April 11, 2007

Mr. Doug Naylor
Douglas K. Naylor Construction
727 Vista Enueno
Alpine, CA 91901

Reference: Albers Subdivision (RECON Number 4071N)

Dear Mr. Naylor:

This letter describes the results of construction noise analysis for the Albers Subdivision site. The analysis was revised in response to the County of San Diego's comment letter dated March 12, 2007, tracking number TPM 20843, ER 04-14-022. The Albers Subdivision is located in the County of San Diego, off Alpine Heights Road (Figures 1, 2 and 3). The adjacent properties are all zoned as A70, limited agricultural zones.

Construction activities associated with the project are projected to comply with the County noise ordinance with incorporation of the noise reduction measures detailed in the Recommendations/Conclusions section below. With these measures, no noise monitoring is required.

Standards

The San Diego County Noise Ordinance, Section 36.410 states:

Except for emergency work,

(a) It shall be unlawful for any person, to operate construction equipment between the hours of 7:00 P.M. of any day and 7:00 A.M. of the following day.

(b) It shall also 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 10:00 A.M. and 5:00 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 also 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 7:00 A.M. and 7:00 P.M.

The locations of where to apply this noise ordinance limit was clarified with the County (Aquino pers. com, 2007).

Analysis

The proposed construction project involves construction of five pads and homes, and widening of the existing road that runs through a section of the project site and off-site along Lilac Lane to Alpine Heights Road from 20 feet wide to 24 feet wide (see Figure 2). Accomplishing this would require the use of various pieces of construction equipment as well as drilling and blasting of rock in some places. Figure 3 shows a more detailed layout of the project site and highlights areas that may require drilling and blasting.

Construction noise generally can be treated as a point source and would attenuate at 6 dB(A) for every doubling of distance. For soft-site conditions, such as a vegetated ground, an additional 1.5 decibels of noise reduction per doubling of distance may be assumed (Federal Highway Administration [FHWA] 1979:A-29).

Site Preparation

Site preparation would occur prior to grading, and includes the installation of septic tanks and running utility lines alongside the driveways from the lots to the road. This work would occur separate from grading operations which are discussed below. Site preparation would take place over two weeks for each lot,and would occur for one lot at a time. The septic tanks would be installed using a backhoe and dumptruck at a different time from the utility lines, which would be installed with a backhoe and front end loader (Naylor pers. com. 2006). Table 1 shows the maximum noise levels under full load, the usage factors, and average hourly noise levels at 50 feet for each piece of equipment. The sum of the noise from equipment used to install the septic tanks is is 76.1 dB(A) $L_{eq[1]}$, and the sum of the noise from equipment used to install the utility lines is is 77.4 dB(A) $L_{eq[1]}$. A soft-site assumption was made in these calculations for distances further than 50 feet from the source since the intervening ground is vegetated. As seen in Table 2, noise due to installation of the utility lineat Pad 4 is projected to exceed 75 dB(A) $_{Leq[1]}$ at the nearest adjacent residential property line.

TABLE 1
NOISE LEVELS OF
SITE PREPARATION CONSTRUCTION EQUIPMENT

Equipment	Usage (Percent)	L_{max} (dBA)	$L_{eq[1]}$ (dBA)
Backhoe	40	77.6	73.6
Dump Truck	40	76.5	72.5
Front End Loader	40	79.1	75.1

SOURCE: RCNM (FHWA 2006)
NOTE: Noise levels at 50 feet from the source.

TABLE 2
SITE PREPARATION NOISE LEVELS AT ADJACENT PROPERTY LINES

	Septic		Utility Lines	
	Distance to Nearest Residential Property Line (feet)	$L_{eq[1]}$ (dBA)	Distance to Nearest Residential Property Line (feet)	$L_{eq[1]}$ (dBA)
Pad 1	165	63	282	59
Pad 2	115	67	74	73
Pad 3	153	64	174	64
Pad 4	60	74	42*	**79**
“Remainder“ Pad	296	57	324	57

Note: Bold indicates exceedance of one-hour noise level
*Distance measured from mid-length of the driveway, which could be trenched in an hour (Naylor pers. com 2007).

As seen in Table 1, noise levels due to the laying of utility line for Pad 4 are projected to exceed 75 dB(A) $L_{eq[1]}$ without noise reduction measures. In order to reduce noise levels to within 75 dB(A) $L_{eq[1]}$ the laying of utility line for Pad 4 will be limited to use of the backhoe alone. Noise levels for the remainder of the pads are projected to be below the standards.

