NOISE ANALYSIS REPORT

RANCHO CIELO ESTATES
SPA 05-004
TM5440, TM5441, TM5442

Rancho Santa Fe, CA

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RANCHO CIELO SPECIFIC PLAN AMENDMENT; 3813-05-004 (SPA); 3100-5440 (TM); 3600-05-010 (R); 3500-05-043 (STP); 3100-5441 (TM); 3600-05-011 (R); 3500-05-044 (STP); LOG 86-06-026B: ADDENDUM TO THE Noise Analysis FOR THE RANCHO CIELO SPECIFIC PLAN AMENDMENT AND TENTATIVE MAPS

The attached report titled "Noise Analysis Report for Rancho Cielo Estates SPA 05-004, TM 5440, TM 5441, TM 5442 " prepared by Kimlgy-Horn and Associates, Inc. dated 06.12.2008, analyzes the impacts of implementation of Specific Plan Amendment and three associated residential subdivisions in accordance with the California Environmental Quality Act (CEQA). Since the completion of the report, the project description has been revised to: 1) increase the number of dwelling units in TM 5440 from 9 to 11; 2) increase the number of dwelling units in TM 5441 from 29 to 31; and 3) delete TM 5442, a three-lot subdivision. The analysis of the property assumed greater site disturbance, than that of the proposed project. The grading limits were maintained in TM 5440 and 5441 even though there is a net increase of four dwelling units between the two lots. Therefore, the reduction of the three-lots does not affect the findings, conclusions, or recommended mitigation measures contained in the report. Accordingly, the report provides an adequate analysis pursuant to CEQA and the County of San Diego Guidelines for Determining Significance.

AMENDED PROJECT DESCRIPTION

The proposed project represents the seventh amendment to the Rancho Cielo Specific Plan in response to the reclassification of three parcels, the deletion of a water reclamation facility and reclaimed water reservoirs and changing the implementation of the Village Estates areas.

Changing the Classifications of Three Parcels

The first reclassification involves the water reclamation facility site that is currently classified as WR in the Specific Plan. The new classification will be CE, Country Estates. The water reservoir site will also be reclassified as CR, Community Recreation. The third reclassification involves changing the VC or Village Center site to VE, Village Estate.

TM 5440

The Village Center site would be reclassified to Village Estate, reflecting a change in the proposed use. The area would be subdivided into one parcel for 11 condominium units. The southern portion of this parcel includes an existing open space easement that would not be affected by the proposed reclassification. The area between the northern edge of the existing open space and southern edge of the development or Zone B brush management area, which ever extends further south, will be dedicated as open space.

TM 5441

The Village Estate site ("H") would be subdivided into one parcel for 31 condominium purposes. The thirty-one condominium units will be constructed over the eastern portion of the site. The existing open space easement will be slightly altered.

Water Reclamation Facility Site

TM 5442 has been withdrawn and this parcel is not being proposed for subdivision.

Changing the Implementation of the Village Estates Areas

The major use permit requirements within the Village Estates areas will be deleted. A major use permit was previously required by a "P" Special Area Regulation, which is a part of the zoning of RV-3, Variable Family Residential Use Regulation. The "P" Special Area Regulation symbolizes a planned development. The applicant is no longer proposing a planned development.

A "D" Special Area Designator will be added to the zoning of both Village Estate sites. Changing the "P" Special Area Regulation to a "D" Special Area Regulation will require approvals of two Rezones. The "D" Special Area Designator will require approvals of two site plans to verify conformance with the design of the other development within the Rancho Cielo Project.

Section 1 Introduction 1-1

1.1 Project Description 1-1
1.2 Environmental Noise Background 1-3

Section 2 Applicable Noise Standards 2-1

2.1 County of San Diego Noise Ordinance 2-1
2.2 County of San Diego General Plan 2-2

Section 3 Existing Noise Environment 3-1

3.1 Ambient Sound Level Measurements 3-2

Section 4 Noise Assessment 4-1

4.1 Construction 4-1
4.2 Filtration Plant 4-3
4.3 HVAC Units 4-3

Section 5 Mitigation 5-1

5.1 Construction 5-1
5.2 Filtration Plant 5-2
5.3 HVAC Units 5-2

Section 6 References 6-1

Tables

Table 1 A-Weighted Sound Levels of Typical Noise Sources and Noise Environments
Table 2 Sound Level Measurement at TM5440 (dBA)
Table 3 24-Hour Sound Level Measurement at TM5442, December 6-7, 2005 (dBA)

Figures

Figure 1 Vicinity Map
Figure 2 TM5440 and TM5441 Site Plan
Figure 3 TM5442 Site Plan
Figure 4 TM5442 and Filtration Plant Aerial Photo

Appendices

Appendix A Cadna/A Calculation Coordinates
Appendix B HVAC Specifications

SECTION 1 INTRODUCTION

This report assesses potential noise impacts from the proposed Rancho Cielo Estates Specific Plan Amendment (SPA) 05-004 project in Rancho Santa Fe, California. The project proponent proposes to add three separate Tentative Maps (TMs): TM5440, TM5441, and TM5442. TM5440 and TM5441 are located near the intersection of Via Ambiente and El Brazo, and TM5442 is located on the west side of Camino de Arriba, south of the Santa Fe Irrigation District R.E. Badger Filtration Plant (Figure 1). The analysis focuses on potential noise impacts to the site from the filtration plant and noise from construction activity to the closest noise sensitive land uses (residences) as requested in the letter from the San Diego County Department of Planning and Land Use dated September 9, 2005. The following details the findings of the field investigation and acoustical calculations.

1.1 PROJECT DESCRIPTION

This seventh amendment to the Rancho Cielo Specific Plan, SPA05-004, is in response to the deletion of the water reclamation facility and the reclaimed water reservoir, changing the classifications of two parcels, redistributing dwelling units within the specific plan area, and changing the implementation of the Village Estates areas.

A. Deletion of the Water Reclamation Facility and the Reclaimed Water Reservoir

The County (The Rancho Cielo Sanitation District) was once going to be the sewer provider for this project and an on-site treatment facility was required. Then the Olivenhain Municipal Water District (OMWD) agreed to supply all the water and sewer resources for the Rancho Cielo Project. Now OMWD's treatment plant is on the 4S Ranch site and the reclaimed water is only generated for use within the 4S Ranch Project. Therefore, a water reclamation facility and the reclaimed water reservoirs on the Rancho Cielo site are no longer required. The applicant will now utilize the underlying zoning, Rural Residential (RR1), for a previous water reclamation facility site and will now subdivide this parcel into three parcels (TM5442). The northernmost reclaimed water reservoir site will be changed to open space. The reclaimed water reservoir site nearest the Village Estate site ("H") will be used as open space. The Village Estate site ("H"), the adjacent open space easement and this reclaimed water reservoir site are proposed to be subdivided into one lot for condominium purposes (TM5441). Twenty-nine condominium units will be constructed over the eastern portion of the site. The existing open space easement will be slightly altered and include the previous reclaimed water site.

B. Changing the Classifications of Three Parcels

The first reclassification involves the water reclamation facility site is currently classified as WR in the specific plan. A water reclamation facility is no longer proposed and the underlying zoning will be utilized. The new classification will be CE, Country Estates, which will match the proposed use of three single-family residences. The second reclassification involves changing the VC or Village Center site to VE, Village Estate. This change also reflects a change in the proposed use, which are nine condominium units. This site is proposed to be subdivided into one parcel (TM5440) to create a condominium lot with 9 units. The Village Center use is no longer proposed.

C. Redistributing Dwelling Units Within the Specific Plan

Three additional single family units within the Country Estate lots (previously the water reclamation facility site) are now proposed. But four less units within the Village Estate lots are now proposed. The total amount of units approved (765 dwelling units) is exactly the amount now proposed in this specific plan area. Rancho Cielo Estates wishes to reserve the right to build that one dwelling unit elsewhere within the remaining undeveloped Planned Development Area.

RANCHO CIELO RESIDENTIAL DWELLING UNITS:

Classification	Approved	Proposed
Country Estates	685	688
Planned Development	38	39
Village Estates	42	38
Totals =	765	765

D. Changing the Implementation of the Village Estate Areas

The major use permit requirement within the Village Estates areas will be deleted. A major use permit was previously required by a "P" Special Area Regulation, which is a part of the zoning of RV-3, Variable Family Residential Use Regulation. The "P" Special Area Regulation symbolizes a planned development. The applicant is no longer proposing a planned development. The above reason is why a major use permit will be no longer required.

