Appendix F

Construction Noise Modeling

HEAVY EQUIPMENT NOISE IMPACT ESTIMATION 1090 S De Anza

Scenario: Demolition
Receptor Location: Nearest Residence

Noise Source	Ave. Maximum SPL @ 50 ft., dBA	Number	Percentage of Workday Hours In Use	Effective Use Factor *	Distance, Ft.	Leq, dBA		
Backhoe [1]	80	1	0.5	0.5	100	68	25000000	6250000
Front End Loader [3]	79	1	0.5	0.5	100	67	19858206	4964551.5
Dozer [3]	82	1	0.5	0.5	100	70	39622330	9905582.5
Forklift [2]	83	1	0.5	0.5	100	71	49881558	12470389
Jack Hammer [3]	88	1	0.5	0.5	100	76	157739336	39434834
Saw [3]	70	1	0.5	0.5	100	58	2500000	625000

TOTAL Leq DURING NORMAL OPERATIONS:	**79**	**dBA**
Daytime Ambient without Equipment Operation:	79	dBA
Nighttime Ambient without Equipment Operation:	45	dBA
Daytime Hours Operating:	8	
Evening Hours Operating:	0	
Nighttime Hours Operating:	0	
Combined Daytime Hourly Leq:	82	*dBA*
Combined Nighttime Hourly Leq:	45	*dBA*
ESTIMATED Ldn:	***79***	***dBA***
ESTIMATED CNEL:	***79***	***dBA***

Distance attenuation assumed at: 6 dBA per doubling of distance
Notes: #N/A = Not Applicable

Distance attenuation assumed at: 6 dBA per doubling of distance
Notes: #N/A = Not Applicable

Note: CNEL calculations assume a decrease in ambient evening noise levels over the assumed daytime level, nighttime ambient noise levels are 45 dBA Leq as stated in the Municipal Code

*Assumed scarifier for forklift noise level, and Backhoe for Bobcat, pettibone, and skip loader noise level
* Assumed percentage of time that equipment is operating at near maximum sound level.
* Equipment type per applicant supplied information
* Daytime ambient noise level from 305 S. Sepulveda (measurement 4) was used for both sites

Equipment Use Source:

[1] Federal Railroad Administration (FRA) (2012), *High Speed Ground Transportation Noise and Vibration Impact Assessment Manual*
[2] Federal Transit Administration (FTA) (2006), Transit Noise and Vibration Assessment
[3] Federal Highway Administration (FHWA) (2006), *Construction Noise Handbook. Accessed at https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/*

HEAVY EQUIPMENT NOISE IMPACT ESTIMATION 1090 S De Anza

Scenario: Site Preparation
Receptor Location: Nearest Residence

Noise Source	Ave. Maximum SPL @ 50 ft., dBA	Number	Percentage of Workday Hours In Use	Effective Use Factor *	Distance, Ft.	Leq, dBA		
Backhoe [1]	80	1	0.5	0.5	100	68	25000000	6250000
Dozer [3]	82	1	0.5	0.5	100	70	39622330	9905582.5
Grader [3]	83	1	0.5	0.5	100	71	49881558	12470389
Front End Loader [3]	79	1	0.5	0.5	100	67	19858206	4964551.5

TOTAL Leq DURING NORMAL OPERATIONS:	**75**	**dBA**
Daytime Ambient without Equipment Operation:	57	dBA
Nighttime Ambient without Equipment Operation:	45	dBA
Daytime Hours Operating:	8	
Evening Hours Operating:	0	
Nighttime Hours Operating:	0	
Combined Daytime Hourly Leq:	75	*dBA*
Combined Nighttime Hourly Leq:	45	*dBA*
ESTIMATED Ldn:	***71***	***dBA***
ESTIMATED CNEL:	***71***	***dBA***

Distance attenuation assumed at: 6 dBA per doubling of distance
Notes: #N/A = Not Applicable