Pad Grading

Grading of the pads would be phased, and would occur over two weeks for each pad (Naylor pers. com. 2006). Pad grading would occur separately from site preparation activities. For the pads where drilling and blasting is anticipated, it is expected that drilling would occur over four days and blasting would occur twice, one blast on two separate days. Grading of the pads would occur in one-foot height increments with work occurring over the entire pad in any given hour (Naylor pers. com. 2007). Table 3 shows the maximum noise levels under full load, the usage factors, and average hourly noise levels at 50 feet for each piece of equipment anticipated to be used in grading. Figure 3 shows the major outcroppings that may require drilling and blasting. The sum of blasting and drilling noise from Table 3 is 77.0 dB(A) $_{Leq[1]}$. The sum of the remainder of the grading equipment is 80.2 dB(A) $_{Leq[1]}$. For the pads where drilling and blasting noise would occur, drilling and blasting noise was added to the general grading noise.

Drilling/blasting noise was assessed at the nearest property line measured from the nearest point of the drill/blast area. Since grading would occur over the entire pad for an hour's work, grading noise was assessed at the nearest property line measured from the center of the pad. Additionally, Figure 3 shows the shortest distances from the drilling and blasting areas and the distances from the grading centers to the adjacent residential property lines. Table 4 summarizes the drilling/blasting and grading noise from each pad at the nearest property line. A soft-site assumption was made in these calculations for distances greater than 50 feet since the intervening ground is vegetated. As seen in this table, with the exception of grading noise from Pad 4, drilling/blasting and grading noise levels are projected to be below 75 dB(A) $_{Leq[1]}$ at the adjacent residences.

TABLE 3
NOISE LEVELS OF GRADING CONSTRUCTION EQUIPMENT

Equipment	Usage (Percent)	L_{max} (dBA)	$L_{eq[1]}$ (dBA)
Dozer	40	81.7	77.7
Pickup Truck	40	75.0	71.0
Blasting	1	94.0	74.0
Rock Drill	20	81.0	74.0
Front End Loader	40	79.1	75.1

SOURCE: RCNM (FHWA 2006)
NOTE: Noise levels at 50 feet from the source.

TABLE 4
DRILLING/BLASTING AND GRADING NOISE LEVELS AT ADJACENT RESIDENTIAL PROPERTY LINE

	Drill/Blast		Other Grading		
	Distance (feet)	dB(A)	Distance (feet)	dB(A)	Total dB(A) $L_{eq[1]}$
Pad 1	N/A	–	215	64	64
Pad 2	N/A	–	99	73	73
Pad 3	134	66	206	65	69
Pad 4	N/A	–	55	79	**79**
"Remainder" Pad	305	57	310	60	62

Note: Bold indicates exceedance of one-hour noise level

As seen in Table 4, noise levels due to grading of Pad 4 are projected to exceed 75 dB(A) $L_{eq[1]}$ without noise reduction measures. In order to reduce noise levels from grading activities on Pad 4 to within 75 dB(A) $L_{eq[1]}$ one of two noise reduction methods can be applied:

(A) Limits on Equipment Operations. During grading operations on Pad 4, no other equipment shall operate within the same one-hour period that the dozer is used. Furthermore, dozer use shall be limited to 16 minutes in any one-hour period. When the dozer is not in use, simultaneous use of the front-end loader and pick-up truck would not result in noise levels exceeding 75 dB(A) $L_{eq[1]}$ at the nearest residential property line.

(B) Temporary Construction Noise Barrier. Construction of a temporary five-foot-high barrier along the eastern edge (as shown in Figure 3) of the pad would reduce construction noise levels resulting from simultaneous operation of all equipment to within 75 dB(A) $L_{eq[1]}$. This calculation assumes an average distance of 44 feet from the pad edge to the noise source, 10 feet from the pad edge to the property line, the same base elevations for the source, barrier, and receiver which is conservative since the majority of the pad is lower, a source height of eight feet above the ground, and a receiver height of five feet above the ground. This results in a noise reduction of 5 dB(A) and would give an hourly noise level within 75 dB(A) $L_{eq[1]}$.