A "D" Special Area Designator will be added to the zoning of both Village Estate sites. Changing the "P" Special Area Regulation to a "D" Special Area Regulation will require approvals of two Rezones (R05-010 and R05-011). The "D" Special Area Designator will require approvals of two site plans (S05-043 and S05-044) to verify conformance with the design of the other development within the Rancho Cielo Project.

E. Access

The access to this project will remain unchanged. The primary access is from Del Dios Highway onto Calle Ambiente northwesterly. Then right on Via Ambiente. To access the three proposed estate lots (the old water reclamation facility site) you would immediately turn left onto Camino de Arriba, which fronts this site. To access the two proposed Village Estate sites on the top of the hill you would precede on Via Ambiente, which eventually fronts both Village Estate sites. For the three proposed estate lots, Camino de Arriba proceeds past the site and eventually links back up with Via Ambiente. Via Ambiente winds through the entire property and eventually provides a secondary emergency access near a bridge over the Escondido Creek and to Harmony Grove Road. The primary and secondary access points were previously approved and designed in conjunction with the Rancho Santa Fe Fire Protection District.

F. Grading and Construction

TM5440 (Village Center) will generate 10,200 cubic yards (cy) of cut and 33,600 cy of fill, requiring 23,400 cy of import (from TM5441 and the stockpile on either Parcel I or M within the Rancho Cielo Estates development). TM5441 will generate 75,600 cy of cut and 57,200 cy of fill, requiring 18,400 cy of export (to TM5440 and TM5442). TM5442 will generate 3,200 cy of cut and 16,400 cy of fill, requiring 13,200 cy of import (from TM5441).

TM5440 TM5441, and TM5442 will be graded concurrently. Because TM5440 and TM5441 are adjacent, these will be graded simultaneously, with an expected duration of 4 months. The grading of TM5442 has an expected duration of 2 months. Transport of materials will occur entirely within the Rancho Cielo Estates development; no haul trips will occur on public roads.

The construction of TM5440 and TM5441 would occur simultaneously and would generate 150 trips per day. The construction of TM5442 would generate 50 trips per day.

1.2 ENVIRONMENTAL NOISE BACKGROUND

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound typically associated with human activity and that interferes with or disrupts normal activities. The human environment is characterized by a certain consistent noise level which varies with each area. This is called ambient noise. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, perceived importance of the noise and its appropriateness in the setting, time of day and type of activity during which the noise occurs, and sensitivity of the individual.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Sound is generally characterized by several variables, including frequency and intensity. Frequency describes the sound's pitch and is measured in cycles per second, or hertz (Hz), whereas intensity describes the sound's loudness and is measured in decibels (dB). Decibels are measured using a logarithmic scale. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above about 120 dB begin to be felt inside the human ear as discomfort and eventually as pain at still higher levels. The minimum change in the sound level of individual events that an average human ear can detect is about 3 dB. The average person perceives a change in sound level of about 10 dB as a doubling (or halving) of the sound's loudness; this relation holds true for sounds of any loudness. Sound levels of typical noise sources and environments are provided in Table 1.

Because of the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. A simple rule is useful, however, in dealing with sound levels. If a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. Thus, for example, 60 dB + 60 dB = 63 dB, and 80 dB + 80 dB = 83 dB.

The normal human ear can detect sounds that range in frequency from about 20 Hz to 20,000 Hz. However, all sounds in this wide range of frequencies are not heard equally well by the human ear, which is most sensitive to frequencies in the range of 1,000 Hz to 4,000 Hz. This frequency dependence can be taken into account by applying a correction to each frequency range to approximate the human ear's sensitivity within each range. This is called A-weighting and is commonly used in measurements of community environmental noise. The A-weighted sound pressure level (abbreviated as dBA) is the sound level with the "A-weighting" frequency correction. In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve.

Because community noise fluctuates over time, a single measure called the Equivalent Sound Level (Leq) is often used to describe the time-varying character of community noise. The Leq is the energy-averaged A-weighted sound level during a measured time interval, and is equal to the level of a continuous steady sound containing the same total acoustical energy over the averaging time period as the actual time-varying sound. Additionally, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the Lmax and Lmin indicators, which represent the root-mean-square maximum and minimum noise levels obtained during the measurement interval. The Lmin value obtained for a particular monitoring location is often called the "acoustic floor" for that location.

To describe the time-varying character of environmental noise, the statistical noise descriptors L10, L50, and L90 are commonly used. They are the noise levels equaled or exceeded during 10, 50, and 90 percent of a stated time, respectively. Sound levels associated with L10 typically describe transient or short-term events, whereas levels associated with L90 describe the steady-state (or most prevalent) noise conditions.

SECTION 2 APPLICABLE NOISE STANDARDS

2.1 COUNTY OF SAN DIEGO NOISE ORDINANCE

The following is taken from the County Noise Ordinance, Section 36.404: Sound Level Limits.

Unless a variance has been applied for and granted, it shall be unlawful for any person to cause or allow the creation of any noise to the extent that the one-hour average sound level, at any point on or beyond the boundaries of the property on which the sound is produced, exceeds the applicable limits set forth below, except that:

(1) Construction noise level limits shall be governed by Section 36.410 of this chapter; and

(2) Where a noise study has been conducted and the noise mitigation measures recommended by that study have been made conditions of approval of a Major Use Permit which authorizes the noise-generating use or activity, and the decision making body approving the Major Use Permit determined that those mitigation measures reduce potential noise impacts to a level below significance, then implementation and compliance with such noise mitigation measures shall be deemed to constitute compliance with this section.

Zone		APPLICABLE LIMIT ONE-HOUR AVERAGE SOUND LEVEL (DECIBELS)
R-S, R-D, R-R, R-MH, A-70, A-72, S-80, S-81, S-87, S-88, S-90, S-92, R-V, and R-U Use Regulations with a density of less than 11 dwelling units per acre.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	50 45
R-RO, R-C, R-M, C-30, S-86, R-V AND R-U Use Regulations with a density of 11 or more dwelling units per acre.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	55 50
S-94 and all other commercial zones.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	60 55
M-50, M-52, M-54	Anytime	70
S-82, M-58, and all other industrial zones.	Anytime	75

If the measured ambient level exceeds the applicable limit noted above, the allowable one hour average sound level shall be the ambient noise level. The ambient noise level shall be measured when the alleged noise violation source is not operating.

The sound level limit at a location on a boundary between two (2) zoning districts is the arithmetic mean of the respective limits for the two districts; provided however, that the one-hour average sound level limit applicable to extractive industries, including but not limited to borrow pits and mines, shall be 75 decibels at the property line regardless of the zone where the extractive industry is actually located.

Fixed-location public utility distribution or transmission facilities located on or adjacent to a property line shall be subject to the noise level limits of this section, measured at or beyond six (6) feet from the boundary of the easement upon which the equipment is located.

The following is taken from the County Noise Ordinance, Section 36.410: Construction Equipment.

Except for emergency work,

(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 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 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 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 a.m. and 7 p.m.

(Amended by Ord. No. 9700 (N.S.), effective 2-4-05)

The County Guidelines for Determining Significance for Noise (March 19, 2007), Section 4.2B states that "For construction activities, the County considers the 75 decibel (A) average to be based on a period of one hour."

2.2 COUNTY OF SAN DIEGO GENERAL PLAN

The following is taken from the Noise Element of the County General Plan.

Policy 4b

Because exterior community noise equivalent levels (CNEL) above 60 decibels and/or interior CNEL above 45 decibels may have an adverse effect on public health and welfare, it is the policy of the County of San Diego that:

1. Whenever it appears that new *development* may result in any (existing or future) *noise sensitive land use* being subject to *exterior noise* levels of CNEL equal to 60 *decibels (A)* or greater, an acoustical analysis shall be required.

2. If the acoustical analysis shows that *exterior noise* levels at any *noise sensitive land use* will exceed CNEL equal to 60 *decibels (A)*, modifications shall be made to the development which

reduce the *exterior noise* level to less than CNEL of 60 *decibels (A)* and the *interior noise* level to less than CNEL of 45 *decibels (A)*.

3. If modifications are not made to the *development* in accordance with paragraph 2 above, the *development* shall not be approved unless a finding is made that there are specifically identified overriding social or economic considerations which warrant approval of the *development* without such modification; provided, however, if the acoustical analysis shows that *exterior noise* levels for any *noise sensitive land use* will exceed CNEL equal to 75 *decibels (A)* even with such modifications, the *development* shall not be approved irrespective of such social or economic considerations.

