Table 5-1

AIRCRAFT OPERATIONS AND FLEET MIX (2009, 2015, and 2030)

INM Category/Aircraft		2009	2015		2030	
	Aircraft Description	Baseline	No Project Alternative	Proposed Project	No Project Alternative	Proposed Project
Jet						
737700	Boeing Business Jet	30	30	30	1,460	1,460
CIT3	Citation III	374	552	552	648	648
CL600	Challenger 600	625	921	921	1,082	1,082
CLREGJ	Canadair Regional Jet 200	-	-	1,460	-	-
CNA500	Citation I	700	1,031	1,031	1,212	1,212
CNA510	Citation Mustang	105	155	155	182	182
CNA750	Citation X	523	771	771	906	906
CRJ9-ER	Canadair Regional Jet 900	-	-	-	-	1,460
CRJ9-LR	Canadair Regional Jet 1000	-	-	-	3,650	3,650
DO328	Dornier 328	26	38	38	45	45
EMB120	Embraer 120	13	19	19	23	23
EMB145	Embraer 145	30	45	45	53	53
EMB190	Embraer 190	-	2,920	1,460	2,920	1,460
FAL20	Falcon 20	268	395	395	464	464
GII	Gulfstream II	17	26	26	30	30
GIIB	Gulfstream III	145	214	214	252	252
GIV	Gulfstream IV	304	448	448	526	526
GV	Gulfstream V	88	130	130	152	152
IA1125	Westwind Astra	281	414	414	487	487
LEAR25	Lear 25	49	72	72	84	84

Table 5-1 continued

INM Category/Aircraft		2009	2015		2030	
	Aircraft Description	**Baseline**	**No Project Alternative**	**Proposed Project**	**No Project Alternative**	**Proposed Project**
Jet						
LEAR35	Lear 35	668	985	985	1,158	1,158
MU3001	Beechjet 400	1,874	2,762	2,762	3,246	3,246
SUBTOTAL		**6,120**	**11,928**	**11,928**	**18,580**	**18,580**
Propeller						
BEC58P	Beech Baron	13,605	21,397	21,397	25,071	25,071
C130	C130 Hercules	50	75	75	100	100
CNA172	Cessna 172	5,339	7,869	7,869	9,248	9,248
CNA182	Cessna 182	2,912	4,291	4,291	5,043	5,043
CNA206	Cessna 206	7,077	10,430	10,430	12,258	12,258
CNA208	Cessna 208	1,676	2,471	2,471	2,904	2,904
CNA20T	Cessna 206 Turbo	2,462	3,629	3,629	4,265	4,265
CNA441	Cessna Conquest	1,851	2,729	2,729	3,207	3,207
DHC6	Dash 6	3,883	5,723	5,723	6,725	6,725
DHC830	Bombardier Q400	3,510	5,110	5,110	7,300	7,300
GASEPF	Single Engine Piston-Fixed Pitch	21,922	36,091	36,091	42,197	42,197
GASEPV	Single Engine Piston-Variable Pitch	12,737	20,391	20,391	23,870	23,870
OV10A	Rockwell Bronco	742	1,093	1,093	1,284	1,284
PA30	Piper Twin Comanche	72	106	106	125	125
PA31	Piper Navajo	359	530	530	623	623
SD330	Shorts 330 (Piaggio P190)	2,457	3,621	3,621	4,256	4,256

Table 5-1 continued

INM Category/Aircraft		2009	2015		2030	
	Aircraft Description	**Baseline**	**No Project Alternative**	**Proposed Project**	**No Project Alternative**	**Proposed Project**
SUBTOTAL		**80,654**	**125,556**	**125,556**	**148,476**	**148,476**
Helicopter						
A109	Augusta 109	924	1,361	1,361	1,600	1,600
B222	Bell 222	43	63	63	74	74
B407	Bell 407	866	1,276	1,276	1,500	1,500
EC130	Eurocopter 130	43	63	63	74	74
R44	Robinson 44	1,938	2,856	2,856	3,356	3,356
S70	Sikorsky Blackhawk	72	106	106	125	125
SUBTOTAL		**3,886**	**5,725**	**5,725**	**6,729**	**6,729**
TOTAL OPERATIONS		**90,660**	**143,209**	**143,209**	**173,785**	**173,785**