Home Building

Building on the lots would occur as development is planned and executed for each home (likely one at a time or staggered), and would occur over six months for each home (Naylor pers. com. 2006). It is assumed that home building activities would occur after all site preparation and grading is complete. Table 5 shows the maximum noise levels under full load, the usage factors, and average hourly noise levels at 50 feet for each piece of primary equipment anticipated to be used in home building. The cement pump and cement truck would be used simultaneously during foundation work. The remaining heavy equipment would operate independently. In addition to the equipment in Table 5, delivery trucks would deliver materials as needed and would be offloaded with a forklift; nail guns and an air compressor would be used for framing roofing and lath, miscellaneous hand tools would be used, a hand-held trencher would be used in landscaping, and a “Super Quiet” Honda Generator (48 to 58 dB rating; Honda 2006) would be used as needed. These other sources would be intermittent and would not contribute substantially to the total noise levels.

Figure 3 shows the shortest distances from the building areas to the adjacent residential property lines. Noise was assessed at the nearest residential property line as measured from the bulding area. The building area is at least 10 feet back from the slopes, specifically 20 feet back from the eastern slope of Pad 4 (Naylor pers. com 2007). Table 6 summarizes the foundation work and other heavy equipment noise at the nearest residential property line. A soft-site assumption was made in these calculations for distances over 50 feet from the source, since the intervening ground is vegetated. As seen in this table, foundation work is projected to exceed 75 dB(A) $_{Leq[1]}$ at the adjacent residential property lines of Pads 2 and 4 and other heavy equipment noise levels are projected to exceed 75 dB(A) $_{Leq[1]}$ at the adjacent residential property line of Pad 4.

TABLE 5
NOISE LEVELS OF HOME BUILDING CONSTRUCTION EQUIPMENT

Equipment	Usage (Percent)	L_{max} (dBA)	$L_{eq[1]}$ (dBA)
Backhoe	40	77.6	73.6
Concrete Mixer Truck	40	78.8	74.8
Concrete Pump Truck	20	81.4	74.4
Front End Loader	40	79.1	75.1

SOURCE: RCNM (FHWA 2006)
NOTE: Noise levels at 50 feet from the source.

TABLE 6
HOME BUILDING NOISE LEVELS AT ADJACENT RESIDENTIAL PROPERTY LINE

	Distance (feet)	Foundation dB(A)	Backhoe dB(A)	Loader dB(A)
Pad 1	170	64	60	62
Pad 2	52	**77**	73	75
Pad 3	158	65	61	63
Pad 4	33	**81**	**77**	**79**
Remainder Pad	285	59	55	56

Note: Bold indicates exceedance of one-hour noise level

As seen in Table 6, foundation work is projected to exceed 75 dB(A) $_{Leq[1]}$ at the adjacent residential property lines of Pads 2 and 4 without consideration of noise reduction. Noise levels can be reduced to within 75 dB(A) $_{Leq[1]}$ by one of two options:

(A) Limiting operations. Limiting operation of the concrete trucks to no closer than 64 feet from the nearest property boundary will result in property line noise levels within 75 dB(A) $_{Leq[1]}$ at the adjacent residential property lines of Pads 2 and 4.

(B) Temporary Construction Noise Barrier. For Pad 2, construction of a temporary three-foot-high barrier along the northern edge of Pad 2 (as shown in Figure 3) would reduce construction noise levels to within 75 dB(A) $L_{eq[1]}$. This calculation assumes 10 feet from the foundation to the barrier, 42 feet from the barrier to the property line, a base elevation for the propery line receiver 16 feet below the base elevation for the source and barrier, a source height of eight feet above the ground, and a receiver height of five feet above the ground. This results in a noise reduction of 3 dB(A) and would give an hourly noise level of 74 dB(A) $L_{eq[1]}$.

For Pad 4, construction of a temporary five-foot-high barrier along the eastern edge of Pad 4 (as shown in Figure 3) would reduce construction noise levels to within 75 dB(A) $L_{eq[1]}$. This calculation assumes 30 feet from the foundation to the barrier, 3 feet from the barrier to the property line, the same base elevations for the barrier and receiver, a base elevation for the source eight feet below the eastern pad edge since the graded elevation is lower, a source height of eight feet above the ground, and a receiver height of five feet above the ground. This results in a noise reduction of 6 dB(A) and would give an hourly noise level of 75 dB(A) $L_{eq[1]}$.