Definitions, Notes & Exceptions

"*Decibels (A)*" refers to A-weighted sound levels as noted on page VIII-2 of this Element.

"*Development*" means any physical development including but not limited to residences, commercial, or industrial facilities, roads, civic buildings, hospitals, schools, airports, or similar facilities.

"*Exterior Noise*":

(a) For single family detached dwelling projects, "exterior noise" means noise measured at an outdoor living area which adjoins and is on the same lot as the dwelling, and which contains at least the following minimum area:

(i)	Net lot area up to 4,000 square feet:	400 square feet
(ii)	Net lot area 4,000 square feet to 10 acres:	10% of net lot area
(iii)	Net lot area over 10 acres:	1 acre

(b) For all other projects, "exterior noise" means noise measured at all exterior areas which are provided for *group or private usable open space* purposes.

(c) For County road construction projects, the *exterior noise* level due to vehicular traffic impacting a *noise sensitive land use* should not exceed the following values:

(i)	Federally funded projects:	The noise standard contained in applicable Federal Highway Administration standards.
(ii)	Other projects:	60 decibels (A), except if the existing or projected noise level without the project is 58 decibels (A) or greater, a 3 decibel (A) increase is allowed, up to the maximum permitted by Federal Highway Administration standards.

"*Group or Private Usable Open Space*" means usable open space intended for common use by occupants of a *development*, either privately owned and maintained or dedicated to a public agency, normally including swimming pools, recreation courts, patios, open landscaped areas, and greenbelts with pedestrian walkways and equestrian and bicycle trails, but not including off-street parking and loading

areas or driveways (Group Usable Open Space) and usable open space intended for use by occupants of one dwelling unit, normally including yards, decks and balconies (Private Usable Open Space).

"*Interior Noise*": The following exception shall apply: For rooms which are usually occupied only a part of the day (schools, libraries, or similar), the interior one-hour average sound level, due to noise outside, should not exceed 50 *decibels (A)*.

"*Noise Sensitive Land Use*" means any residence, hospital, school, hotel, resort, library or any other facility where quiet is an important attribute of the environment.

SECTION 3 EXISTING NOISE ENVIRONMENT

TM5440 and TM5441

TM5440 is located at the southwest corner of the intersection of Via Ambiente and El Brazo; TM5441 is located at the northeast corner of this intersection. The lots to the south and west of TM5440 and 5441 are graded for residential development, the residential lots to the north are currently undeveloped, and the area to the east is open space. The closest developed residential lot is Lot 26; the eastern property line is approximately 1,075 feet west of the western property line of TM5441. There are no significant noise sources near these sites.

TM5442

TM5442 is located on the west side of Camino de Arriba, south of the filtration plant. Adjacent to TM5442 is the filtration plant to the northwest, open space to the northeast, a plant nursery to the southwest, and developed residential Lot 86 to the southeast.

The filtration plant is a non-conforming land use that has been operating under a Special Use Permit (SUP) since November 1967. The SUP contains specific sound level limits for the filtration plant's operation; therefore, the filtration plant is required to comply with Section 36.404 of the County Noise Ordinance as described in Section 2.1 of this report. TM5442 is zoned RR1 and the filtration plant is zoned A70. The hourly sound level limit for both zones is 50 dBA Leq between 7:00 a.m. and 10:00 p.m. and 45 dBA Leq between 10:00 p.m. and 7:00 a.m.

Noise sources associated with the filtration plant include the emergency generator, the flocculators, and the excavation of the sedimentation basins. Sound level measurements of these noise sources were conducted at the filtration plant on Thursday, December 22, 2005; refer to Table 2 for further details. The measurements were conducted using a Larson Davis Model 720 American National Standards Institute (ANSI) Type 2 sound level meter. The meter was calibrated before and after the measurement periods. The meter was mounted on a tripod roughly five feet above the ground to simulate the average height of the human ear. All sound level measurements were in accordance with ISO 1996a, b, and c.

The emergency generator is located in the basement of the main building; mechanical noise associated with the generator is therefore inaudible at the exterior of the building. However, the intake and exhaust ports are located on the eastern corner of the building. This noise source was measured during a test of the generator; these ports produced a maximum of 75.3 dBA at 50 feet and were not audible at TM5442. Testing of the generator occurs once every month, and is 30 minutes to one hour in duration (Santa Fe Irrigation District 2005).

The flocculators are located approximately 50 feet south of the main building; the noise sources are the 16 continuously-running mixer motors arranged in a grid and spaced approximately 10 feet apart. These motors produced a measured minimum of 67.5 dBA at 5 feet and a maximum of 81.5 dBA at 5 feet, and were not audible at TM5442.

The excavation of the sedimentation basins is accomplished with a Ford 545D loader. No other equipment is used. Measurements of the excavation process were not possible due to the infrequency of the

operation; therefore, the loader was measured in a stationary position. The loader produces a maximum of 74 dBA at 25 feet with the engine at idle and 84 dBA at 25 feet with the engine at full throttle. There are four sedimentation basins on the filtration plant site. One of the basins is excavated every month; the process takes approximately 3 days to complete. The process consists of using the loader to scrape the sediment (deposited after water evaporation) from the basins and transporting it to a long-term storage area in the interior of the property, where it is held until it is removed from the site on a quarterly basis. Excavation occurs between 6:30 a.m. and 3:00 p.m. on a continuous basis during the 3 days.

The plant nursery is a retail operation, primarily serving RCE homeowners. The forklift is the primary piece of noise-producing equipment on the plant nursery property. The plant nursery is a commercial use, not an agricultural use.

3.1 AMBIENT SOUND LEVEL MEASUREMENTS

A 1-hour sound level measurement was taken on the TM5440 project site (ML1) between 10:15 a.m. and 11:15 a.m. on December 6, 2005 to quantify the existing ambient noise environment. The measurement was conducted using the sound level meter described above. Results of the measurement are summarized in Table 2 and correspond to the measurement location depicted on Figure 2. Noise sources consisted of wind through vegetation, distant aircraft, distant construction, and one vehicle passby. The 1-hour Leq was 38.6 dBA.

A 24-hour sound level measurement was taken on the TM5442 project site (ML2) between 11:00 a.m. on December 6, 2005 and 11:00 a.m. on December 7, 2005 to quantify the existing ambient noise environment and to determine the existing filtration plant noise level on the project site. Results of the measurement are summarized in Table 3 and correspond to the measurement location depicted on Figure 3. Noise sources during the site visits consisted of wind through vegetation, distant aircraft, distant construction, plant nursery activity, and vehicle traffic on Camino de Arriba and the adjacent construction trailer access road to the north. The filtration plant was not audible at the project site during the site visits. The plant nursery did not generate a significant portion of the noise at the project site during the site visits. The 24-hour Leq was 46.9 dBA, the 24-hour CNEL was 49.4 dBA, the 24-hour average L10 was 46.0 dBA, and the 24-hour average L90 was 38.6 dBA.

SECTION 4 NOISE ASSESSMENT

4.1 CONSTRUCTION

Construction activities at the proposed site would result in a short-term, temporary increase in the ambient noise level. The increase in noise level would be primarily experienced close to the noise source. The magnitude of the impact would depend on the type of construction activity, noise level generated by various pieces of construction equipment, duration of the construction phase, and distance between the noise source and receiver. Sound levels of typical construction equipment range from approximately 65 dBA to 95 dBA at 50 feet from the source (U.S. Environmental Protection Agency [U.S. EPA] 1971).

Construction activity and delivery of construction materials and equipment would be limited to the hours between 7:00 a.m. and 7:00 p.m. Monday through Saturday. A grading plan and construction phasing plan has not been developed at this time; therefore, only a general estimate of construction noise levels can be provided. The primary noise from project construction would be from site preparation which would last approximately 6 to 9 months. Grading would require the use of heavy equipment such as bulldozers, loaders, and scrapers. Blasting would periodically occur after the second month to fracture large rock on TM5440 and TM5441. Approximately 6 to 8 blasts would be required. Blasting is not required on TM5442. Rock crushing of the fractured rock on TM5440 and TM5441 would periodically occur after the second month. The assumed rock crusher location is shown on Figure 2. The excavated material would be stockpiled and remain onsite. Rock crushing is not required on TM5442.

