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Project #: 3100-5562 (TM)
Environmental Log #:
3910-09-02-003 (ER)

March 25, 2010

Mr. Darryl Sapien
4333 Balboa Street
San Francisco, CA 94121

SUBJECT: TM 5562 (Sapien) Residential Development Construction Noise Assessment – County of San Diego CA

Dear Mr. Sapien:

This noise letter report provides a focused analysis of construction noise to adjacent residential properties and potential noise impacts associated with the development of the residential subdivision, TM 5562. The purpose of this analysis is to identify any necessary mitigation measures to bring the grading operation noise below the County of San Diego property line standard.

Project Location and Description

The project proposes a ten (10) unit single-family residential subdivision. The project site is located at 711 Constant Creek Road in Fallbrook CA within the northern portion of the unincorporated area of San Diego County CA. The site currently consists of undeveloped land, various vegetation and agricultural uses. The project site vicinity map is provided in Figure 1.

Grading of the project will occur all in a single phase with the roadways being graded using a grader and scraper while the lots are graded separately using a backhoe, a dozer and a dump truck. All the grading activities will be completed prior the building and occupancy of any proposed residential units. The project site configuration and proposed grading activities are provided in Figure 2 on Page 3.

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Figure 1: Project Vicinity Map

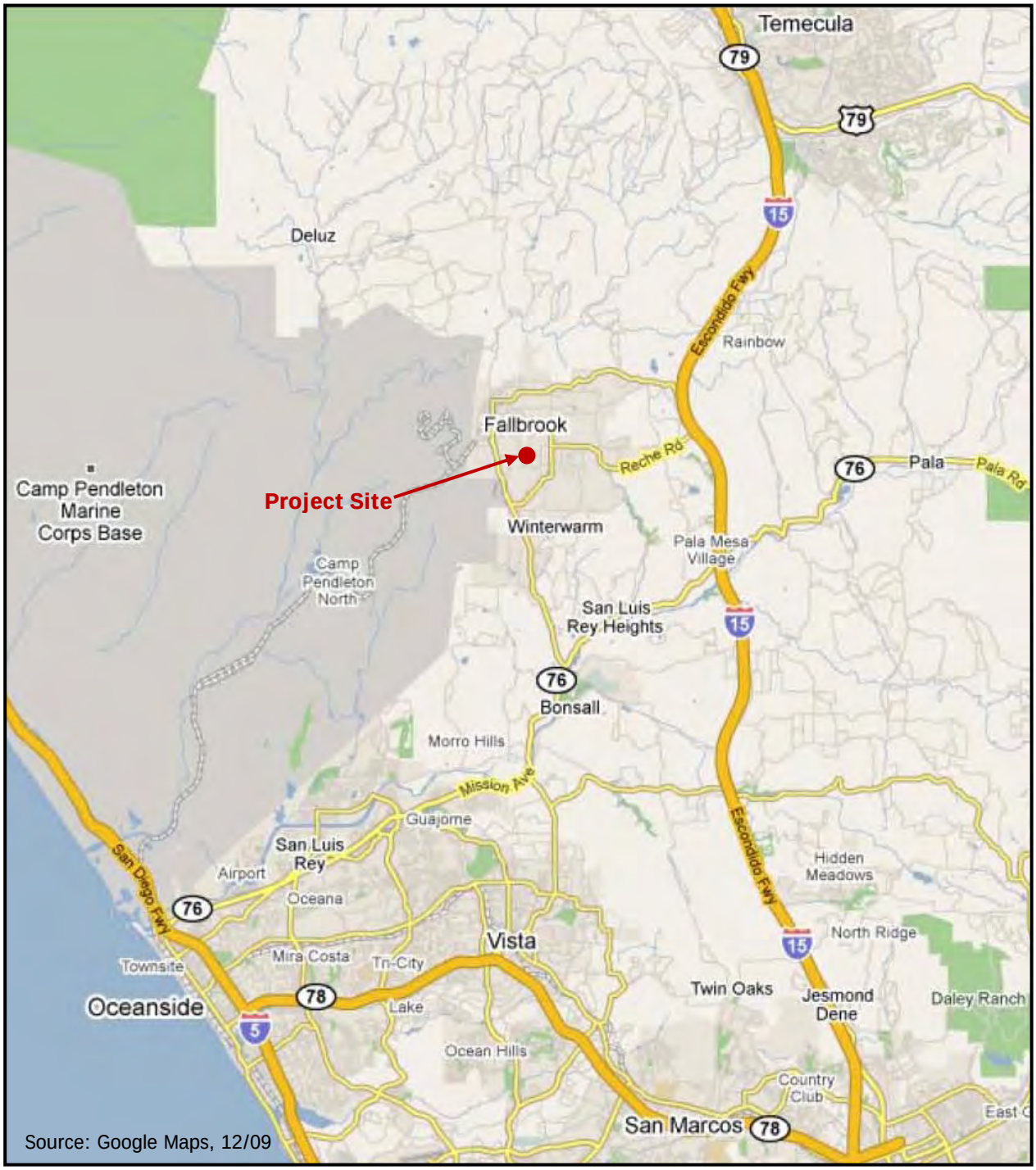

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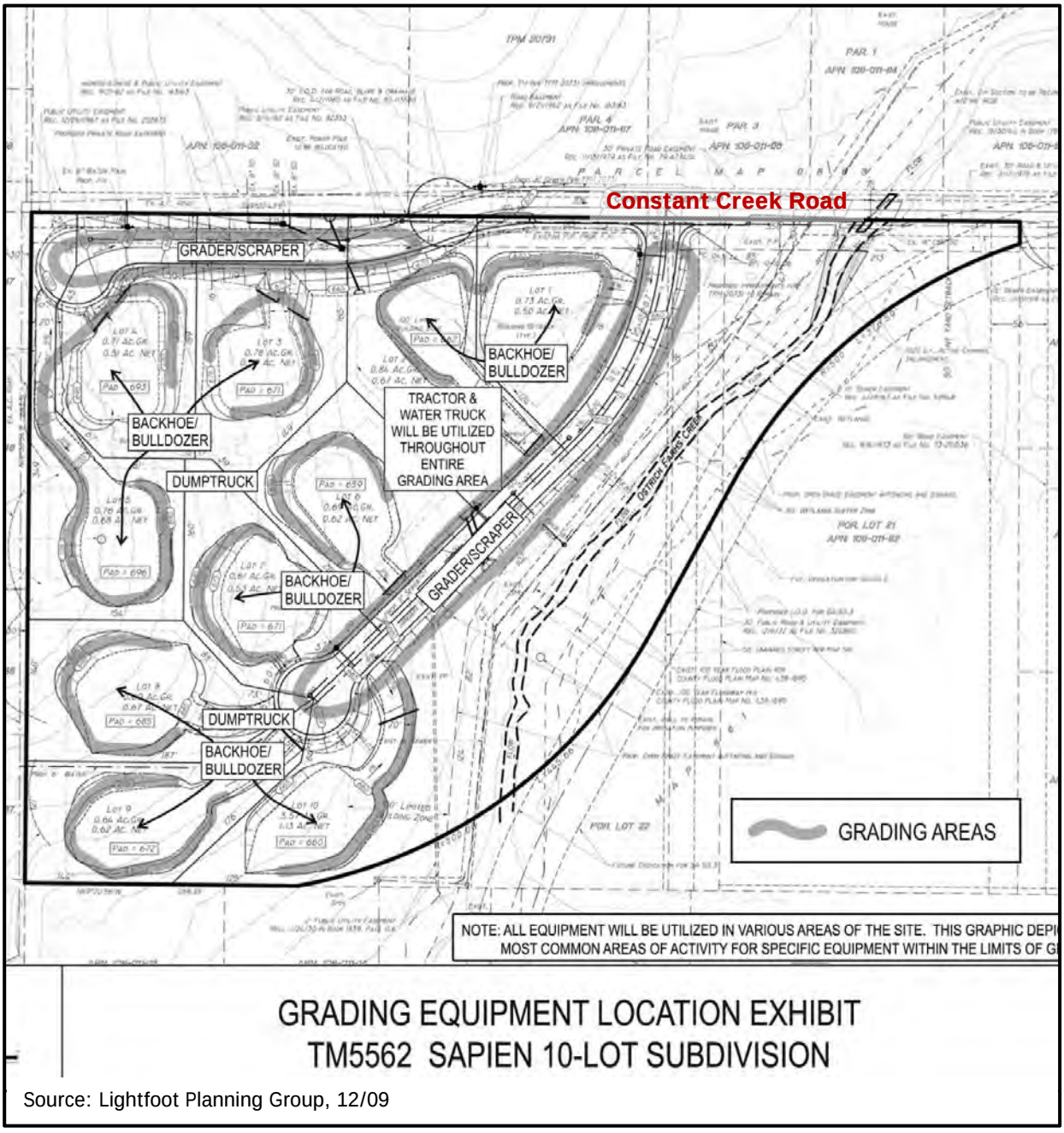
Figure 2: Project Site Plan and Grading Activities