SOURCE: Mead & Hunt, MGA/L&B (2011)

5.3 NOISE IMPACTS OF THE NO PROJECT ALTERNATIVE

Future noise exposure at the Airport for the 2015 and 2030 No Project Alternative is presented in this section. For the No Project Alternative, the airfield is retained in its current layout throughout the analysis period; the taxiway, runway, and flight track alignments would remain the same as existing conditions. Changes in noise exposure would be generally due to changes in number of operations.

5.3.1 2015 and 2030 No Project Alternative Noise Modeling Assumptions

The major modeling input variables for this analysis are the number of aircraft operations, fleet mix, and runway utilization. All other INM input variables, such as time of day and stage length, are constant and are consistent with the non-air carrier aircraft under the existing conditions described in section 4. The runway utilization and time of day allocation for air carrier aircraft during 2015 and 2030 are listed on Table 5-2 and 5-3. Flight track utilization rates for the 2015 and 2030 No Project Alternative are assumed to be consistent with existing conditions, using the forecast activity levels for the respective timeframes, as the 2015 and 2030 No Project Alternative would not change the existing runway layout and no changes to existing air traffic control procedures are proposed. The fleet mix changes from existing conditions by adding the Embraer 190 to the 2015 No Project Alternative, and the Embraer 190 and the Canadiar Regional Jet 1000 to the 2030 No Project Alternative (See Table 5-1).

5.3.2 2015 and 2030 No Project Alternative CNEL Noise Contours

CNEL contours for the Airport were prepared using the Integrated Noise Model Version 7.0b to assess noise conditions for the 2015 and 2030 No Project Alternative. These contours are shown in Figures 5-1 and 5-2.

Table 5-2

AIR CARRIER RUNWAY UTILIZATION – 2015 AND 2030

INM Aircraft Type	Aircraft Description	Runway 01	Runway 19	Runway 14	Runway 32
DEPARTURES					
737700	Boeing Business Jet	-	-	91%	9%
CLREG	Canadair Regional Jet 200	-	-	91%	9%
CRJ9-ER	Canadair Regional Jet 900	-	-	91%	9%
CRJ9-LR	Canadair Regional Jet 1000	-	-	91%	9%
DHC830	Bombardier Q400	-	-	91%	9%
EMB190	Embraer 190	-	-	91%	9%
ARRIVALS					
737700	Boeing Business Jet	-	-	17%	83%
CLREG	Canadair Regional Jet 200	-	-	17%	83%
CRJ9-ER	Canadair Regional Jet 900	-	-	17%	83%
CRJ9-LR	Canadair Regional Jet 1000	-	-	17%	83%
DHC830	Bombardier Q400	-	-	17%	83%
EMB190	Embraer 190	-	-	17%	83%

SOURCE: MGA/L&B (2011)