Sound levels from site preparation were estimated at the closest developed residential property lines. Grading and construction on all lots of the proposed TMs would be completed prior to occupancy of any residence on the created lots. Noise from grading equipment was considered a line source. Grading sound levels were estimated using the Cadna/A Noise Prediction Model, a Windows-based software program that predicts and assesses noise levels near various noise sources. The model uses industry-accepted propagation algorithms and accepts sound power levels (in decibels *re* 1 picowatt) based on ISO 9613-2, an internationally recognized standard that establishes a method for calculating the attenuation of sound during propagation outdoors in order to predict the levels of environmental noise at a distance from a variety of sources (ISO 1993). The method predicts the equivalent continuous A-weighted sound pressure level.

The project site configurations were imported into Cadna/A from the project CAD files. Because of the uncertainty associated with any computer model, the site operating parameters were designed to evaluate a worst-case condition. The site and surrounding areas were assumed to be flat, therefore, no intervening topographical effects were considered. The grading operations were assumed to consist of two pieces of equipment, such as a bulldozer, each operating at an estimated sound pressure level of 85 dBA at 50 feet. It was assumed that both pieces of equipment were operating continuously in a loop (30 feet wide × 215 feet long) at 3 mph and would complete approximately 30 round trips in one hour. In the interest of a worst-case scenario, the operation was evaluated for the grading of the site area closest to the potentially-impacted area. At TM5441, the closest point of the grading path is approximately 1,075 feet from the east property line of Lot 26. At TM5442, the closest point of the grading path is approximately 12 feet from the north property line of Lot 86. No correction was applied for downtime associated with equipment maintenance, breaks, or similar situations; therefore, the analysis is worst-case. Refer to Appendix A for calculation coordinates.

The grading of TM5440 and TM5441 would generate an unmitigated hourly average sound level of approximately 55 dBA at the east property line of Lot 26 (the closest developed residential lot). Refer to Figure 3.

The grading of TM5442 would generate an unmitigated hourly average sound level of approximately 88 dBA at the north property line of Lot 86 (the closest developed residential lot). Refer to Figure 3.

Noise from the rock crusher was considered a point source. Sound from a point source generally decays at a rate of six dBA per doubling of distance from the source. This is a logarithmic relationship describing the acoustical spreading of a pure, undisturbed spherical wave in air. The rule applies to the propagation of sound waves with no ground interaction. Rock-crushing sound levels were calculated using the formula

$$SPL_2 = SPL_1 - 20\log\left(\frac{d_2}{d_1}\right)$$

where

SPL_1	=	known sound level,
SPL_2	=	desired sound level,
d_1	=	known distance, and
d_2	=	desired distance.

The sound level from the rock crusher was estimated to range from 85 to 95 dBA at 50 feet. The rock crusher was assumed to be placed at the eastern edge of TM5441. The distance between the rock crusher and the east property line of Lot 26 is approximately 1,925 feet. The attenuating effects of intervening topography were not considered. No correction was applied for downtime associated with equipment maintenance, breaks, or similar situations; therefore, the analysis is worst-case.

Rock crushing associated with grading of TM5440 and TM5441 would generate an hourly average sound level of approximately 53 to 63 dBA at the east property line of Lot 26 (the closest developed residential lot). Refer to Figure 3.

4.1.1 Construction Traffic

TM5441 would generate 18,400 cy of export; 13,200 cy of this would satisfy the import requirement for TM5442, and the remaining 5,200 cy would go to TM5440. Because TM5440 is adjacent to TM5441 across Via Ambiente, this transfer would not generate truck traffic on any roadway. However, TM5440 would require 18,200 additional cy to satisfy the total 23,400 cy import requirement; this would come from the stockpile on Parcel I or M, both of which are located east of TM5440 near the intersection of Via Rancho Cielo and Cerro del Sol.

The concurrent grading of TM5440 and TM5441 would be 4 months in duration. Assuming 10 cy of material per truck, 20 working days per month, and an 8-hour work day, the import to TM5440 would require approximately 3 full trucks from Parcel I or M per hour. This corresponds to 6 hourly truck trips on the internal roadways between Parcel I or M and TM5440. The grading of TM442 would be 2 months in duration. Under the same assumptions, the import to TM5442 would generate 8 hourly truck trips between TM5441 and TM5442.

The FHWA's Traffic Noise Model (TNM) version 2.5 was used to estimate construction traffic noise levels adjacent to the traveled roadways. The model assumed a long straight roadway, heavy trucks traveling at 25 miles per hour (mph), and a default ground type of "hard soil." Calculations show that the

6 hourly truck trips between Parcel I or M and TM5440 (along Via Rancho Cielo and Via Ambiente) would generate approximately 53 dBA Leq at 50 feet from the roadway centerline. The 8 hourly truck trips TM5441 and TM5442 (along Via Ambiente and Camino de Arriba) would generate approximately 54 dBA Leq at 50 feet from the roadway centerline.

There are scattered residences along these routes, some of which are occupied. It is possible that others could be built or become occupied before the commencement of grading. However, because the haul trucks would not generate noise levels over 75 dBA Leq at 50 feet from the centerline of the haul route, transfer of material between the sites would not produce an impact at existing or future noise sensitive receptors near the haul route.

No materials would be transported out of the Rancho Cielo Estates development. No offsite material handling would occur.

4.2 FILTRATION PLANT

The property line of TM5442 is approximately 400 feet southeast of the eastern corner of the main filtration plant building. Under a worst-case scenario (loader operating continuously under full load), the sedimentation basin excavation would generate 84 dBA at 25 feet during the 3 days of operation per month. The loader was treated as a point source.

Table 4 shows the distance from each single-family lot to each sedimentation basin and the unmitigated sound level from excavation for each source-receiver pair. The worst-case sound level at each residential lot backyard was calculated using the sound level generated by the loader while in each basin. The arithmetic mean of these four sound levels was calculated for each lot. A review of the table shows that the excavation would produce sound levels in excess of the County daytime noise level limit of 50 dBA Leq at each lot.

Other activities from the filtration plant would comply with the sound level limits.

4.3 HVAC UNITS

The proposed project includes 9 condominium units on TM5440, 29 condominium units on TM5441, and 3 single-family units on TM5442. Each condominium unit would be equipped with one Carrier model 38HDC036 3-ton HVAC unit (or similar) (Sibbet 2007). This unit produces a sound power level of 68 dBA. The placement of the units is shown on Figure 2. The specifications are shown in Appendix A.

TM5440 has nine HVAC units. The worst-case noise scenario is the two adjacent HVAC units for the westernmost building. These units are 25 and 35 feet away from the northern property line, and would generate a combined hourly sound level of approximately 42 dBA Leq at this property line.

TM5441 has 29 HVAC units. The worst-case noise scenario is the two adjacent HVAC units for the southwesternmost building. These units are 70, 85, and 130 feet away from the southern property line, and would generate an hourly sound level of approximately 33 dBA Leq at the closest property line.

SECTION 5 MITIGATION

5.1 CONSTRUCTION

The noise levels associated with grading of TM5442 would exceed the County construction noise limit without mitigation. Noise barriers, such as walls or berms, and/or setbacks are commonly used to mitigate noise levels from construction sources. Cadna/A was used to estimate the insertion loss of potential barriers. The assumed noise source height was 12 feet, and the assumed receptor was 5 feet high and placed 10 feet behind the barrier. Calculations show that a temporary 14-foot-high × 175-foot-long noise barrier extending west from the east property line of Lot 86 along the south property line of TM5442 would provide 15 dBA of insertion loss and reduce the construction noise level to 73 dBA. This barrier must be of solid construction, with no gaps or cracks through or below the wall, and have a minimum density of 3.5 lbs/ft^2. Refer to Figure 3 for further details.