As seen in Table 6, the separate use of a backhoe and front-end loader are projected to exceed 75 dB(A) $_{Leq[1]}$ at the adjacent residential property lines to the east of Pad 4 without consideration of noise reduction. These were indicated to be separate activities and should remain as such. Noise levels can be reduced to within 75 dB(A) $_{Leq[1]}$ by the use of a temporary construction noise barrier. Construction of a temporary four-foot-high barrier along the eastern edge of Pad 4 (as shown in Figure 3) would reduce construction noise levels to within 75 dB(A) $L_{eq[1]}$. This calculation assumes 30 feet from the foundation to the barrier, 3 feet from the barrier to the property line, the

same base elevations for the barrier and receiver, a base elevation for the source eight feet below the eastern pad edge, a source height of eight feet above the ground, and a receiver height of five feet above the ground. This results in a noise reduction of 4 dB(A) and would give hourly noise levels of 75 and 73 dB(A) $L_{eq[1]}$ for front-end loader and backhoe work, respectively.

Road Work

Road work would occur over three weeks overall in three distinct phases: (1) road widening, which would prepare the additional four feet of road width over the entire length of the on- and off-site extent; (2) utility installation, which would occur only on the project site from the cul-de-sac to the northeast corner of Pad 4; and (3) paving the entire extent. Table 7 shows the maximum noise levels under full load, the usage factors, and average hourly noise levels at 50 feet for each piece of equipment anticipated to be used in the road work. Phase 1, the road widening preparation, would primarily use a dozer and a dump truck, with a water truck used as needed in the vicinity of the cul-de-sac, and where the road enters the property; and would use a backhoe from 900 feet north of Alpine Heights Road to where the road enters the property. Phase 2, utility installation, would use a backhoe, a dump truck, an asphalt/concrete saw, a compactor, and a concrete truck. Phase 3, the road paving, would use a dump truck for delivering asphalt, a paving machine, and an asphalt roller; for this activity, the dump truck would arrive with asphalt, load it into the paving machine, then depart the site, which would occur for approximately 15 minutes per hour (Naylor pers. com. 2006).

The combined dozer and dump truck to be used in phase 1, road widening, would generate 79 dB(A) at 50 feet. With soft-site assumptions, this would attenuate to 75 dB(A) at a distance of 79 feet. The dozer and dump truck would be used in the vicinity of the cul-de-sac, and where the road enters the property; the minimum distance to a residence from these locations is 214 feet, therefore no mitigation is required for this activity, which is anticipated to take one to two days. A backhoe would be used for road widening preparation along the segment of road 900 feet north of Alpine Heights Road to the cul-de-sac. As seen in Table 7, a backhoe would generate 73.6 dB(A) $L_{eq[1]}$ at 50 feet, or 75 dB(A) $L_{eq[1]}$ at 36 feet. This phase would occur over three work days (Naylor pers. com. 2006), which, given the approximate 2,800-foot length of the widening, results in 933 feet per day, or 117 feet per hour assuming an eight-hour work day. Over the course of an hour, the noise source would not be centered directly in front of any one residence, and an average angular distance of 36 feet would occur for a home located 14 feet from the road, as illustrated in Figure 4. As shown in Figure 5, there are no homes located within 14 feet of the road. There are three homes where noise levels would be just at 75 dB(A) $L_{eq(1)}$, therefore, no mitigation is required for this phase.

The combined equipment used in Phase 2, utility installation, would generate 85 dB(A) at 50 feet. The nearest residence is located 214 feet from this work, which would result in a noise level of 69 dB(A) $L_{eq[1]}$ given the intervening soft ground. The utility installation would occur over eight workdays. No mitigation is required for this phase.

The combined equipment use in Phase 3, road paving, would generate 78 dB(A) $L_{eq(1)}$ at 50 feet. With soft-site assumptions, this would attenuate to 75 dB(A) $L_{eq(1)}$ at a distance of 71 feet. This phase would occur over two work days, which given the approximate 3,700 foot length of the paving results in 1,850 feet paved per day, or 231.25 feet per hour assuming an eight-hour work day. Over the course of an hour, the noise source would not be centered directly in front of any one residence, and an average angular distance of 71 feet would occur for a home located 27 feet from the road. As shown in Figure 5, there are three homes located within 27 feet of the road, and one home where noise levels would be just at 75 dB(A) $L_{eq(1)}$. Therefore, mitigation of construction noise would be required in the vicinity of the structures within 27 feet of the road.Restricting the

transfer of asphalt from the dump truck to the paver to at least a distance of 71 feet from the three potentially impacted houses would result in only noise due to the paver and roller. The noise level generated by these two sources is 77 dB(A), which would reduce to 75 dB(A) at 63 feet. Again assuming 231.25 feet per hour paved results in an average angular distance of 63 feet, which would occur for a home located just at the roadway. Therefore, restricting the transfer of asphalt from the dump truck to the paver to at least a distance of 71 feet from the three potentially impacted houses, as shown in Figure 5, would result in noise levels within the 75 dB(A) $L_{eq(1)}$ limit.