Source: Lightfoot Planning Group, 12/09

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COUNTY OF SAN DIEGO STANDARDS

Section 36.409 of the County of San Diego ordinance controls construction equipment noise. Except for emergency work, it shall be unlawful for any person, including the County of San Diego, to operate construction equipment at any construction site, except as outlined in subsections (a) and (b) below:

(a) It shall be unlawful for any person to operate construction equipment between the hours of 7 p.m. of any day and 7 a.m. of the following day.

(b) It shall be unlawful for any person to operate construction equipment on Sundays, and days appointed by the President, Governor, or the Board of Supervisors for a public fast, Thanksgiving, or holiday, but a person may operate construction equipment on the above-specified days between the hours of 10 a.m. and 5 p.m. at his residence or for the purpose of constructing a residence for himself, provided that the average sound level does not exceed 75 decibels during the period of operation and that the operation of construction equipment is not carried out for profit or livelihood.

(c) It shall be unlawful to operate any construction equipment so as to cause at or beyond the property line of any property upon which a legal dwelling unit is located an average sound level greater than 75 decibels between the hours of 7 a.m. and 7 p.m. For temporary activities, the County considers the 75 decibel (A) average to be based on a period of eight hours.

In 1991, the U.S. Fish and Wildlife Service (USFWS) recommended that noise levels not exceed 60 dBA or ambient conditions, whichever is greater, to protect the Coastal California Gnatcatcher and other bird species. The County of San Diego has adopted this standard for all sensitive species. Therefore, the 60 dBA Leq, or ambient, will be used as the noise criteria to assess noise impacts on sensitive wildlife both on and off site.

Section 36.410 of the County of San Diego ordinance controls impulsive noise levels. In addition to the general limitations on sound levels in section 36.404 and the limitations

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on construction equipment in section 36.409, the following additional sound level limitations shall apply:

(a) Except for emergency work or work on a public road project, no person shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level of 82 dBA at residential or civic uses and 85 dBA at agricultural, commercial or industrial uses as described in the County Zoning Ordinance. This is measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period, as described in Guidelines for Determining Significance for 12 Noise subsection (c) below. The maximum sound level depends on the use being made of the occupied property.

(b) Except for emergency work, no person working on a public road project shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in 85 dBA at residential or civic uses and 90 dBA at agricultural, commercial or industrial uses as described in the County Zoning Ordinance. This is measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period, as described in subsection (c) below. The maximum sound level depends on the use being made of the occupied property.

(c) The minimum measurement period for any measurements conducted under this section shall be one hour. During the measurement period a measurement shall be conducted every minute from a fixed location on an occupied property. The measurements shall measure the maximum sound level during each minute of the measurement period. If the sound level caused by construction equipment or the producer of the impulsive noise, exceeds the maximum sound level for any portion of any minute it will deemed that the maximum sound level was exceeded during that minute.