To minimize unnecessary annoyance from construction noise, the construction contractor should be required to comply with all provisions of the County Noise Ordinance (Section 36.410). The following construction noise control measures should be used as necessary to comply with the noise ordinance:

- Limit construction activity and delivery of construction materials and equipment to the hours between 7:00 a.m. and 7:00 p.m., Monday through Saturday.
- Prohibit construction and delivery workers from arriving at the site prior to 7:00 a.m.
- Limit construction noise to 75 dBA Leq at the property line of any developed residential lot.
- Select equipment capable of performing the necessary tasks with the lowest sound level and the lowest acoustic height possible.
- Operate and maintain all construction equipment to minimize noise generation. Keep equipment and vehicles in good repair and fitted with "manufacturer-recommended" mufflers.
- Locate the rock-crushing area as far from residences as possible, for the entire duration of crushing.
- Place a portable noise screen or enclosure to provide shielding from rock crushing as necessary. The effectiveness of a barrier depends upon factors such as the height of the barrier relative to the line-of-sight from the source to the receiver, the distances from the barrier to the source and receiver, and the reflections of sound. To be effective, a barrier must block the line-of-sight from the source to the receiver. Under the best of circumstances, a properly designed noise barrier can reduce noise by as much as 20 dBA.
- Perform blasting in accordance with County blasting requirements. Residences should be notified of blasting activities at least 72 hours prior to a blast.

5.2 FILTRATION PLANT

The noise level at the residential lots created by TM5442 would periodically exceed the County noise limit during excavation of the sedimentation basins at the filtration plant. Mitigation could be achieved through engineering controls implemented by the filtration plant or installation of a noise barrier at the residential lots on TM5442.

Noise barriers such as walls, berms, or a combination are commonly used to reduce noise levels from heavy equipment. The effectiveness of a barrier depends on the distance from the source to the barrier, the distance from the receiver to the barrier, and the relative height of the barrier above the line-of-sight between the source and receiver. To be effective, a barrier must block this line-of-sight, be constructed of solid material (such as concrete masonry), and be long enough to prevent sound from flanking around the ends. The Fresnel diffraction method (Harris 1998) was used to estimate the noise reduction achieved by noise barriers (insertion loss $IL_{barrier}$). The calculations are based on the formulas

$$N = (2/\lambda)\left[d_1 + d_2 - d\right]$$

and

$$IL_{barrier} = 10\log\left[3 + 10NK\right]$$

where

N	=	Fresnel number,
λ	=	wavelength,
d_1	=	distance from source to top of barrier,
d_2	=	distance from receiver to top of barrier,
d	=	distance from source to barrier, and
K	=	correction factor for atmospheric effects; K=1 for distances less than 100 meters.

The calculations assumed point source noise attenuation characteristics, a source height of 6 feet (12-foot-high stack on a loader in a 6-foot-deep basin), a receiver height of 5 feet, a source elevation of 480 feet MSL, and a receiver elevation of 510 feet MSL for all three lots.

The insertion loss achieved by a combination 8-foot-high sound barrier (6-foot-high wall on a 2-foot-high berm) along the top of slope of the northwestern pad edge of Lot 1 was calculated for each basin-lot pair, and subtracted from the unmitigated level. The arithmetic mean of these for resultant mitigated levels was calculated for each lot. A review of the table shows that this barrier would reduce the hourly excavation sound level to 50 dBA Leq at Lot 1, 47 dBA Leq at Lot 2, and 45 dBA Leq at Lot 3. The location of the barrier is shown on Figure 3.

5.3 HVAC UNITS

The HVAC units for the condominium units on TM5440 and TM5441 would not produce noise levels exceeding the County nighttime residential property line hourly noise limit of 45 dBA Leq. No mitigation is required.

SECTION 6 REFERENCES

County of San Diego. 2006. General Plan. Part VIII: Noise Element. September 27.

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2005. Department of Planning and Land Use letter regarding draft noise significance guidelines. April 22.

Harris, Cyril M. 1998. Handbook of Acoustical Measurements and Noise Control, Third Edition. Acoustical Society of America. Woodbury, NY.

International Organization for Standardization (ISO). 1993. ISO 9613-2. Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation.

1996a. ISO 1996-1. Acoustics – Description and Measurement of Environmental Noise – Part 1: Basic Quantities and Procedures.

1996b. ISO 1996-2. Acoustics – Description and Measurement of Environmental Noise – Part 2: Acquisition of Data Pertinent to Land Use.

1996c. ISO 1996-3. Acoustics – Description and Measurement of Environmental Noise – Part 3: Application to Noise Limits.

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Santa Fe Irrigation District. 2005. Personal Communication with Cor Shaffer, R.E. Badger Filtration Plant Manager. December 22.

Sibbet, David. 2007. Personal Communication with Steve Fiedler regarding HVAC unit selection. August 13.

Table 1
A-Weighted Sound Levels of Typical Noise Sources and Noise Environments

Noise Source (at Given Distance)	Noise Environment	A-Weighted Sound Level	Human Judgment of Noise Loudness (Relative to Reference Loudness of 70 Decibels*)
Military Jet Takeoff with Afterburner (50 ft)	Carrier Flight Deck	140 Decibels	128 times as loud
Civil Defense Siren (100 ft)		130	64 times as loud
Commercial Jet Take-off (200 ft)		120	32 times as loud **Threshold of Pain**
Pile Driver (50 ft)	Rock Music Concert Inside Subway Station (New York)	110	16 times as loud
Ambulance Siren (100 ft) Newspaper Press (5 ft) Gas Lawn Mower (3 ft)		100	8 times as loud **Very Loud**
Food Blender (3 ft) Propeller Plane Flyover (1,000 ft) Diesel Truck (150 ft)	Boiler Room Printing Press Plant	90	4 times as loud
Garbage Disposal (3 ft)	Noisy Urban Daytime	80	2 times as loud
Passenger Car, 65 mph (25 ft) Living Room Stereo (15 ft) Vacuum Cleaner (10 ft)	Commercial Areas	70	Reference Loudness **Moderately Loud**
Normal Speech (5 ft) Air Conditioning Unit (100 ft)	Data Processing Center Department Store	60	1/2 as loud
Light Traffic (100 ft)	Large Business Office Quiet Urban Daytime	50	1/4 as loud
Bird Calls (distant)	Quiet Urban Nighttime	40	1/8 as loud **Quiet**
Soft Whisper (5 ft)	Library and Bedroom at Night Quiet Rural Nighttime	30	1/16 as loud
	Broadcast and Recording Studio	20	1/32 as loud **Just Audible**
		0	1/64 as loud **Threshold of Hearing**

Source: Compiled by Kimley-Horn and Associates, Inc.

Table 2
Sound Level Measurement at TM5440 (dBA)

Measurement	Time	Leq	Lmin	Lmax	L10	L50	L90
ML1	12-06-2005 10:15 – 11:15	38.6	34.3	58.4	40.8	35.7	34.6

Table 3
24-Hour Sound Level Measurement at TM5442, December 6-7, 2005 (dBA)

Time	Leq	Lmin	Lmax	L10	L50	L90
11:00 -12:00	47.8	37.5	69.2	46.9	41.2	38.9
12:00 -13:00	48.0	37.8	69.1	47.7	41.8	39.1
13:00 -14:00	51.1	37.4	72.3	47.5	40.8	38.5
14:00 -15:00	44.1	38.2	57.2	46.2	42.8	40.5
15:00 -16:00	55.1	38.4	84.2	50.9	44.6	40.6
16:00 -17:00	48.4	37.6	68.5	49.5	41.8	39.1
17:00 -18:00	45.2	37.1	64.2	45.1	39.8	38.3
18:00 -19:00	40.3	37.3	49.4	41.9	39.6	38.3
19:00 -20:00	42.7	37.3	63.4	43.7	39.9	38.4
20:00 -21:00	41.1	36.3	57.1	42.3	38.8	37.7
21:00 -22:00	40.8	36.6	61.1	39.8	37.9	37.1
22:00 -23:00	46.3	36.2	69.2	39.3	37.5	36.4
23:00 -24:00	37.3	36.2	50.5	37.9	37.2	36.3
24:00 -01:00	37.1	35.8	43.0	37.9	36.9	36.2
01:00 -02:00	37.1	35.5	50.8	38.1	36.7	36.1
02:00 -03:00	38.0	35.7	59.2	38.1	36.8	36.2
03:00 -04:00	36.9	35.4	50.3	37.9	36.7	36.1
04:00 -05:00	36.7	35.8	40.4	37.4	36.6	36.1
05:00 -06:00	45.2	35.7	78.4	37.6	36.6	36.1
06:00 -07:00	37.7	36.0	48.8	38.9	37.2	36.2
07:00 -08:00	41.4	37.0	59.5	43.1	39.5	37.7
08:00 -09:00	49.6	41.0	69.6	51.3	45.2	42.8
09:00 -10:00	50.2	39.5	71.4	50.7	45.2	41.6
10:00 -11:00	49.1	38.5	72.2	50.4	43.3	40.2

