	975 ft.	440 ft.	846 ft.
Leq	75 dBA	50 dBA	43 dBA	50 dBA	44 dBA
DNL	9 hrs.	40 dB	47 dB	48 dB	42 dB
Softball 4					
Dist.	25 ft.	454 ft.	975 ft.	36 ft.	1,237 ft.
Leq	75 dBA	50 dBA	43 dBA	72 dBA	41 dBA
DNL	9 hrs.	47 dB	40 dB	69 dB	38 dB

TABLE XV					
Alternative B Scenario Baseball and Softball Game Noise Levels					
Varsity Field	Ref. Value	West PL	East PL	South PL	North PL
Dist	25 ft.	89 ft.	1,330 ft.	885 ft.	476 ft.
Leq	84 dBA	73 dBA	49 dBA	53 dBA	58 dBA
DNL	9 hrs.	**70 dB**	46 dB	50 dB	55 dB
Jr. Varsity Field					
Dist.	25 ft.	85 ft.	1,335 ft.	1,028 ft.	338 ft.
Leq	78 dBA	67 dBA	43 dBA	46 dBA	55 dBA
DNL	9 hrs.	**64 dB**	40 dB	43 dB	52 dB
Softball 1					
Dist.	25 ft.	36 ft.	1,384 ft.	570 ft.	800 ft.
Leq	75 dBA	72 dBA	40 dBA	48 dBA	45 dBA
DNL	9 hrs.	**69 dB**	37 dB	45 dB	42 dB
Softball 2					
Dist	25 ft.	471 ft.	948 ft.	472 ft.	805 ft.
Leq	75 dBA	49 dBA	43 dBA	49 dBA	45 dBA
DNL	9 hrs.	46 dB	40 dB	46 dB	42 dB
Softball 3					
Dist.	25 ft.	285 ft.	1,139 ft.	2,198 ft.	908 ft.
Leq	75 dBA	54 dBA	42 dBA	36 dBA	44 dBA
DNL	9 hrs.	51 dB	39 dB	33 dB	41 dB
Softball 4					
Dist.	25 ft.	490 ft.	952 ft.	36 ft.	1,246 ft.
Leq	75 dBA	49 dBA	43 dBA	72 dBA	41 dBA
DNL	9 hrs.	46 dB	40 dB	69 dB	38 dB

Baseball and softball games under the Project scenario will be in compliance with the standards of the City of Salinas Noise Element and the Monterey County Safety Element. However, under Alternatives A and B, the two baseball diamonds and one softball field closest to the west property line may generate noise in excess of the standards if these fields are used for extended periods of time, such as during a weekend little league or community softball event. This is a **potentially significant impact**. Mitigation measures will be recommended.

Outdoor Stage

Outdoor concerts of a large concert band or an amplified "rock" band will typically generate sound levels of approximately 94 dBA @ 20 ft. from the front of the stage (main speakers). Over the course of 1 hour, the hourly average sound level would be 93 dBA $L_{eq(h)}$, which includes a 15 minute break. This sound level also includes the sound reflections or "buildup" from the buildings surrounding the state area.

Project

At the most impacted Jade Drive residence, 520 ft. from the stage (-28 dB for distance) and shielded by the classroom building (-17 dB shielding), the noise level under the Project scenario would be 48 dBA $L_{eq(h)}$. Assuming a 4 hour music event before 10:00 p.m., the noise exposure was calculated to be 40 dB DNL.

The existing and future noise exposures at this residence are 50 and 53 dB DNL, respectively. Therefore, the addition of 40 dB DNL to the background noise exposure results in no increase.

Noise from the outdoor stage area under the Project scenario will be compliance with the City of Salinas Noise Element standards and with the County of Monterey Safety Element standards. Outdoor stage activity will not substantially increase the noise environment at the residences. This is a Less Than Significant Impact.

Alternative A

At the most impacted Jade Drive residence, 760 ft. from the stage (-32 dB for distance), shielded by the music building (-12 dB for shielding) and -8 dB due to off-axis orientation (stage faces away from residence), the noise level under the Alternative A scenario would be 41 dBA $L_{eq(h)}$. Assuming a 4 hour music event, the noise exposure was calculated to be 33 dB DNL.

The existing and future noise exposures at this residence are 46 and 49 dB DNL, respectively. Therefore, the addition of 33 dB DNL to the background noise exposure results in no increase.

Noise from the outdoor stage area under the Alternative A scenario will be compliance with the City of Salinas Noise Element standards and with the County of Monterey Safety Element standards. Outdoor stage activity will not substantially increase the noise environment at the residences. This is a Less Than Significant Impact.

Alternative B

At the most impacted Jade Drive residence, 760 ft. from the stage (-32 dB for distance), shielded by the music building (-12 dB for shielding) and -8 dB due to off-axis orientation (stage faces away from residence), the noise level under the Alternative A scenario would be 41 dBA $L_{eq(h)}$. Assuming a 4 hour music event, the noise exposure was calculated to be 33 dB DNL.