Note: CNEL calculations assume a decrease in ambient evening noise levels over the assumed daytime level, nighttime ambient noise levels are 45 dBA Leq as stated in the Municipal Code

*Assumed scarifier for forklift noise level, and Backhoe for Bobcat, pettibone, and skip loader noise level
* Assumed percentage of time that equipment is operating at near maximum sound level.
* Equipment type per applicant supplied information
* Daytime ambient noise level from 305 S. Sepulveda (measurement 4) was used for both sites

Equipment Use Source:
[1] Federal Railroad Administration (FRA) (2012), *High Speed Ground Transportation Noise and Vibration Impact Assessment Manual*
[2] Federal Transit Administration (FTA) (2006), Transit Noise and Vibration Assessment
[3] Federal Highway Administration (FHWA) (2006), *Construction Noise Handbook. Accessed at https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/*

HEAVY EQUIPMENT NOISE IMPACT ESTIMATION 1090 S De Anza

Scenario: Project Grading
Receptor Location: Nearest Residence

Noise Source	Ave. Maximum SPL @ 50 ft., dBA	Number	Percentage of Workday Hours In Use	Effective Use Factor *	Distance, Ft.	Leq, dBA		
Backhoe [1]	80	1	0.5	0.5	100	68	25000000	6250000
Dozer [3]	82	1	0.5	0.5	100	70	39622330	9905582.5
Excavator [3]	81	1	0.5	0.5	100	69	31473135	7868283.8
Front End Loader [3]	79	1	0.5	0.5	100	67	19858206	4964551.5
Truck [3]	88	1	0.5	0.5	100	76	157739336	39434834

TOTAL Leq DURING NORMAL OPERATIONS:	**72**	**dBA**
Daytime Ambient without Equipment Operation:	57	dBA
Nighttime Ambient without Equipment Operation:	45	dBA
Daytime Hours Operating:	8	
Evening Hours Operating:	0	
Nighttime Hours Operating:	0	
Combined Daytime Hourly Leq:	72	*dBA*
Combined Nighttime Hourly Leq:	45	*dBA*
ESTIMATED Ldn:	***68***	***dBA***
ESTIMATED CNEL:	***68***	***dBA***

Distance attenuation assumed at: 6 dBA per doubling of distance
Notes: #N/A = Not Applicable
Note: CNEL calculations assume a decrease in ambient evening noise levels over the assumed daytime level, nighttime ambient noise levels are 45 dBA Leq as stated in the Municipal Code

*Assumed scarifier for forklift noise level, and Backhoe for Bobcat, pettibone, and skip loader noise level
* Assumed percentage of time that equipment is operating at near maximum sound level.
* Equipment type per applicant supplied information
* Daytime ambient noise level from 305 S. Sepulveda (measurement 4) was used for both sites

Equipment Use Source:
[1] Federal Railroad Administration (FRA) (2012), *High Speed Ground Transportation Noise and Vibration Impact Assessment Manual*
[2] Federal Transit Administration (FTA) (2006), Transit Noise and Vibration Assessment
[3] Federal Highway Administration (FHWA) (2006), *Construction Noise Handbook. Accessed at https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/*

HEAVY EQUIPMENT NOISE IMPACT ESTIMATION 1090 S De Anza

Scenario: Building Construction
Receptor Location: Nearest Residence

Noise Source	Ave. Maximum SPL @ 50 ft., dBA	Number	Percentage of Workday Hours In Use	Effective Use Factor *	Distance, Ft.	Leq, dBA		
Backhoe [1]	80	1	0.5	0.5	100	68	25000000	6250000
Crane [3]	83	1	0.5	0.5	100	71	49881558	12470389
Concrete Mixer [1]	85	1	0.5	0.5	100	73	79056942	19764235
Concrete Pump [1]	82	1	0.5	0.5	100	70	39622330	9905582.5
Forklift [2]	83	1	0.5	0.5	100	71	49881558	12470389
Generator Set [3]	81	1	0.5	0.5	100	69	31473135	7868283.8
Front End Loader [3]	79	1	0.5	0.5	100	67	19858206	4964551.5
Saw [3]	70	1	0.5	0.5	100	58	2500000	625000
Welder [3]	74	1	0.5	0.5	100	62	6279716.1	1569929

