VALIANO PROJECT

APPENDIX G

ACOUSTICAL SITE ASSESSMENT REPORT

for the

DRAFT ENVIRONMENTAL IMPACT REPORT

PDS2013-SP-13-001, PDS2013-GPA-13-001,
PDS2013-STP-13-003, PDS2013-TM-5575,
PDS2013-REZ-13-001, PDS2013-ER-12-08-002

APRIL 2015

Prepared for:
COUNTY OF SAN DIEGO
PLANNING & DEVELOPMENT SERVICES
5510 OVERLAND AVENUE, SUITE 310
SAN DIEGO, CALIFORNIA 92123

Acoustical Site Assessment Report

Valiano Project

PDS2013-SP-13-001, PDS2013-GPA-13-001,
PDS2013-STP-13-003, PDS2013-TM-5575,
PDS2013-REZ-13-001, PDS2013-ER-12-08-002

Lead Agency:
County of San Diego
Planning & Development Services
5510 Overland Avenue, Suite 310
San Diego, California 92123

Project Proponent:
Eden Hills Project Owner, LLC
2235 Encinitas Boulevard, Suite 216
Encinitas, California 92024

Prepared by:
Charles Terry, County-approved Noise Consultant
HELIX Environmental Planning, Inc.
7578 El Cajon Boulevard
La Mesa, California 91942

April 2015

TABLE OF CONTENTS

Section Title **Page**

TABLE OF CONTENTS (cont.)

Section Title **Page**

APPENDICES

TABLE OF CONTENTS (cont.)

LIST OF FIGURES

LIST OF TABLES

GLOSSARY OF TERMS AND ACRONYMS

ADT	Average Daily Trips (roadway traffic)
ANSI	American National Standards Institute
CAD	Computer Aided (engineering and architectural) Design
CADNA	Computer Aided Noise Abatement
County	County of San Diego
CNEL	Community Noise Equivalent Level
CMU	Concrete Masonry Unit
dB	Decibel
dBA	A-weighted decibels
DU	dwelling unit
FHWA	Federal Highway Administration
HVAC	Heating, ventilating, and air conditioning
Hz	Hertz
kHz	kilohertz
L_{EQ}	The equivalent sound level, or the continuous sound level, that represents the same sound energy as the varying sound levels, over a specified monitoring period
L_{DN}	Day-Night level: A 24-hour average, where sound levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. have an added 10 dB weighting
mPa	micro-Pascals
M1	Noise measurement location adjacent to Ingraham Street
mph	miles per hour
ms	millisecond
NSLU	Noise-sensitive land use

GLOSSARY OF TERMS AND ACRONYMS (cont.)

PDS	Planning & Development Services (County of San Diego)
PPV	peak particle velocity
SPL	Sound pressure level
S_{WL}	Sound power level
SR	State Route
STC	Sound transmission control
SW	Sound Wall
TNM	Traffic Noise Model
USFWS	U.S. Fish and Wildlife Service
WTWRF	wastewater treatment and water reclamation facility

THIS PAGE INTENTIONALLY LEFT BLANK

EXECUTIVE SUMMARY

The proposed Valiano Project ("Project" or "Proposed Project") includes a residential community on an approximately 239-acre site in an unincorporated portion of San Diego County (County) near the cities of San Marcos and Escondido. The Project site is located approximately 1.7 miles west of Interstate 15 (I-15) and 0.8 mile south of State Route (SR-) 78 at its closest points.

The Proposed Project consists of a residential community with 326 single-family dwelling units (DUs) and related facilities within a total disturbance area of approximately 127 acres. The residential development is divided into five distinct neighborhoods. The proposed development also incorporates a number of related amenities and facilities, including a community recreation area, an on-site wastewater treatment and water reclamation facility (WTWRF) and wet weather storage area, three pump (lift) stations, an existing barn complex in the southeastern portion of the site that would be retained, a small booster pump station (as part of the water circulation system), and a number of off-site roadway improvements.

Activities associated with project construction, including grading and blasting, would result in potentially significant short-term noise impacts and would require mitigation. For the construction of the Project, no blasting shall occur at a distance of less than 600 feet from any off-site structure without specific analysis by the blasting contractor showing less than significant vibration impacts to the structure. If ripping, drilling, or excavation is required within 180 feet of a residentially occupied property line, a 12-foot high barrier shall be erected along the length of the property line. If a breaker is required on-site, then it shall not be used within 300 feet of property lines of occupied off-site residences.

The Project would include an on-site WTWRF, along with three pump stations, for the sewer needs of the development. Noise generated by the backup power generator and other stationary equipment could have the potential to exceed allowable levels, and would require noise control. WTWRF equipment noise may be controlled by equipment enclosures; increasing setbacks between noise-generating equipment and residences; locating equipment such that noise shielding would be provided from on-site buildings or structures; and incorporating acoustical louvers or paneling into the design of the equipment.

Diesel generator noise (associated with the WTWRF generator, the booster pump and wastewater pump station generators) may be controlled by the following methods: enclosing the diesel generator within a custom designed noise control structure (such as a steel enclosure), or placing the diesel generator within a concrete masonry unit (CMU) building that includes noise control features.

The applicant shall be required to provide a final noise impact analysis as part of the facilities design submittal package for the WTWRF and pump stations prepared by a County-approved noise consultant. The final noise impact analysis shall demonstrate compliance for with the County 45 dBA L_{EQ} nighttime property line noise limit.

Residential HVAC noise may exceed allowable levels if the condenser is installed within 45 feet of a property line. A 5.5–foot-tall sound wall would reduce noise impacts in the outdoor use area from an adjacent residential air conditioning condenser to less than 45 dBA L_{EQ}.