The existing and future noise exposures at this residence are 46 and 49 dB DNL, respectively. Therefore, the addition of 33 dB DNL to the background noise exposure results in no increase.

Noise from the outdoor stage area under the Alternative A scenario will be compliance with the City of Salinas Noise Element standards and with the County of Monterey Safety Element standards. Outdoor stage activity will not substantially increase the noise environment at the residences. This is a Less Than Significant Impact.

E. Construction Phase Impacts

Short-term construction impacts may be created during construction of the development. Construction equipment generates noise levels in the range of 70 to 90 dBA at a 50 ft. distance from the source, and has a potential to disturb residences along Jade Drive and Topaz Way. The noise levels at the property boundaries will be approximately 64 to 84 dBA. Hourly average noise levels will range from 60 to 74 dBA L_{eq} with the highest noise levels occurring during grading of the site near the residences. The noise exposures are likely to be up to 72 dB DNL on the noisiest days. Typical noise exposures from construction will be 55-65 dB DNL. Heavy truck traffic and backing horns will also be a significant source of noise to the residences. This is **a temporary significant impact.**

VII. Mitigation Measures

A. Traffic Noise Impacts to the School

Project	Alternative A	Alternative B
No Mitigation**	No Mitigation	No Mitigation

** Noise mitigation is not required for the school buildings including the Auditorium. However, we recommend that noise reduction measures be incorporated into the design of the Auditorium to reduce noise from the exterior to inaudibility.

Mitigation Measure 1)

Adopt 15 dBA L_{eq} as an interior design goal for the Auditorium from exterior sources.

Mitigation Measure 2)

Design the Auditorium building shell to reduce exterior noise to no more than 15 dBA L_{eq} from exterior sources. Consult with an acoustician to ensure the correct design measures will be implemented.

B. Project-Generated Traffic Noise Impacts

Project	Alternative A	Alternative B
No Mitigation	No Mitigation	No Mitigation

C. Football Games

Project	Alternative A	Alternative B
No Mitigation	No Mitigation	No Mitigation

D. Soccer Games

Project	Alternative A	Alternative B
No Mitigation	West Property Line Noise Barrier	West Property Line Noise Barrier

Mitigation Measure 3)

To achieve compliance with the standards of the City of Salinas Noise Element and the County of Monterey Safety Element, the following noise control barriers will be required:

- Construct a 6 ft. high acoustically-effective barrier along the west property line of the site contiguous with the residences along Jade Drive, as shown on Figure 1. The barrier height is in reference to the nearest residential building pad elevation or soccer field elevation, whichever is higher.

- Construct the barrier following the noise barrier construction provisions on page 41.

E. Marching Band Noise

Project	Alternative A	Alternative B
No Mitigation	No Mitigation	No Mitigation

F. Basketball Court Noise

Project	Alternative A	Alternative B
No Mitigation	No Mitigation	No Mitigation

G. Tennis Courts

Project	Alternative A	Alternative B
No Mitigation	No Mitigation	No Mitigation

H. Baseball/Softball Games

Project	Alternative A	Alternative B
No Mitigation	West Property Line Noise Barrier	West Property Line Noise Barrier

Mitigation Measure 4)

Baseball/Softball Noise Barrier

To achieve compliance with the standards of the City of Salinas Noise Element and the County of Monterey Safety Element, the following noise control barriers will be required:

- Construct an acoustically-effective barrier along the west property line of the site contiguous with the residences along Jade Drive and Topaz Way, as shown on Figure 1. The barrier north of Topaz Way shall achieve a height no less than 3 ft. above the top seat of the bleachers of the baseball diamonds closest to the property line. The barrier south of Topaz Way shall be a minimum of 6 ft. high. The barrier height is in reference to the nearest residential building pad or baseball diamond elevation, whichever is higher.
- Construct the barrier following the noise barrier construction provisions on page 41.

I. Outdoor Stage Noise

Project	Alternative A	Alternative B
No Mitigation	No Mitigation	No Mitigation

Noise Barrier Construction Provisions

To achieve an acoustically-effective barrier, it must be made air-tight, i.e., without cracks, gaps, or other openings and must provide for long-term durability. The barriers can be constructed of wood, concrete, stucco, masonry, earth berm or a combination thereof and must have a minimum surface weight of 2.5 lbs. per sq. ft. If wood fencing is used, homogeneous sheet materials are preferable to conventional wood fencing as the latter has a tendency to warp and form openings with age. However, high quality, air-tight, tongue-and-groove, shiplap, or board and batten construction can be used, provided the minimum surface weight requirement is met and the construction is air-tight. The noise control barriers must be constructed so that all joints, including connections with posts, pilasters or the building shells are sealed air-tight and no openings are permitted between the upper barrier components and the ground.