TOTAL Leq DURING NORMAL OPERATIONS:	**79**	**dBA**	
Daytime Ambient without Equipment Operation:	57	dBA	86
Nighttime Ambient without Equipment Operation:	45	dBA	
Daytime Hours Operating:	8		
Evening Hours Operating:	0		
Nighttime Hours Operating:	0		
Combined Daytime Hourly Leq:	79	*dBA*	
Combined Nighttime Hourly Leq:	45	*dBA*	
ESTIMATED Ldn:	***74***	***dBA***	
ESTIMATED CNEL:	***74***	***dBA***	

Distance attenuation assumed at: 6 dBA per doubling of distance
Notes: #N/A = Not Applicable
Note: CNEL calculations assume a decrease in ambient evening noise levels over the assumed daytime level, nighttime ambient noise levels are 45 dBA Leq as stated in the Municipal Code

*Assumed scarifier for forklift noise level, and Backhoe for Bobcat, pettibone, and skip loader noise level
* Assumed percentage of time that equipment is operating at near maximum sound level.
* Equipment type per applicant supplied information
* Daytime ambient noise level from 305 S. Sepulveda (measurement 4) was used for both sites

Equipment Use Source:
[1] Federal Railroad Administration (FRA) (2012), *High Speed Ground Transportation Noise and Vibration Impact Assessment Manual*
[2] Federal Transit Administration (FTA) (2006), Transit Noise and Vibration Assessment
[3] Federal Highway Administration (FHWA) (2006), *Construction Noise Handbook. Accessed at https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/*

HEAVY EQUIPMENT NOISE IMPACT ESTIMATION 1090 S De Anza

Scenario: Site, Landscaping, and Offsite Construction
Receptor Location: Nearest Residence

Noise Source	Ave. Maximum SPL @ 50 ft., dBA	Number	Percentage of Workday Hours In Use	Effective Use Factor *	Distance, Ft.	Leq, dBA		
Air Compressor [3]	81	1	0.5	0.5	100	69	31473135	7868283.8
Generator Sets [3]	81	1	0.5	0.5	100	69	31473135	7868283.8

TOTAL Leq DURING NORMAL OPERATIONS:	**69**	**dBA**
Daytime Ambient without Equipment Operation:	57	dBA
Nighttime Ambient without Equipment Operation:	45	dBA
Daytime Hours Operating:	8	
Evening Hours Operating:	0	
Nighttime Hours Operating:	0	
Combined Daytime Hourly Leq:	69	*dBA*
Combined Nighttime Hourly Leq:	45	*dBA*
ESTIMATED Ldn:	***65***	***dBA***
ESTIMATED CNEL:	***65***	***dBA***

Distance attenuation assumed at: 6 dBA per doubling of distance
Notes: #N/A = Not Applicable

Note: CNEL calculations assume a decrease in ambient evening noise levels over the assumed daytime level, nighttime ambient noise levels are 45 dBA Leq as stated in the Municipal Code

*Assumed scarifier for forklift noise level, and Backhoe for Bobcat, pettibone, and skip loader noise level
* Assumed percentage of time that equipment is operating at near maximum sound level.
* Equipment type per applicant supplied information
* Daytime ambient noise level from 305 S. Sepulveda (measurement 4) was used for both sites

Equipment Use Source:
[1] Federal Railroad Administration (FRA) (2012), *High Speed Ground Transportation Noise and Vibration Impact Assessment Manual*
[2] Federal Transit Administration (FTA) (2006), Transit Noise and Vibration Assessment
[3] Federal Highway Administration (FHWA) (2006), *Construction Noise Handbook.*
Accessed at https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/