Table 4
Sedimentation Basin Excavation Noise Levels at TM5442 (dBA)

Receiver	Distance (feet)*				
	Basin 1	Basin 2	Basin 3	Basin 4	
Lot 1	265	353	441	529	
Lot 2	348	436	524	612	
Lot 3	481	569	657	745	
	Unmitigated Sound Level†				Arithmetic Mean
Lot 1	63.5	61.0	59.1	57.5	60
Lot 2	61.1	59.2	57.6	56.2	59
Lot 3	58.3	56.9	55.6	54.5	56
	Insertion Loss Achieved by 8-Foot-High Sound Barrier on Lot 1 Pad Edge				
Lot 1	9.8	10.2	10.4	10.6	
Lot 2	10.2	10.9	11.4	11.7	
Lot 3	11.2	11.6	11.8	12.0	
	Resultant Sound Level with Mitigation				Arithmetic Mean
Lot 1	53.7	50.8	48.7	46.9	50
Lot 2	50.9	48.3	46.2	44.5	47
Lot 3	47.1	45.3	43.8	42.5	45

Notes:

* Distances are to receiver locations (10' back from top of slope of Lot 1 pad and 10' back from property lines of Lots 2 and 3).
† Sound levels at Lots 2 and 3 do not account for insertion loss achieved by top of slope at northwest edge of Lot 1 pad.
Insertion loss reported at 500 Hz.

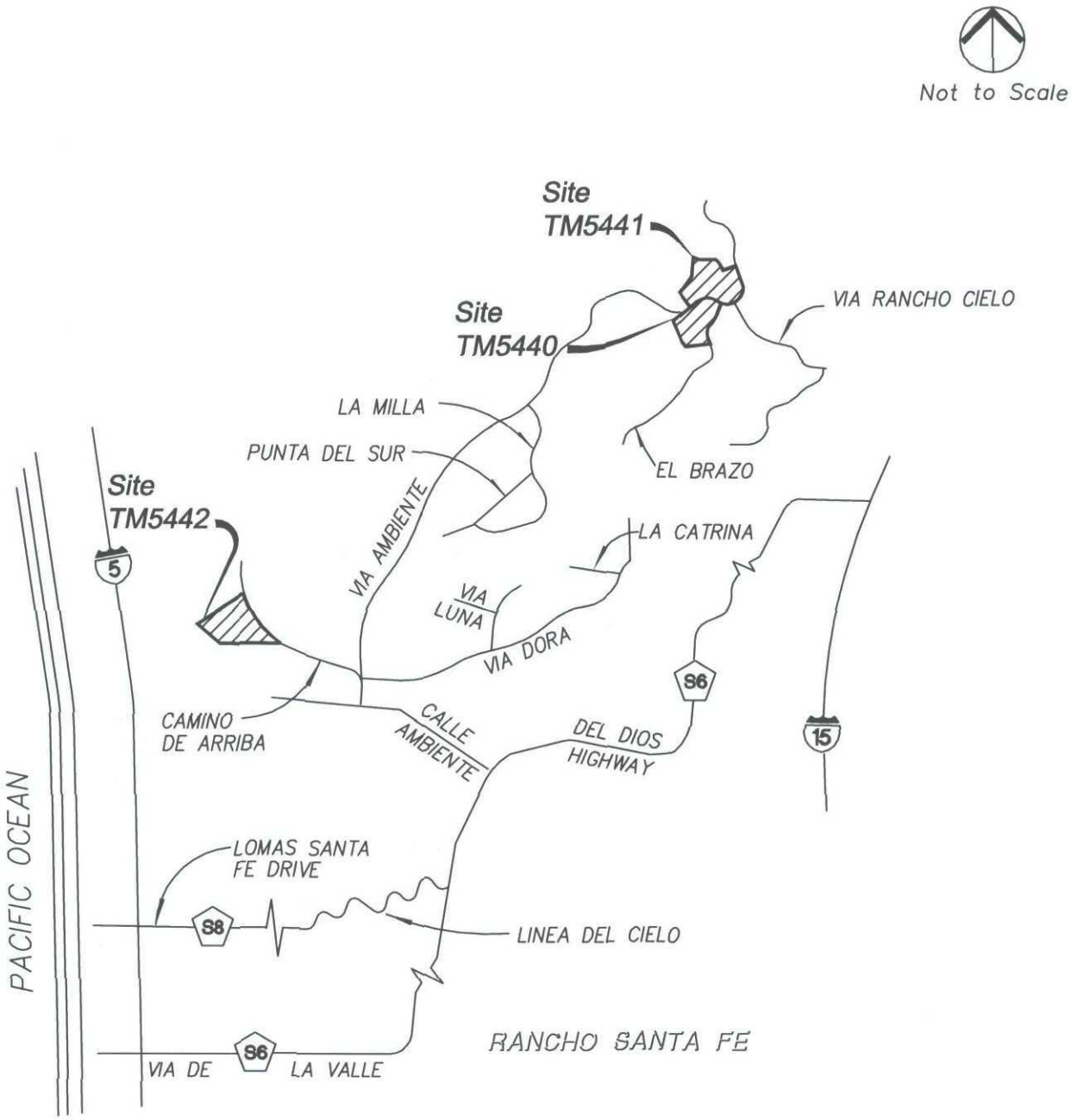

Figure 1

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Vicinity Map

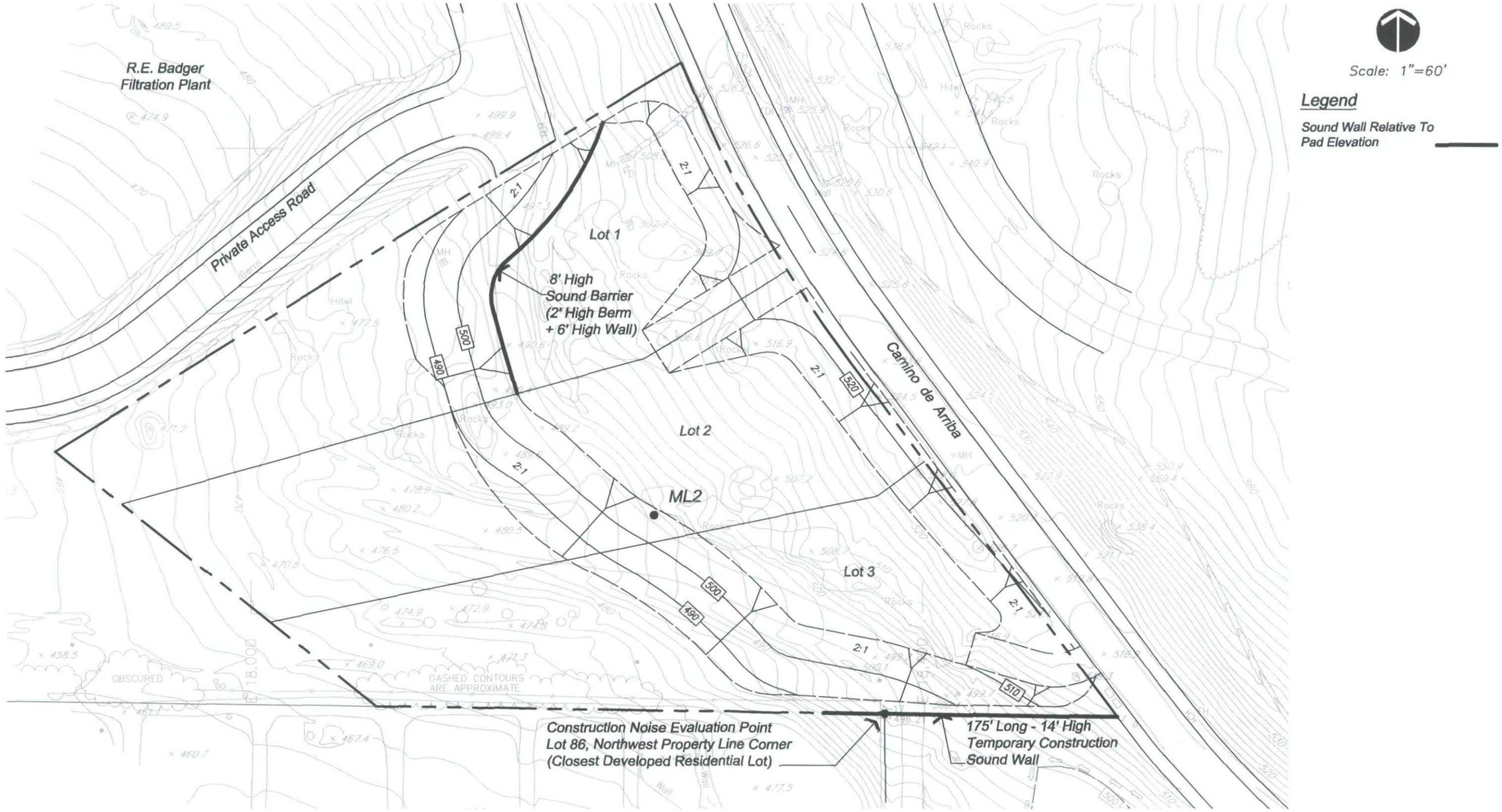
K:\NOISE\095219003\CAD\219003-Vicinity Map.dwg 8-13-07-12:18 PM