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Construction Analysis Procedures and Findings

Construction noise represents a short-term impact on the ambient noise levels. Noise generated by construction equipment includes haul trucks, water trucks, graders, dozers, loaders and scrapers can reach relatively high levels. The most effective method of controlling construction noise is through local control of construction hours and by limiting the hours of construction to normal weekday working hours.

The U.S. Environmental Protection Agency (U.S. EPA) has compiled data regarding the noise generating characteristics of specific types of construction equipment. Noise levels generated by heavy construction equipment at a distance of 50 feet can range from 60 dBA for a small tractor up to 100 dBA for rock breakers. However, these noise levels diminish rapidly with distance from the construction site at a rate of approximately 6 dBA per doubling of distance. For example, a noise level of 75 dBA measured at 50 feet from the noise source to the receptor would be reduced to 69 dBA at 100 feet from the source to the receptor, and reduced to 63 dBA at 200 feet from the source.

Using a point-source noise prediction model, calculations of the expected construction noise impacts were completed. The essential model input data for these performance equations include the source levels of each type of equipment, relative source to receiver horizontal and vertical separations, the amount of time the equipment is operating in a given day, also referred to as the duty-cycle and any transmission loss from topography or barriers. To determine the worst-case noise levels for the grading operations no topographic attenuation, duty-cycle or barrier reductions were utilized.

Construction noise impacts for the residential subdivision (TM 5562) was completed based upon construction equipment anticipated for the project pursuant to the noise information provided by the client, project team and the equipment needs on similar projects in the County. The original list provided to the County in October 2009 was ultra conservative for planning purposes to determine if impacts were possible. That original list has been updated to reflect a more accurate anticipated list of equipment based on conversations with the project team.

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Grading of the project will occur all in a single phase with the roadways being graded using a grader and scraper while the lots are graded separately using a backhoe, a dozer and a dump truck. All the grading activities will be completed prior the building and occupancy of any proposed residential units. Additionally, no rock crushing or blasting is required during the grading operations of the project site. The grading of the proposed roadways and the proposed lots are analyzed separately below.

Roadway Grading Operations

The site plan with the anticipated grading operations provided in Figure 2 identifies a single scraper and a grader will be needed to complete the proposed on-site roadways. A water truck will occasionally be needed to wet the soil. Due to physical constraints and normal roadway grading operations when the water truck is wetting down the soil the other pieces of equipment are not operating in the same vicinity. The noise levels from a water truck are below the noise levels of the grader and scraper, therefore the worst-case condition would occur when the scraper and the grader are working in close proximity to each other.

Based on the EPA noise emissions and empirical data the reference noise levels for each piece of equipment, the cumulative noise levels and the distance needed from the property line to meet the County's 75 dBA standard are provided in Table 1 below. Also shown in Table 1, utilizing the drop-off rate of 6 decibels for each doubling of distance the required distance separation required for the grading activities to meet the County standard is 67-feet.

The roadway grading activities for the access road for Lots 1, 2 and 6-10, along the eastern portion of the site, would be more than 100-feet from property line and no impacts will occur and no mitigation is needed. The worst-case noise levels will occur in the northwest portion of the site with the extension from Constant Creek Road and the grading of the driveway for Lot 5. These grading activities will occur at distances of 30-feet to 60-feet from the northern and western property lines. The acoustical center of the activities would be in between those two distances, at 45-feet from the property line. At a distance of 45-feet the roadway grading activities are anticipated to exceed the County's 75-dBA standard without any mitigation measures. As can been seen in

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Table 2 below, the cumulative property line noise levels at 45-feet would be 78.4 dBA and an additional 3.4 decibel reduction would be needed to comply with Section 36.409 of the County of San Diego Noise Ordinance.