The implementation of the above recommended measures will reduce the exterior noise exposure impacts to the residential area to 60 dB DNL or lower.

J. Construction Phase Noise

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

- Scheduling noisy operations for the daytime hours of 7:00 a.m. to 7:00 p.m. to avoid the more sensitive evening and early morning hours.

- Utilizing temporary berms or noise barriers, such as lumber or other material stockpiles.

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

- Earth Removal: Use scrapers as much as possible for earth removal, rather than the noisier loaders and hauling trucks.
- Backfilling: Use a backhoe for backfilling, as it is less costly and quieter than either dozers or loaders.
- Ground Preparation: Use a motor grader rather than a bulldozer for final grading.
- Building Construction: Power saws should be shielded or enclosed where practical to decrease noise emissions. Nail guns should be used where possible as they are less noisy than manual hammering.

VIII. Conclusions

In conclusion, the noise impacts to the project will be in compliance with the City of Salinas Noise Element, the State of California Title 24 and ANSI standards. The project-generated noise impacts to the residential area to the west of the site, to the agricultural uses to the south and east of the site and to the agricultural operations across Rogge Road to the north of the site will be in compliance with the City of Salinas Noise Element and the County of Monterey Safety Element with the exception of baseball/softball games under the Alternative A and Alternative B scenarios. Construction noise will generate temporary noise impacts. Mitigation measures for the noise exposure excesses are described in Section VII of this report.

The study findings for existing conditions are based on field measurements and other data and are correct to the best of our knowledge. Future noise projections are based on information provided by the consulting traffic engineer. Significant deviations in the predicted school enrollment, site planning, future changes in school activity levels, noise regulations or other future changes beyond our control may produce long-range noise results different from our estimates.

Report Prepared By:

_____

Jeffrey K. Pack
President

APPENDIX A

References

(a) The City of Salinas Noise Element of the General Plan, September 2002

(b) Monterey County General Plan, Safety Element, October 26, 2010

(c) The State of California Code of Regulations, Title 24, Part 11, Section A5.507.5 Enhanced, June 29, 2009

(d) American National Standards Institute, S12.60-2010/Part 1, "American National Standard Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools, Part 1: Permanent Schools", Approved April 28, 2010

(e) Site Plan, Salinas High School #5, by Kasavan Architects, January 13, 2011

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

(g) Information on Project Traffic Volumes Provided by Mr. Dan Takacs, Hatch, Mott, MacDonald Traffic Consultants, by email, to Edward L. Pack Associates, Inc., June 3, 2011

(h) "Noise Assessment Study of High School Football, Milpitas Sports Center, Milpitas", by Edward L. Pack Associates, Inc., Project No. 21-012, October 16, 1989

(i) "Noise Assessment Study for the Planned Football Field Remodel, Serra High School, San Mateo", by Edward L. Pack Associates, Inc., Project No. 34-096, November 11, 2002

(j) "Noise Assessment Study for the Planned St. Francis Youth Center Soccer Fields, College Road, Watsonville", by Edward L. Pack Associates, Inc., Project No. 27-092, November 6, 1995

(k) "Noise Monitoring of Soccer Games, Barkley Family Park & Fields, Farm Hill Road, Woodside", by Edward L. Pack Associates, Inc., Project No. 41-032, October 13, 2009

(l) "Noise Analysis for the Basketball Court, Wood Ranch, Danville", by Edward L. Pack Associates, Inc., Project No. 24-030, June 6, 1992

(m) "Acoustical Analysis for the Planned Tennis Court Remodel Project, Winterlodge of Palo Alto, 3009 Middlefield Road, Palo Alto", by Edward L. Pack Associates, Inc., Project No. 28-016, March 24, 1996

(n) "Noise Assessment Study for the Environmental Impact Report, Gilroy Sports Park, Monterey Frontage Road, Gilroy", by Edward L. Pack Associates, Inc., Project No. 30-081, November 18, 1998

APPENDIX B

Noise Standards, Terminology, Instrumentation,

1. Noise Standards

A. City of Salinas General Plan Noise Element Standards

The City of Salinas General Plan Noise Element, adopted September 17, 2002, utilizes the Community Noise Equivalent Level (CNEL) noise metric and contains the exterior noise standards for various land uses in Table N-2. Table N-3 is a Noise/Land Use Compatibility Matrix, similar to what is shown in the *State of California Guidelines for the Preparation of a Noise Element.* The "Normally Acceptable" exterior noise limits are shown below:

Land Use	Community Noise Exposure, dB CNEL
Residential	60
Transient Lodging	60
Schools, Hospitals, Churches, Libraries, Nursing Homes	60
Playgrounds, Parks	70
Golf Course, Riding Stables, Water Recreation, Cemeteries	70
Office Buildings, Business Commercial, and Professional	65
Industrial, Manufacturing, Utilities, Agriculture	70

Residential Interiors are limited to 45 dB CNEL.