Table 5-3

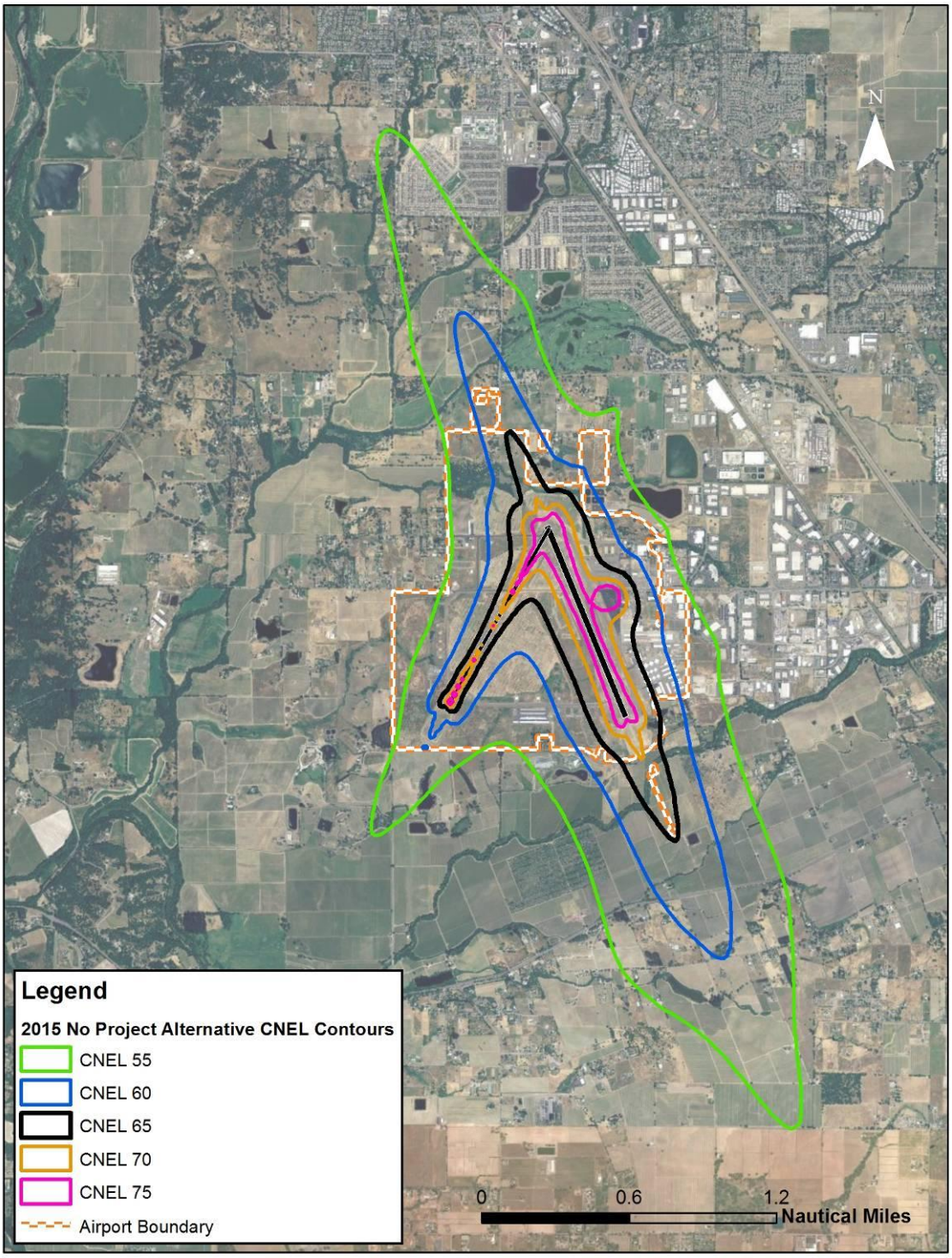
AIR CARRIER OPERATIONS BY DAY/EVENING/NIGHT PERIOD – 2015 AND 2030

INM Aircraft Type	Aircraft Description	Day	Evening	Night
DEPARTURES				
737700	Boeing Business Jet	100%	-	-
CLREG	Canadair Regional Jet 200	100%	-	-
CRJ9-ER	Canadair Regional Jet 900	100%	-	-
CRJ9-LR	Canadair Regional Jet 1000	100%	-	-
DHC830	Bombardier Q400	61%	17%	22%
EMB190	Embraer 190	100%	-	-
ARRIVALS				
737700	Boeing Business Jet	75%	25%	-
CLREG	Canadair Regional Jet 200	75%	25%	-
CRJ9-ER	Canadair Regional Jet 900	75%	25%	-
CRJ9-LR	Canadair Regional Jet 1000	75%	25%	-
DHC830	Bombardier Q400	61%	17%	22%
EMB190	Embraer 190	75%	25%	-