Table 1: Roadway Grading Noise Levels

Construction Equipment	Quantity	Source Level @ 50-Feet (dBA Leq)	Duty Cycle (Hours/Day)	Cumulative Noise Level @ 50-Feet (dBA Leq)
Grader	1	74	8	74.0
Scraper	1	75	8	75.0
			Cumulative Levels @ 50 Feet (dBA)	77.5
			Noise Reduction Needed to Achieve Standard	2.5
			Required Distance To Achieve Noise Reduction at Property Line	67

Table 2: Roadway Grading Noise Levels – Northwest Portion of the Site

Construction Equipment	Quantity	Source Level @ 50-Feet (dBA Leq)	Duty Cycle (Hours/Day)	Cumulative Noise Level @ 50-Feet (dBA Leq)
Grader	1	74	8	74.0
Scraper	1	75	8	75.0
			Cumulative Levels @ 50 Feet (dBA)	77.5
			Distance To Property Line (Feet)	45
			Noise Reduction/Increase Due To Distance (dBA)	+0.9
			Nearest Property Line Noise Level (dBA)	78.4
			Additional Noise Reduction Needed (dBA)	3.4

This would result in an unmitigated impact at the northern and western property lines. In order to mitigate noise levels to below the 75 dBA 8-hour standard, a temporary 8-foot high noise barrier is required. The location of the barrier is shown graphically in Figure 3

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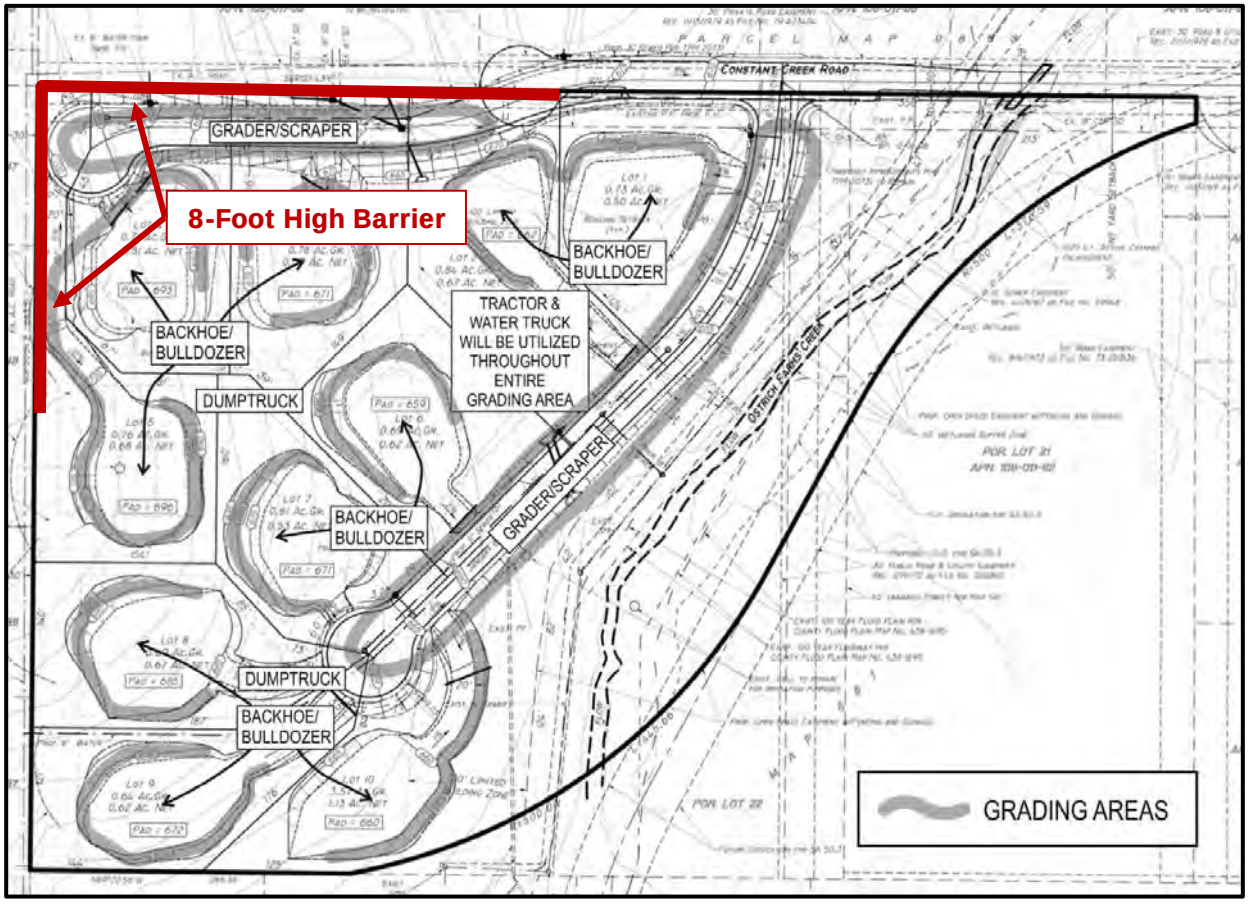
below. The temporary barrier should be non-gapping, free of any cut-outs and be constructed of ¾ inch plywood or equivalent materials.