K:\NOISE\095219003\CAD\219003-TM5441-TM5440 SITE PLAN.dwg 8-13-07-12:26 PM

Kimley-Horn and Associates, Inc.
Engineering, Planning and Environmental Consultants

Figure 2

TM5440 and TM5441 Site Plan

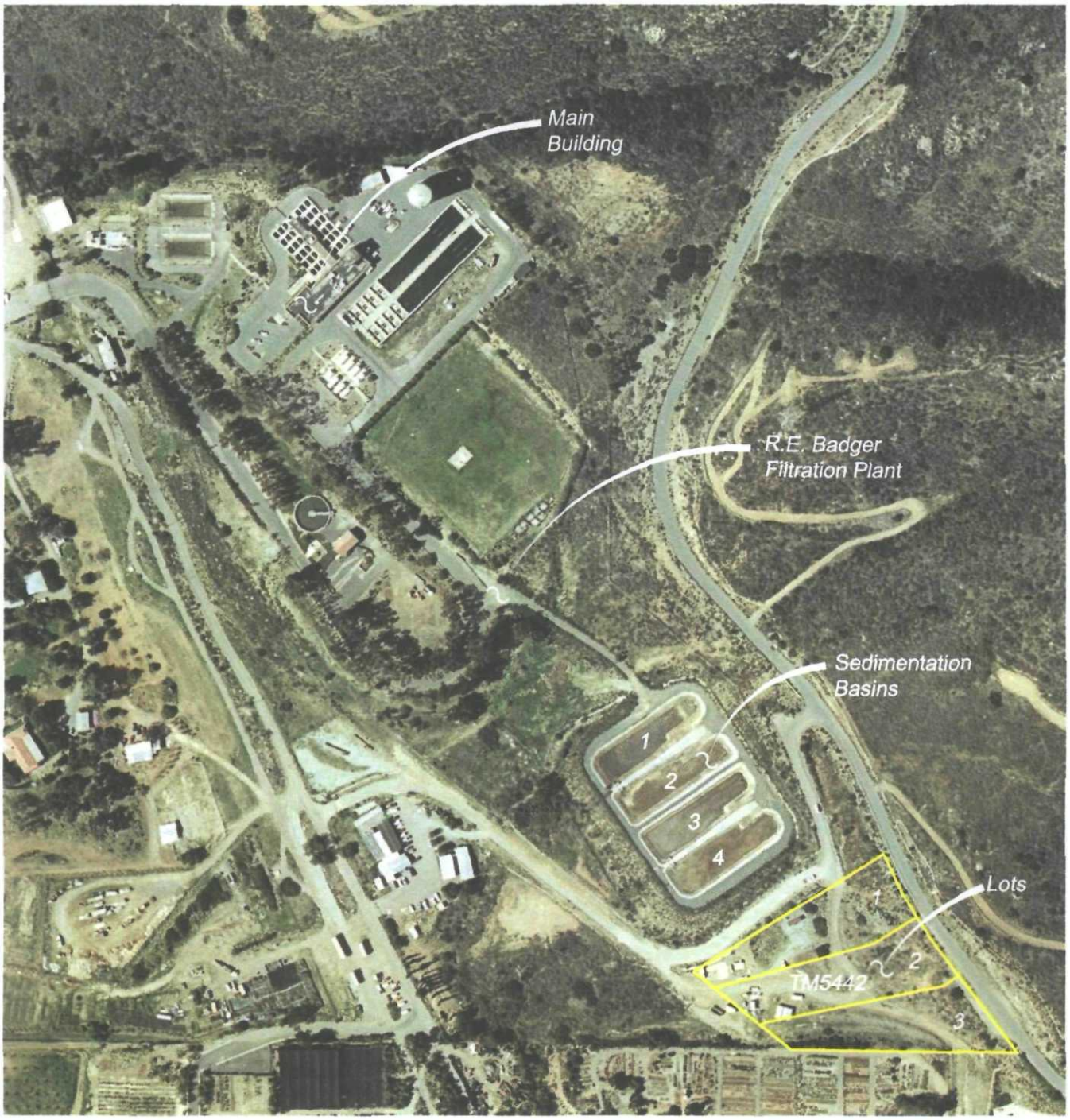


K:\NOISE\095219003\CAD\219003-TM5442 SITE PLAN 2008.06.12.dwg 6-12-08-10:02 AM

Kimley-Horn and Associates, Inc.
Engineering, Planning and Environmental Consultants

Figure 3

TM5442 Site Plan



Scale: 1"=300'

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and Associates, Inc.
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Figure 4

TM5442 And Filtration Plant Aerial Photo

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APPENDIX A

CADNA/A CALCULATION COORDINATES

line source
grading operation
sound power level moving point source 119.6
operations/hour 60
speed 5 km/h

x (m)	y (m)	z (m)
5633.62	6605.24	3.5
5620.04	6605.41	3.5
5604.04	6606.49	3.5
5592.7	6607.82	3.5
5583.12	6608.41	3.5
5575.45	6610.07	3.5
5572.98	6610.99	3.5
5571.37	6613.08	3.5
5572.81	6615.49	3.5
5575.62	6617.33	3.5
5583.7	6618.08	3.5
5595.28	6617.58	3.5
5612.2	6616.58	3.5
5625.12	6614.91	3.5
5631.18	6613.39	3.5
5635.37	6611.16	3.5
5637.46	6607.66	3.5
5636.31	6605.49	3.5
5633.63	6605.24	3.5

barrier
temp construction barrier

x (m)	y (m)	z (m)
5591.05	6601.97	4.25
5643.71	6601.31	4.25

receivers

	x (m)	y (m)	z (m)	level
Lot 86 north pl - west	5601.48	6601.96	1.5	86.8
Lot 86 north pl - center	5621.86	6601.66	1.5	87.7
Lot 86 north pl - east	5643.49	6601.32	1.5	81.8
Lot 86 north pl - west - 10' setback	5601.49	6599.05	1.5	73
Lot 86 north pl - center - 10' setback	5621.88	6598.67	1.5	73
Lot 86 north pl - east - 10' setback	5643.48	6598.25	1.5	71.2
Lot 26 east pl	5571.94	6280.46	1.5	54.5

limits of grading

x (m)	y (m)
5639.79	6608.77
5639.29	6607.52
5638.58	6606.38
5637.68	6605.38
5636.62	6604.54
5635.43	6603.91
5634.15	6603.49
5632.82	6603.3

TM5442 boundary

x (m)	y (m)
5564.39	6721.18
5451.01	6650.21
5509.19	6603.37
5601.42	6601.93
5643.71	6601.32
5595.2	6666.47
5593.55	6668.71
5589.11	6675.02

5612.97	6603.59
5585.55	6605.38
5580.64	6605.53
5579.18	6605.66
5577.5	6606.04
5575.89	6606.65
5574.38	6607.49
5573.01	6608.52
5571.79	6609.74
5568.9	6612.9
5565.84	6615.88
5562.61	6618.68
5559.23	6621.3
5555.7	6623.72
5552.04	6625.93
5549.96	6627.07
5547.75	6628.11
5544.71	6629.77
5541.79	6631.63
5539.02	6633.7
5536.4	6635.96
5533.94	6638.4
5531.66	6641
5529.57	6643.76
5527.68	6646.66
5525.99	6649.68
5524.53	6652.82
5523.29	6656.05
5521.85	6661.19
5521.66	6661.69
5521.39	6662.15
5521.05	6662.55
5521.02	6662.57
5517.04	6666.4
5517.02	6666.42
5516.67	6666.82
5516.4	6667.28
5516.22	6667.78
5515.14	6671.63
5514.64	6673.81
5514.31	6676.26
5514.22	6678.72
5514.38	6681.19
5514.78	6683.62
5515.07	6684.7
5515.7	6686.3
5516.55	6687.8
5517.61	6689.17
5518.84	6690.37
5520.23	6691.38
5554.74	6712.98
5555.42	6713.36
5584.88	6681.46
5580.85	6688.03
5577.03	6694.73
5573.42	6701.55
5570.03	6708.48
5566.87	6715.51
5564.41	6721.19