SOURCE: RS&H, MGA/L&B (2011)

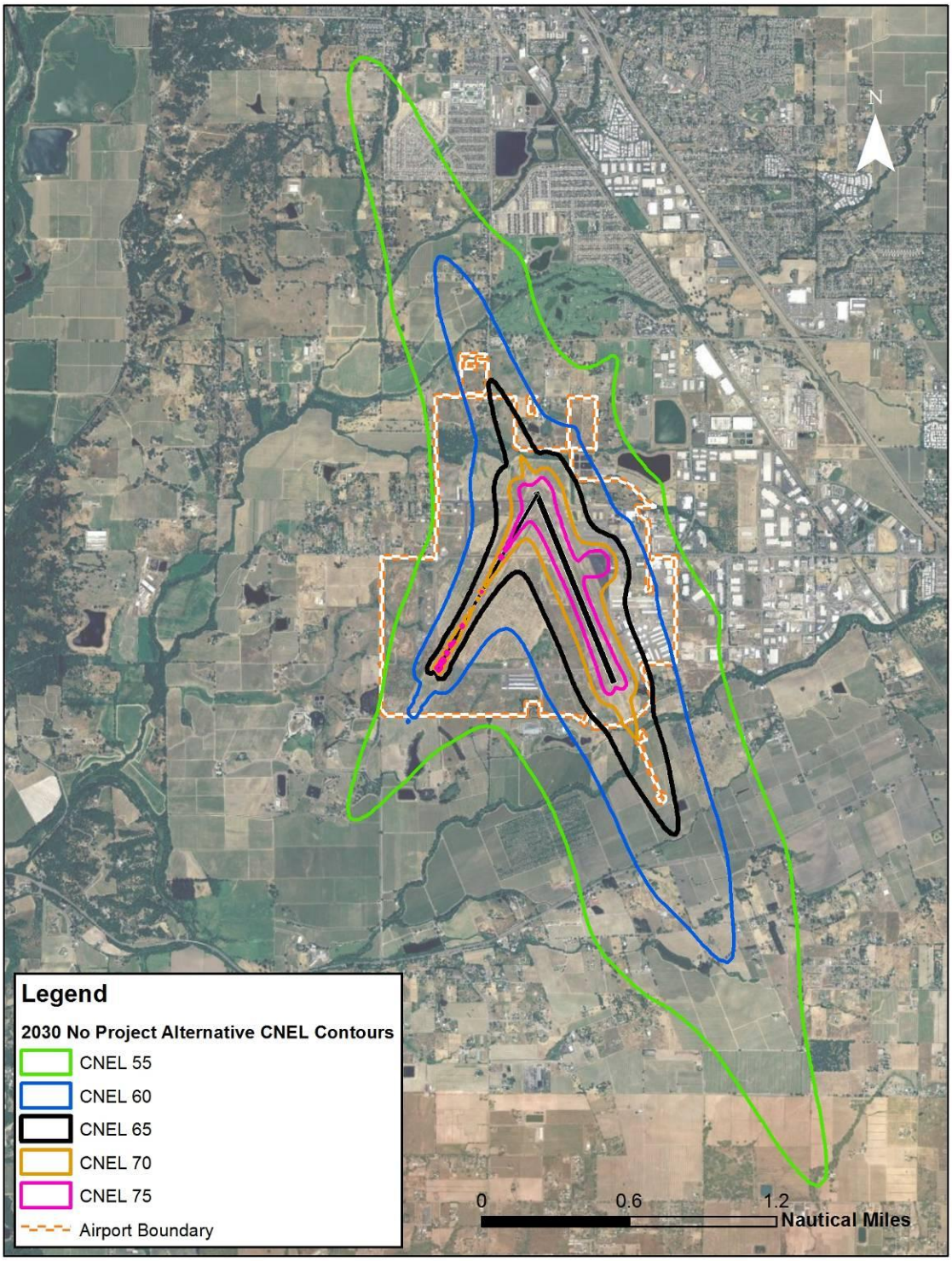
Figure 5-1

2015 NO PROJECT ALTERNATIVE CNEL CONTOURS



SOURCE: MGA/L&B (2011)

Figure 5-2
2030 NO PROJECT ALTERNATIVE CNEL CONTOURS



SOURCE: MGA/L&B (2011)

Table 5-4 below describes the size of the respective CNEL contours in acres. The contour area for existing conditions is shown for comparison.