Figure 3: Temporary Noise Mitigation for Roadway Grading Activities



The Fresnel Diffraction Method was utilized for determining the relative noise reduction associated with a temporary 8-foot-high wood mitigation wall. The Fresnel model output is provided as Appendix A to this letter report. The proposed mitigation wall would need to be located at the property line to break the line of sight from the equipment at the adjacent property. The temporary mitigation wall would reduce mid octave-band (250-Hz and 500-Hz) sound levels associated with typical construction activities between 8.5 dB and 10.0 dB. The reduction is dependent upon the source elevation and the topography

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between the source and receptor. The effective mitigated sound level at the nearest residential area is therefore anticipated to be at or below 69.0 dB (77.5 dB minus 8.5 dB). With the incorporation of the 8-foot-high temporary barrier no impacts are anticipated and no further mitigation is required for the proposed roadway grading activities.

Proposed Residential Lot Grading Operations

The construction equipment needed for each individual lot will consist of one dozer or a backhoe, a small tractor and the occasional use of a water truck and dump truck during the preparation and grading of each pad as originally identified in Figure 2. Once the roadways are graded each Lot will be prepared one-by-one. Due to physical constraints and normal pad grading operations the worst-case condition would occur when a dozer and a tractor are all working together in close proximity on a single pad. The occasional use of the water truck and the dump truck will occur in place of one of the other pieces of equipment and at greater distances, as shown in the anticipated grading exhibit provided in Figure 2. As can be seen in the anticipated grading activity graphics, the dump truck and the water truck will be generally located 150-feet or more from the nearest property line and the related activity will be very short in duration, only lasting a few minutes several times a day.

Based on the EPA noise emissions and empirical data the reference noise levels for each piece of equipment, the cumulative noise levels and the distance needed from the property line to meet the County's 75 dBA standard are provided in Table 3 below. Also shown in Table 3, utilizing the drop-off rate of 6 decibels for each doubling of distance the required distance separation required for the grading activities to meet the County standard is 87-feet.

The grading activities for Lots 1, 2 and 3 will be between 80-feet and 160-feet, or average 120-feet, from the northern property line and no impacts are anticipated. The grading activities for Lots 6 and 7, near the center of the site, are more than 200-feet from the nearest property line and no impacts will occur. The worst-case noise levels will occur in the western and southern portions of the site with the grading of Lots 4, 5, 8, 9 and 10. These grading activities will occur at centralized distances as close as 60-feet from the property lines. At a distance of 60-feet, the individual Lot grading activities are anticipated not to exceed the County's 75-dBA standard and no impacts

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and no mitigation measures are required. As can been seen in Table 4 below, the cumulative property line noise levels at 60-feet would be 74.5 dBA and no impacts are anticipated and no mitigation is required to comply with Section 36.409 of the County of San Diego Noise Ordinance.