TABLE 7
NOISE LEVELS OF ROAD WORK CONSTRUCTION EQUIPMENT

Equipment	Usage (Percent)	L_{max} (dBA)	L_{eq} (dBA)
Backhoe	40	77.6	73.6
Dozer	40	81.7	77.7
Dump Truck	40	76.5	72.5
Paver	50	77.2	74.2
Dump Truck (asphalt delivery)	25*	76.5	70.5
Roller	20	80.0	73.0
Compactor	20	83.2	76.2
Concrete Saw	20	89.6	82.6
Concrete Mixer Truck	40	78.8	74.8

SOURCE: RCNM (FHWA 2006)
NOTE: Noise levels at 50 feet from the source.
*Usage factor of 25% (Naylor pers. com. 2006)

Recommendations/Conclusions

Construction activities associated with the project are projected to comply with the county noise ordinance with the incorporation of the following noise reduction measures:

- The laying of utility line for Pad 4 will be limited to use of the backhoe alone.

- Grading operations on Pad 4 will be within 75 dB(A) $L_{eq[1]}$ by applying one of two noise reduction methods (A or B):

  (A) Limits on equipment operations. During grading operations on Pad 4, no other equipment shall operate within the same one-hour period that the dozer is used. Furthermore, dozer use shall be limited to 16 minutes in any one-hour period. When the dozer is not in use, simultaneous use of the front-end loader and pick-up truck would not result in noise levels exceeding 75 dB(A) $L_{eq[1]}$ at the nearest residential property line.

  (B) Temporary Construction Noise Barrier. Construction of a temporary five-foot-high barrier along the eastern edge of Pad 4 (as shown in Figure 3).

- Concrete foundation work for Pads 2 and 4 is projected to be within 75 dB(A) $_{Leq[1]}$ by applying one of two noise reduction methods (A or B) for each of the two Pads:

  (A) Limiting Operations. Limiting operation of the concrete trucks to no closer than 64 feet from the nearest property boundary will result in property line nose levels within 75 dB(A) $_{Leq[1]}$ at the adjacent residential property lines of Pads 2 and 4.

  (B) Temporary Construction Noise Barrier. Construction of a temporary three-foot high barrier along the northern edge of Pad 2 (as shown in Figure 3). Construction of a temporary five-foot-high barrier along the eastern edge of Pad 4 (as shown in Figure 3).

- The the separate use of a backhoe and front-end loader during home building for Pad 4 is projected to be within 75 dB(A) $_{Leq[1]}$ by the use of a temporary four-foot-high construction noise barrier along the eastern edge of Pad 4 (as shown in Figure 3).

- The transfer of asphalt from the dump truck to the paver occurs at least a distance of 71 feet from the three potentially impacted houses, as shown in Figure 5.

Construction activities are required to be limited to the hours and days specified in the County's noise ordinance.

In addition, blasting operations would be subject to the provisions of the County of San Diego Uniform Fire Code, which require licensing and review of all proposed blasting activities. To obtain permits, the project proponent or agent responsible for the activity must comply with the United States Bureau of Mine Safety and California Division of Health and Safety (Cal/OSHA) standards. Additional conditions may be imposed after consultation with the County Fire Marshal. At a minimum, adjacent property owners, tenants, or occupants of all residences (including mobile homes), businesses, and structures within 600 feet of any potential blast site will receive a minimum one-week written notice prior to the blasting occurrence. Pre- and post-blast inspections of off-site properties are also required. Blasting, when approved, is only permitted between the hours of 9:00 A.M. and 4:00 P.M.

If you have any questions regarding the results of this survey, please contact me at (619) 308-9333.

Sincerely,

Cheryl K. Johnson

CJK:eab

References Cited

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2007 Personal communications with Cheryl Johnson, RECON regarding construction operations. March 28 and April 10.