Table 5-4

YEARS 2015 AND 2030 NO PROJECT ALTERNATIVE CNEL AREA IN ACRES

Contour CNEL (dB)	Baseline 2009	2015 No Project Alt.	2030 No Project Alt.
55 – 60	1,006	1,450	1,762
60 – 65	398	565	667
65 – 70	159	224	263
70 – 75	71	93	106
75 +	50	72	83
55 CNEL & greater	**1,684**	**2,404**	**2,881**

SOURCE: MGA/L&B (2011)

As shown in Table 5-4, the 55 through 75 CNEL contour would increase in area under the 2015 and 2030 No Project Alternative conditions due to the forecast increase in total operations during the respective years. CNEL noise levels can also be expressed in tabular form for specific sites of interest. CNEL noise levels for the receptor locations for Baseline 2009, 2015 and 2030 No Project Alternative are shown in Table 5-5.

Table 5-5

CNEL SUMMARY OF NO PROJECT ALTERNATIVE AT NOISE RECEPTOR SITES – YEARS 2015 & 2030

Receptor Sites	Name	Land Use	Baseline 2009 CNEL (dB)	2015 No Project Alt. CNEL (dB)	2030 No Project Alt. CNEL (dB)
1	Airport Property East	Airport	59.4	61.2	62.0
2	Airport Property West	Airport	55.2	57.0	57.8
3	Triple Oak Way	Residential	50.9	52.8	53.8
4	Cutrer Winery	Commercial	47.3	49.2	49.9
5	Rio Ruso Dr	Residential	44.6	46.3	47.2
6	Windsor High School	School	49.9	51.6	52.4
7	Mitchell Ln	Residential	47.8	49.6	50.3
8	Trione Cir	Residential	50.1	51.9	52.6
9	Olivet Rd	Residential	47.8	49.5	50.2
10	Piner High School	School	43.2	45.1	46.2

SOURCE: MGA/L&B (2011)

5.4 NOISE IMPACTS OF THE PROPOSED PROJECT

Future noise exposure at the Airport for the construction of the proposed project elements is presented in this section.

5.4.1 Constuction Noise Impacts

During the construction of the short-term project elements, noise from construction activities would occur. The closest noise-sensitive uses from any proposed construction location would be residential areas to the north and west of the Airport. The general types of equipment that may be expected to be used include the following:

- Cement and Mortar Mixer
- Excavators
- Grader
- Other General Industrial Equipment
- Paver
- Paving Equipment
- Rollers
- Rubber Tired Dozers
- Tractor Loader/Backhoe
- Trencher
- Water Truck

Construction equipment noise levels for this equipment and others are shown in Figure 5-3. This table shows the typical range of noise levels for common types of construction equipment. The levels shown are the A-weighted maximum noise level at a distance of 50 feet. Not all of this equipment will be used for this project, but until engineering design is complete and construction plans are developed it is not possible to positively identify equipment that will be used. It is not anticipated that pile drivers will be used for these projects. However, noise levels from a point source, such as construction equipment, decrease at the rate of approximately six dB with each doubling of distance from the source. For example, if a backhoe were 92 dBA at 50 feet, it would be 86 dBA at 100 feet, 80 dBA at 200 feet, 74 dBA at 400 feet, etc.