Table 3: Lot Grading Noise Levels

Construction Equipment	Quantity	Source Level @ 50-Feet (dBA Leq)	Duty Cycle (Hours/Day)	Cumulative Noise Level @ 50-Feet (dBA Leq)
Dozer	1	74	8	74.0
Small Tractor	1	72	8	72.0
			Cumulative Levels @ 50 Feet (dBA)	76.1
			Noise Reduction Needed to Achieve Standard	1.1
			Required Distance To Achieve Noise Reduction at Property Line	57

Table 4: Roadway Construction Noise Levels – Northwest Portion of the Site

Construction Equipment	Quantity	Source Level @ 50-Feet (dBA Leq)	Duty Cycle (Hours/Day)	Cumulative Noise Level @ 50-Feet (dBA Leq)
Grader	2	74	8	74.0
Small Tractor	2	72	8	72.0
			Cumulative Levels @ 50 Feet (dBA)	76.1
			Distance To Property Line (Feet)	60
			Noise Reduction/Increase Due To Distance (dBA)	-1.6
			Nearest Property Line Noise Level (dBA)	74.5
			Additional Noise Reduction Needed (dBA)	None

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Construction Conclusions

The worst-case noise levels associated with the roadway grading activities will occur in the northwest portion of the site with the extension from Constant Creek Road and the grading of the driveway for Lot 5. At a distance of 45-feet the roadway grading activities are anticipated to exceed the County's 75-dBA standard without any mitigation measures. This would result in an unmitigated impact along a portion of the northern and western property lines. In order to mitigate noise levels to below the 75 dBA 8-hour standard, a temporary 8-foot high noise barrier is required.

The worst-case noise levels associated with the grading activities for each individual Lot will occur in the western and southern portions of the site with the grading of Lots 4, 5, 8, 9 and 10. These grading activities will occur at centralized distances as close as 60-feet from the property lines. Due to physical constraints and the limited amount of construction equipment, at a distance of 60-feet the individual Lot grading activities are anticipated not to exceed the County's 75-dBA standard and no impacts are anticipated and no mitigation is required to comply with Section 36.409 of the County of San Diego Noise Ordinance.

No rock crushing or blasting is required during any of the grading operations for the project site. Therefore no impulsive noise impacts are anticipated to occur.

If you have any questions, please contact me directly at (760) 473-1253.

Sincerely,
Ldn Consulting, Inc.

Jeremy Louden
Principal

Appendix A: Fresnel Barrier Reduction Calculations

Appendix A

FRESNEL BARRIER REDUCTION CALCULATIONS

Elevated Point Source
Source to Receiver Horizontal Distance (ft) = 55.00
Source to Barrier Horizontal Distance (ft) = 45.00
Barrier to Receiver Horizontal Distance (ft) = 10.00
Source Height (ft) = 8.00
Receiver Height (ft) = 5.00
Barrier Height (ft) = 8.00
Distance Source to Receptor (ft) d = 55.08
Distance Source to Barrier top (ft) d1 = 45.00
Distance Barrier top to Receiver (ft) d2 = 10.44

Frequency (Hz) = 8000 Attenuation (db) = 20.0 Fresnel N = 5.090 Over Range
Frequency (Hz) = 4000 Attenuation (db) = 17.0 Fresnel N = 2.545
Frequency (Hz) = 2000 Attenuation (db) = 14.2 Fresnel N = 1.273
Frequency (Hz) = 1000 Attenuation (db) = 11.9 Fresnel N = 0.636
Frequency (Hz) = 500 Attenuation (db) = 10.0 Fresnel N = 0.318
Frequency (Hz) = 250 Attenuation (db) = 8.5 Fresnel N = 0.159
Frequency (Hz) = 125 Attenuation (db) = 7.3 Fresnel N = 0.080
Frequency (Hz) = 63 Attenuation (db) = 6.2 Fresnel N = 0.040