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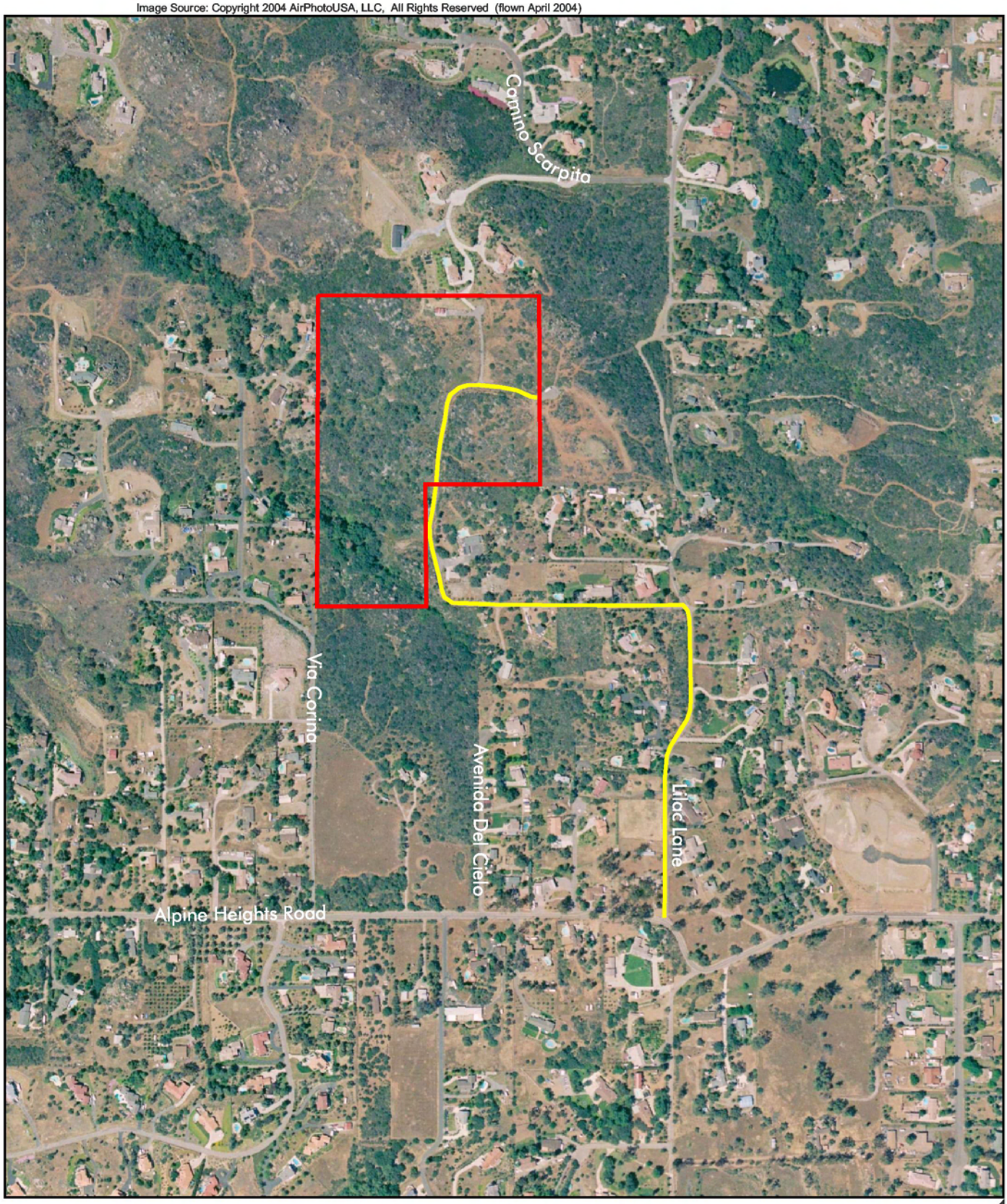
fig1 (regl) 09/20/06

FIGURE 1

Regional Location

Image Source: Copyright 2004 AirPhotoUSA, LLC, All Rights Reserved (flown April 2004)