B. Monterey County Safety Element Standards

The County of Monterey Safety Element, Table S-2, adopted October 26, 2010, identifies levels of acceptability for various land uses. The Safety Element utilizes either the Day-Night Level (DNL) or Community Noise Equivalent Level (CNEL) for community noise exposure. The table below lists the following noise level limits for various land uses:

Land Use Category	Noise Limits (dB CNEL)			
	Norm. Accept.	Cond. Accept.	Norm. Unaccept.	Clearly Unaccept.
Residential-Low Density	60	70	75	>75
Residential-Multi-Family	65	70	75	>75
Transient Lodging	65	70	80	>80
Schools, Libraries, Churches	70	70	80	>80
Commercial, Offices	70	80	85	
Industrial	75	80	>80	

Residential interior living spaces are limited to 45 dB CNEL.

2. Terminology

A. Statistical Noise Levels

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

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

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

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

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

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

B. Day-Night Level (DNL)

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

$$DNL = [(L_d+10\log_{10}15) \,\&\, (L_n+10+10\log_{10}9)] - 10\log_{10}24$$

Where:

L_d = L_{eq} for the daytime (7:00 a.m. to 10:00 p.m.)
L_n = L_{eq} for the nighttime (10:00 p.m. to 7:00 a.m.)
24 - indicates the 24-hour period
& - denotes decibel addition.

C. A-Weighted Sound Level

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

3. Instrumentation

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

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

APPENDIX C

Noise Measurement Data and Calculation Tables

DNL CALCULATIONS

CLIENT: EMC PLANNING GROUP
FILE: 43-005
PROJECT: SALINAS HIGH SCHOOL #5
DATE: 3/28-29/2011
SOURCE: EXISTING AMBIENT

LOCATION 1	ROGGE ROAD			
Dist. To Source	45 ft.			
TIME	Leq	10^Leq/10		
7:00 AM	66.4	4365158.3		
8:00 AM	63.2	2089296.1		
9:00 AM	63.0	1995262.3		
10:00 AM	65.3	3388441.6		
11:00 AM	63.9	2454708.9		
12:00 PM	63.8	2398832.9		
1:00 PM	64.8	3019951.7		
2:00 PM	66.4	4365158.3		
3:00 PM	65.1	3235936.6		
4:00 PM	66.4	4365158.3		
5:00 PM	65.1	3235936.6		
6:00 PM	63.4	2187761.6		
7:00 PM	62.1	1621810.1		
8:00 PM	60.6	1148153.6		
9:00 PM	55.9	389045.1	SUM=	40260612
10:00 PM	54.6	288403.2	Ld=	64.3
11:00 PM	48.4	69183.1		
12:00 AM	48.0	63095.7		
1:00 AM	49.3	85113.8		
2:00 AM	47.6	57544.0		
3:00 AM	50.5	112201.8		
4:00 AM	55.7	371535.2		
5:00 AM	61.8	1513561.2		
6:00 AM	66.8	4786300.9	SUM=	7346939
		1.0	Ld=	59.1
		1.0		
	Daytime Level=	76.1		
	Nighttime Level=	78.6		
	DNL=	**67**		
	24-Hour Leq=	63.0		

LOCATION 2	TOPAZ WAY PL			
Dist. To Source	670 ft. to Rogge Rd			
TIME	Leq	10^Leq/10		
7:00 AM	54.9	309029.5		
8:00 AM	49.3	85113.8		
9:00 AM	47.5	56234.1		
10:00 AM	52.5	177827.9		
11:00 AM	45.4	34673.7		
12:00 PM	42.5	17782.8		
1:00 PM	43.2	20893.0		
2:00 PM	49.6	91201.1		
3:00 PM	49.8	95499.3		
4:00 PM	49.5	89125.1		
5:00 PM	44.1	25704.0		
6:00 PM	42.5	17782.8		
7:00 PM	44.3	26915.3		
8:00 PM	43.4	21877.6		
9:00 PM	40.8	12022.6	SUM=	1081683
10:00 PM	39.4	8709.6	Ld=	48.6
11:00 PM	37.2	5248.1		
12:00 AM	39.9	9772.4		
1:00 AM	39.6	9120.1		
2:00 AM	38.9	7762.5		
3:00 AM	43.4	21877.6		
4:00 AM	46.1	40738.0		
5:00 AM	49.9	97723.7		
6:00 AM	50.7	117489.8	SUM=	318442
		1.0	Ld=	45.5
		1.0		
	Daytime Level=	60.4		
	Nighttime Level=	65.0		
	DNL=	**52**		
	24-Hour Leq=	47.7		