Of the equipment expected to be used on site, the noisiest will likely be the tractors, front loaders and other heavy construction trucks. This equipment ranges from the mid 70‘s to highs in the range of 94 dBA at a distance of 50 feet. Jackhammers and drills to the extent they are use have the highest maximum noise levels of about 98 dBA at a distance of 50 feet.

There are 6 homes or groups of homes that are the closest homes to the project construction or staging areas or construction haul routes and are as follows and shown in Figure 5-4:

1. Home closest to south end of Runway 32, east of runway and located adjacent to a pond, about 400 feet from perimeter road construction site, and 1000 feet from the taxiway construction on the southwest side of the end of Runway 32. This home will be acquired and removed between 2015 and 2030.
2. Home southwest of end of Runway 32 is approximately 200 feet from the access road construction area and 700 feet from the taxiway construction ares located on the southwest side of the south end of Runway 32. This home will be acquired and removed between 2015 and 2030.

3. Homes northeast of the end of Runway 14. The closest of these is approximately 350 feet from the construction and staging area for the runway lengthening project. Most of these homes will be acquired and removed by 2015 (aread 3A in Figure 5-4), while the remaining homes are acquired by 2030 (these latter are the northern most in the acquisition area, area 3B in Figure 5-4).
4. Homes west of the airport on the west side of Windsor Road north of Silk Road. These homes are approximately 1600 feet from the runway and access road construction. They are also about 85 feet from Windsor Road which will likely serve as a truck route during construction. Some of these homes front to Windsor Road and some are side to Windsor Road. Those that front have the rear yards shielded from the noise from Windsor Road.
5. Homes on Sanders Road east of the homes to be acquired will be exposed to construction traffic noise using Sanders Road.
6. The condominiums that are shared vacation homes on Shiloh Road at Skylane Boulevard will be exposed to construction traffic noise from Shiloh Road. These homes are considered like a hotel use in the County General Plan.

The home listed as number 1 above is adjacent to the pond and will have short term construction noise impacts during the pond fill and construction of the access road. In the long term this home is acquired.

The home listed as number 2 above is 200 feet from access road construction and 700 feet from taxiway construction. This will be short term construction noise impacts. In the long term this home will be acquired after the year 2015.

The homes listed as number 3 above will largely be acquired by 2015 (area 3A). The ones on the north end of the acquisition area will be acquired after 2015 (area 3B). The closest homes are approximately 350 feet from the staging and construction area.

For the homes along Windsor Road (listed as area 4), the use of Windsor Road at night may cause short term construction noise impacts. At approximately 85 feet from the center of the road, construction traffic may have noise levels in the range of 65 dBA to 89 dBA. Night use of this road will result in short term noise impacts. The construction on the runway extensions and access road will be 1600 feet or more from these homes. At this distance the construction noise has the potential for disturbing surrounding land uses when equipment is operating in the vicinity. At this distance typical noise levels from equipment that will likely be used for most of the heavy construction work such as backhoes, tractors, front loaders, graders, jackhammers and trucks will be in the range of 40 to 68 dBA at these homes (based on a range of 70 to 98 dBA at 50 feet and 6 dBA per doubling of distance dropoff rate to 1600 feet). In some cases, intervening landscaping or topography would further reduce noise at noise-sensitive locations.

Areas 5 and 6 are located on Shiloh Road and Sanders Road and may be affected by construction traffic using those roads.

Table 5-6 shows the maximum noise levels for each of these 6 receptor areas for both construction activity and construction traffic.

Any disturbance would be most noticeable during nighttime construction activities. There will be 20 nights o night construction activity during Phase 1 and 15 nights during Phase 2. The longest number of consecutive nights of construction will be 10 nights. During phase 1 there will be no night truck trips on to the construction site and during phase 2, there would be as many as 80

trucks per night for a total of 3 nights. The night work would consist of:

- grading and paving at the north end where the two runways intersect
- grading and paving of Taxiway D at the south end of Runway 14-32
- removal of Taxiway Z at the south end of Runway 14-32

This night work is necessitated by the need to work within the runway safety area (RSA). The runway must be closed when work occurs in the RSA.