Project location

Road widening

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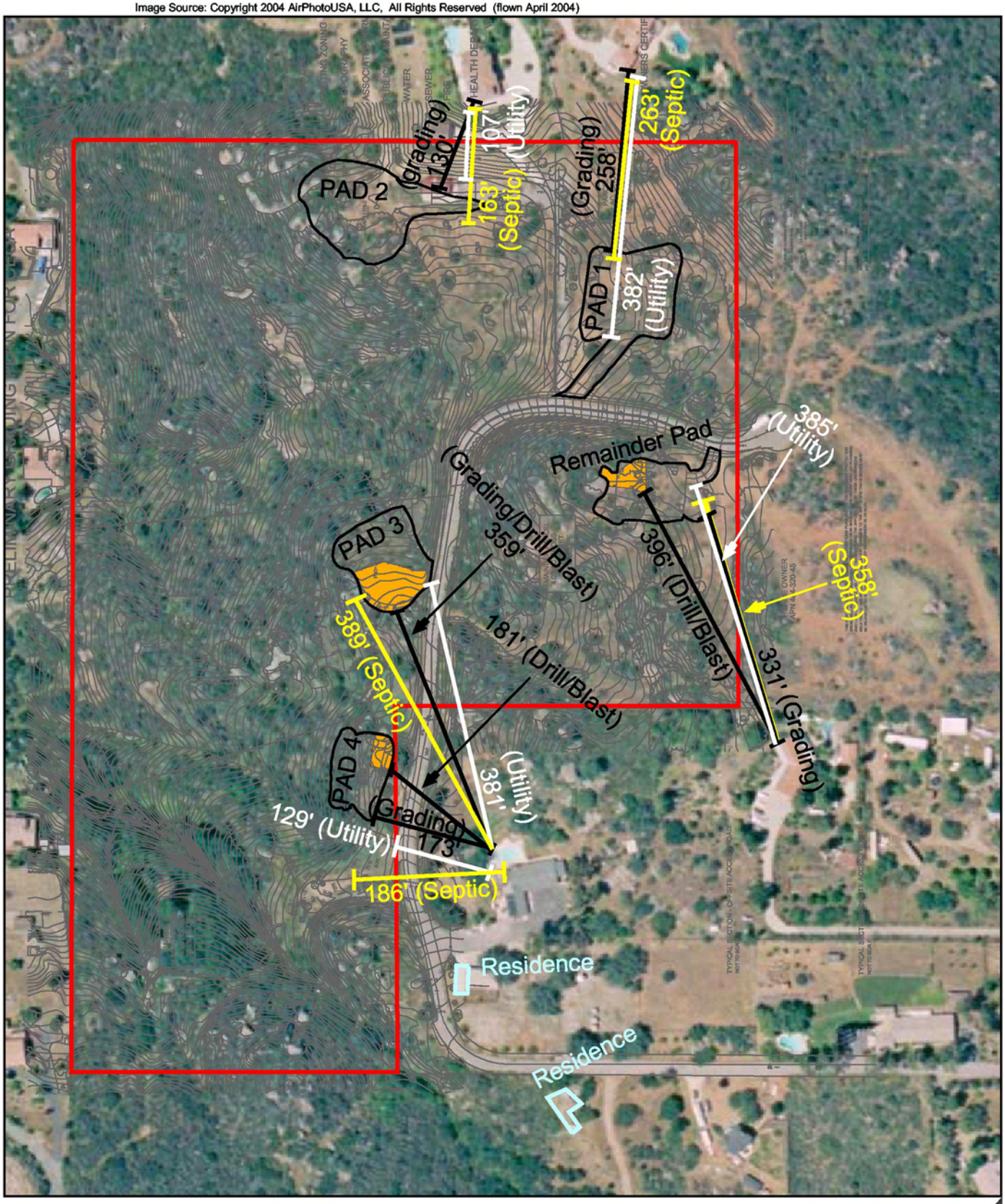
fig2 (aerial) 09/20/06

FIGURE 2

Aerial Photograph of Project

Image Source: Copyright 2004 AirPhotoUSA, LLC, All Rights Reserved (flown April 2004)



Project boundary

Pad boundary

Drilling and Blasting sites

FIGURE 3

Drilling and Blasting Sites with Distances from work/activity to Residences

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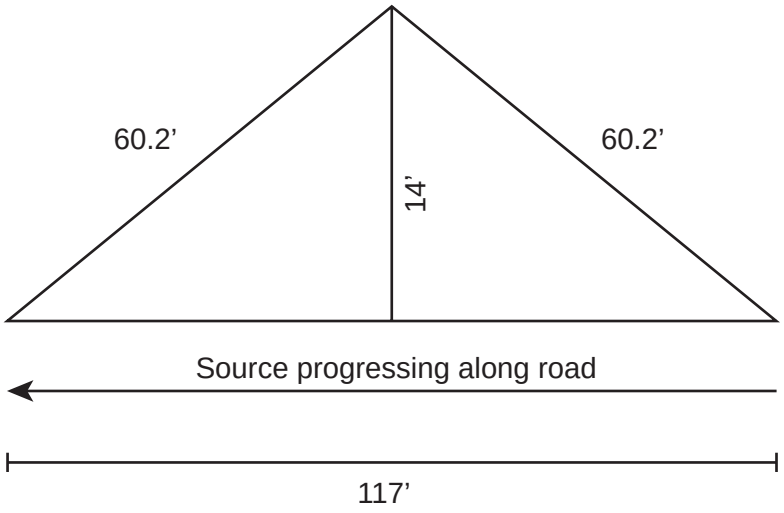
fig3 (sites) 09/27/06