5556.66	6713.84
5557.97	6714.09
5559.3	6714.12
5560.61	6713.92
5561.86	6713.49
5563.03	6712.84
5564.06	6712.01
5564.94	6711.01
5565.62	6709.87
5569.26	6702.73
5573.12	6695.69
5573.59	6694.86
5575.32	6692.93
5577.23	6691.17
5579.29	6689.6
5581.49	6688.23
5582.45	6687.72

APPENDIX B

HVAC SPECIFICATIONS

Carrier®

Duct-Free Systems Digest

Product

ARI Capacities 1
Application Data 2
Electrical Data 3
System Charges 4
Features & Accessories 5
Guide Specifications 6
Model Number Nomenclature 7
Physical Data 8
Sound Data 9
System Cross-Match (Carrier/Bryant) 10
System & Unit Specifications 11

Application

Performance Data & Expanded Ratings (Condenser Only) 12
Performance Data & Expanded Ratings 13
Piston & Charge Combinations 14
Refrigerant Lines & Long Line Applications 15
Selection Procedure 16
Drawings 17

Installation

AccuRater Metering Device 18
Charge Verification 19
Controls 20
Control Circuit Connections (Under Development) 21
Installation Diagrams 22
Service 23
Start-Up Instructions & Checklist 24
Wire Diagrams (Under Development) 25

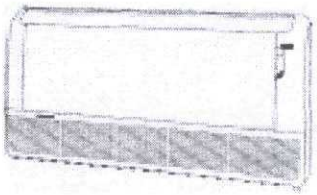
Maintenance/ Repair

Cleaning & Maintenance 26
Troubleshooting and Fault Codes 27

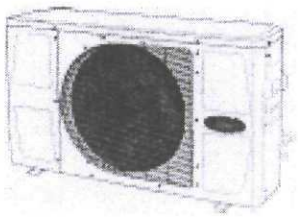
? HELP

Duct Free Systems
Product Data Digest

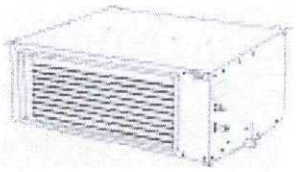
¾ to 5 Nominal Tons



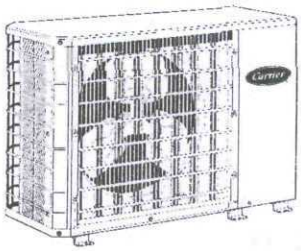
Console



Console Condenser & Mulit-Zone

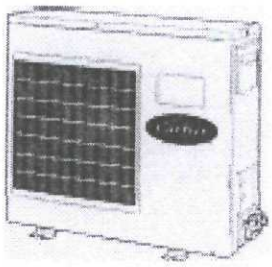


Satellite

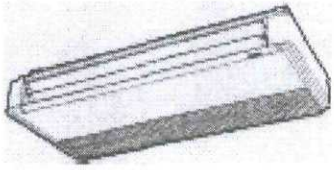


HDC, HDL, HDS & QR Condensers

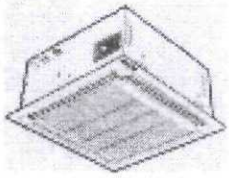
High Wall



AN/BK Condensers



Under Ceiling



Cassette

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Catalog #853-023 (CD) #853-030 (PRINT)

Sound Data "Condensers" (A Weighted)

Model	Sound Power #1(dBa)	Sound Power #2(dBa)	Sound Pessure (dBa)	Fan Speed	Sound Power Data Octave Band (dBa)						
					125	250	500	1000	2000	4000	8000
38AN009	62.3	64.0	54.0	Single	48.9	54.9	58.3	59.1	54.9	49.1	39.9
38AN012	63.1	65.0	54.8	Single	49.3	59.1	59.0	60.0	55.2	49.2	44.0
38BK009	63.4	65.0	55.1	Single	50.3	56.4	57.8	60.8	55.8	49.9	42.9
38BK012	62.8	65.0	54.5	Single	50.8	56.2	60.7	58.7	54.9	50.1	43.2
38BK018	67.2	68.0	58.9	Single	51.0	57.0	62.0	62.5	62.0	56.5	47.5
38BK024	63.3	68.0	55.0	Single	54.5	59.0	61.5	62.0	60.5	54.5	49.5
38HDC018	66.1	70.0	57.8	Single	55.1	55.5	58.4	61.6	61.2	56.0	45.5
38HDC024	65.5	68.0	57.2	Single	48.6	55.8	59.6	61.8	59.3	55.1	44.2
38HDC030	63.0	68.0	54.7	Single	67.5	58.0	59.0	60.5	51.5	48.0	40.5
38HDC036	64.5	68.0	56.2	Single	47.3	55.3	59.2	61.3	57.9	52.3	44.9
38HDC048	70.1	72.0	61.8	Single	58.5	63.2	64.3	65.3	64.2	61.3	50.7
38HDC060	69.4	72.0	61.1	Single	54.9	59.8	63.6	64.5	63.9	60.1	50.3
38HDL018	59.5	n/a	51.2	Single	48.9	51.4	53.3	56.5	52.7	47.0	36.4
38HDL024	63.2	68.0	54.9	Single	48.9	48.9	63.8	58.0	52.2	46.0	41.9
38HDL030	59.5	64.0	51.2	Single	46.4	49.9	53.8	57.5	50.7	44.5	36.9
38HDL036-301	64.7	71.0	56.4	Single	62.9	62.9	63.8	59.5	56.2	47.5	40.4
38HDL036-311	64.6	70.0	62.2	Single	61.8	60.3	64.5	62.9	61.7	54.4	43.7
38HDL048	65.4	72.0	57.1	Single	61.9	57.4	59.8	61.5	59.2	54.5	44.4
38HDL060	65.8	71.0	57.5	Single	60.9	55.9	60.3	61.5	59.2	57.0	47.9
38HDS024	65.5	68.0	57.2	Single	48.6	55.8	59.6	61.8	59.3	55.1	44.2
38HDS048	70.1	72.0	61.8	Single	58.5	63.2	64.3	65.3	64.2	61.3	50.7
38QRC018	67.2	68.0	58.9	Single	51.0	57.0	62.0	62.5	62.0	56.5	47.5
38QRC024	66.3	68.0	58.0	Single	54.5	59.0	61.5	62.0	60.5	54.5	49.5
38QRC030	65.9	68.0	57.6	Single	55.0	56.5	61.0	63.0	58.5	53.5	43.0
38QRC036	66.2	68.0	57.9	Single	57.0	61.0	61.0	62.5	59.0	55.5	51.0
38QRC036 *	71.5	74.0	63.2	Single	67.0	66.0	67.0	67.0	64.5	62.5	52.0
38QRC048	73.0	76.0	64.7	Single	60.5	68.5	68.0	68.5	67.0	62.5	54.0
38QRC060	73.6	72.0	65.3	Single	62.5	67.5	71.0	68.0	67.0	63.5	54.5
38CG-018—301	79.0	n/a	49.0	Low	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38CG-024—301	74.0	n/a	49.0	Low	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38CG-030—301	78.0	n/a	49.0	Low	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38CS-018—301	79.0	n/a	49.0	Low	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38CS-024—301	74.0	n/a	49.0	Low	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38CS-030—301	78.0	n/a	49.0	Low	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38SB-030—301	80.0	n/a	51.0	Low	n/a	n/a	n/a	n/a	n/a	n/a	n/a
38SB-030—301	80.0	n/a	51.0	Low	n/a	n/a	n/a	n/a	n/a	n/a	n/a

* 3 Phase Unit

Note:

1) Sound #2 levels are tone corrected values taken in accordance with ARI Sound Standard 270
2) Sound Pressure data is measured at 1m from the unit.

Legend

ARI - Air Conditioning & Refrigeration Institute dBa - Decibels on the A scale n/a - Not Available

Rev "A"
01/09/02