A summary of estimated noise levels in each of the 6 residential areas with potential construction or construction traffic noise impacts is presented in Table 5-6 below:

Table 5-6

SUMMARY OF CONTRUCTION OR CONSTRUCTION TRAFFIC MAXIMUM NOISE LEVELS

Location	Distance, feet		Maximum Noise Level, dBA			Night Construction
	Construction Areas	Construction Haul Road**	Construction Equipment	Jackhammers	Construction Traffic	
1	400	-	76	80	-	No
2	200	-	82	86	-	No
3A	350	-	77	81	-	Yes
3B	350	85	77	81	89	Yes
4	1600	85	64	68	89	Yes
5	-	60	-	-	92	Yes
6	-	85	-	-	89	Yes

*Locations 1, 2, and 3A are acquired in Phase 1.

**Distance is to roadway centerline for the closest of the homes to the road.

The County of Sonoma does not have a noise ordinance or an ordinance that limits the hours of operation. These issues on considered on a case by case basis. The County Noise Element does have a Table of Maximum Allowable Exterior Noise Exposures for Non-Transportation Noise Sources as shown in Table 5-7. These limits are not identified for construction noise, but will be used here for such as an example of how construction noise levels compare to these limits. These are exterior noise levels, measured at the location of outdoor activity areas, not the property line. The outdoor activity area is usually the backyard for single family homes.

Table 5-7

MAXIMUM ALLOWABLE EXTERIOR NOISE EXPOSURES FOR NON-TRANSPORTATION NOISE SOURCES

Hourly Noise Metric[1], dBA	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
L50 (30 minutes in any hour)	50	45
L25 (15 minutes in any hour)	55	50
L08 (5 minutes in any hour)	60	55
L02 (1 minute in any hour)	65	60

[1] The sound level exceeded n% of the time in any hour. For example, the L50 is the value exceeded 50% of the time or 30 minutes in any hour; this is the median noise level. The L02 is the sound level exceeded 1 minute in any hour. Source: Sonoma County General Plan Noise Element

The Noise Element table effectively limits daytime maximum noise levels to 65 dBA and nighttime maximum noise levels to 60 dBA. It is clear from Table 5-6 and Table 5-7 that construction noise levels will greatly exceed the Noise Element Maximum Allowable Exterior Noise Exposures for Non-Transportation Noise Sources at all 6 receptor locations. Generally, daytime construction noise is exempt from municipal noise ordinance limits. However, night construction noise will be significant, although of limited duration.

A common source of night construction noise complaints are back-up beepers. These beepers are an important safety feature. The requirements for these beepers is that they be heard above background noise at a distance of 200 feet, or that a flag man be used in lieu of the back up beeper. There is another alternative and that is the use of a backup beeper that adjusts its volume to the ambient noise level. This may be particularly useful at night when background noise levels are typically lower. Potential mitigation measures include the use of flagmen in lieu of back up beepers or requiring back-up beepers that adjust level to background noise.