Average of the angular distances = 36 feet

FIGURE 4

Average Angular Distance

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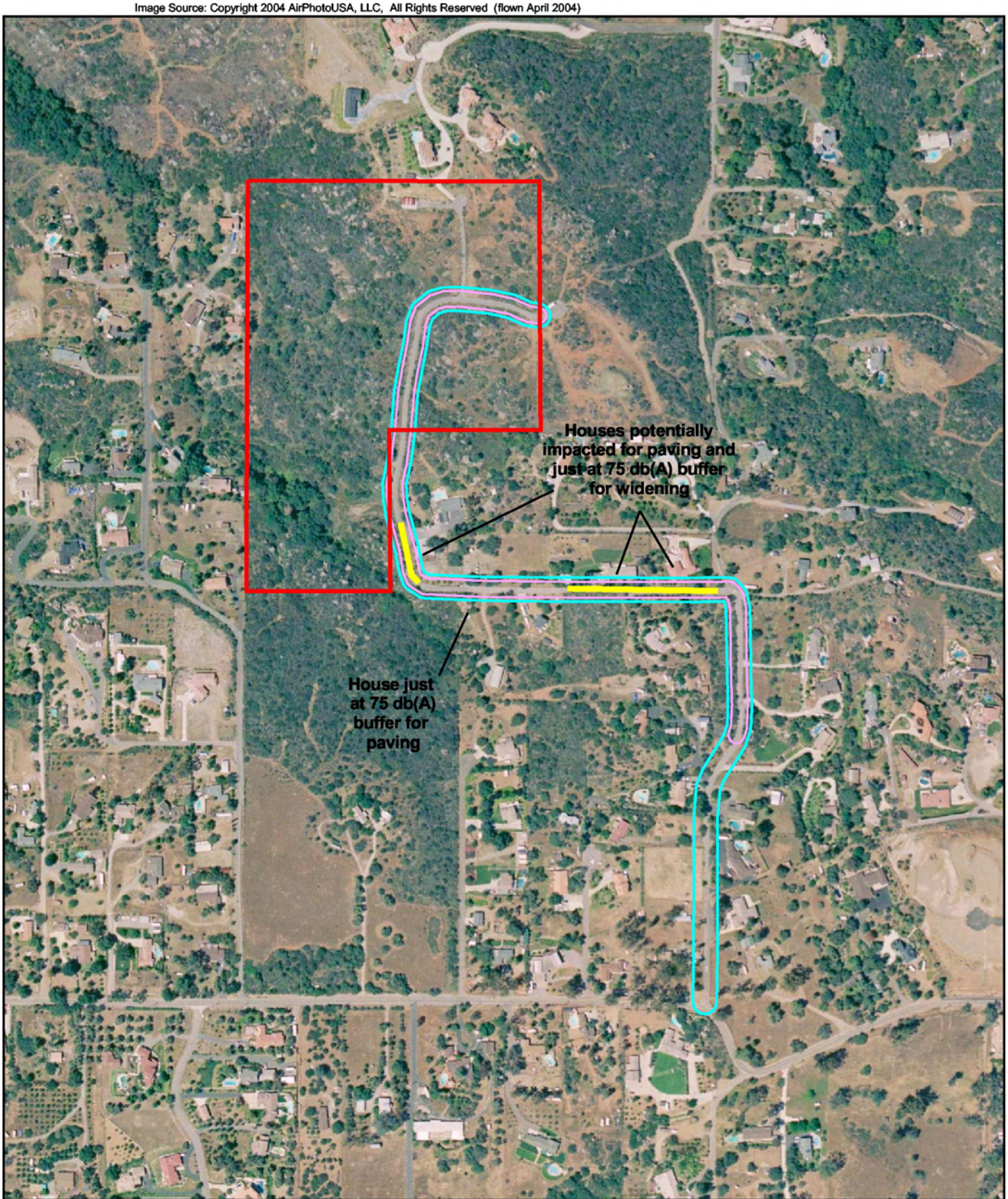

Project boundary

No transfer of asphalt to paver

Road widening - 75 db(A) Leq (1) buffer

Road paving - 75 db(A) Leq (1) buffer

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Fig5 (noise barriers) 09/28/06

FIGURE 5

Noise Impacts