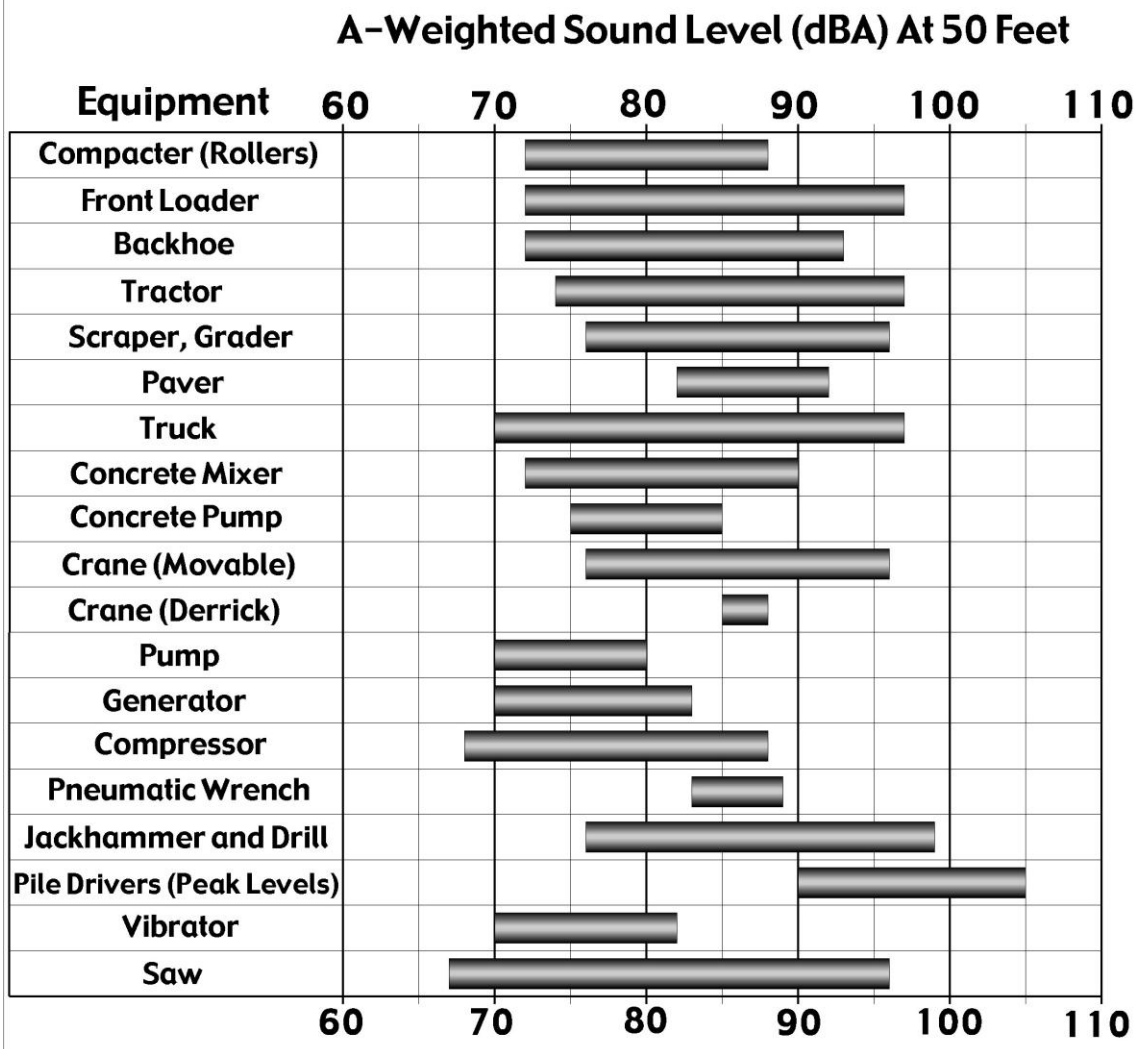
Temporary construction noise barriers, such as sound blankets may be of some use if they are high enough and have no flanking around the sides. This generally would require a continuous "wall" of such blankets. While a minimum barrier of this type may provide from 5 to 10 dB of noise reduction, it is not practical along the haul roads as the necessary breaks for driveways would create holes in the barrier that would render them mostly ineffective.

Short-Term Mitigation Measure

Develop of construction noise control plan prior to initiation of construction. Night construction work should use back up beepers that adjust to ambient levels or use flag men as a substitute for back up beepers. Unless night construction is required, all construction shall be limited to the hours of 7 a.m. to 5 p.m. on weekdays with no construction permitted on weekends or federal holidays. Even with this mitigation, construction noise will be a significant adverse short-term impact.

Figure 5-3

TYPICAL AIRPORT CONSTRUCTION EQUIPMENT NOISE LEVELS



Source: **"Handbook of Noise control," by Cyril Harris, 1979**