Future traffic noise levels for off-site residences are forecasted to exceed 60 CNEL at both structural façades and exterior use locations in both the Existing plus Cumulative condition, and the Existing plus Project plus Cumulative condition (worst-case near-term year); however, the Project's contribution to the cumulative noise impact would be less than cumulatively considerable. If the additional access option (which includes Project access on Hill Valley Drive) is incorporated, the potential impacts to off-site residences are comparable.

Future traffic noise levels at some exterior use areas facing Country Club Drive may exceed 60 CNEL. A sound wall would also be required to abate noise levels at exterior use areas associated with residences fronting Country Club Drive in Neighborhood 5 (6 feet in height).

Additionally, as noise levels at the Project's residential building façades (with second stories) facing Country Club Drive may exceed 60 CNEL, they would require an exterior-to-interior analysis to demonstrate that interior noise levels would be below 45 CNEL. This analysis would be submitted with the final building plan submittal for the residential units along Country Club Drive.

With regard to the off-site wastewater options, none of the proposed options (connecting to the City of Escondido Hale Avenue Resource Recovery Facility [HARRF], the Vallecitos Water District [VWD] Facility, or Harmony Grove Treatment Plant) would result in construction noise impacts.

Operations associated with connecting to the City of Escondido HARRF would involve a reliance upon gravity flow with the utilization of the three described and analyzed Project wastewater pump stations; this off-site option would not result in operational noises levels in excess of thresholds, and impacts would be less than significant.

The off-site options that include either connecting to the VWD facility or to the Harmony Grove Treatment Plant would require an additional wastewater pump station (four in total). The pump station, like the three previously described Project pump stations, would be a submersible package sewer system with potential impacts that would be comparable to the previously discussed Project pump stations and diesel generator noise. Mitigation for the off-site VWD option or Harmony Grove Treatment Plan option would be comparable to mitigation required for the three on-site pump stations. The diesel generator noise may be controlled by the following methods: enclosing the diesel generator within a custom designed noise control structure (such as a steel enclosure) or placing the diesel generator within a CMU building that includes noise control features. The applicant would be required to provide a final noise impact analysis as part of the facilities design submittal package for the pump station backup power generators prepared by a County-approved noise consultant. The final noise impact analysis would need to demonstrate compliance with the County 45 dBA nighttime noise limit.

1.0 INTRODUCTION

The proposed Valiano Project ("Project" or "Proposed Project") includes a residential community on an approximately 239-acre site in an unincorporated portion of San Diego County (County) near the cities of San Marcos and Escondido. The Project site is located approximately 1.7 miles west of Interstate 15 (I-15) and 0.8 mile south of State Route (SR) 78 at its closest points. Principal site access is from SR-78, Nordhal Road and Country Club Drive, from which a number of smaller surface streets (e.g., Eden Valley Lane and Mt. Whitney Road) extend along or near the northern and eastern property boundaries.

1.1 Noise and Sound Level Descriptors and Terminology

1.1.1 Descriptors

All noise level or sound level values presented herein are expressed in terms of decibels (dB), with A-weighting (dBA) to approximate the hearing sensitivity of humans. Time-averaged noise levels are expressed by the symbol L_{EQ}, with a specified duration. The Community Noise Equivalent Level (CNEL) is a 24-hour average, where noise levels during the evening hours of 7:00 p.m. to 10:00 p.m. have an added 5 dB weighting, and sound levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. have an added 10 dB weighting. This is similar to the Day-Night sound level (L_{DN}), which is a 24-hour average with an added 10 dB weighting on the same nighttime hours but no added weighting on the evening hours. Sound levels expressed in CNEL are always based on dBA. These metrics are used to express noise levels for both measurement and municipal regulations, as well as for land use guidelines and enforcement of noise ordinances.

1.1.2 Terminology

Sound, Noise, and Acoustics

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air) to a hearing organ, such as a human ear. Noise is defined as loud, unexpected, or annoying sound.

In the science of acoustics, the fundamental model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determine the sound level and characteristics of the noise perceived by the receiver. The field of acoustics deals primarily with the propagation and control of sound.

Frequency

Continuous sound can be described by frequency (pitch) and amplitude (loudness). A low-frequency sound is perceived as low in pitch. Frequency is expressed in terms of cycles per second, or Hertz (Hz) (e.g., a frequency of 250 cycles per second is referred to as 250 Hz). High

frequencies are sometimes more conveniently expressed in kilohertz (kHz), or thousands of Hertz. The audible frequency range for humans is generally between 20 Hz and 20,000 Hz.

Sound Pressure Levels and Decibels

The amplitude of pressure waves generated by a sound source determines the loudness of that source. Sound pressure amplitude is measured in micro-Pascals (mPa). One mPa is approximately one hundred billionth (0.00000000001) of normal atmospheric pressure. Sound pressure amplitudes for different kinds of noise environments can range from less than 100 to 100,000,000 mPa. Because of this huge range of values, sound is rarely expressed in terms of mPa. Instead, a logarithmic scale is used to describe sound pressure level (SPL) in terms of dB. The threshold of hearing for the human ear is about 0 dB, which corresponds to 20 mPa.

Addition of Decibels

Because decibels are logarithmic units, SPL cannot be added or subtracted through ordinary arithmetic. Under the decibel scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one automobile produces an SPL of 70 dB when it passes an observer, two cars passing simultaneously would not produce 140 dB: rather, the SPL of two cars would combine to produce 73 dB. Under the decibel scale, three sources of equal loudness together produce a sound level 5 dB louder than one source.

To create an overall 3 dBA L_{EQ} change in traffic noise, the traffic volume must double while maintaining the same speed.

Under controlled conditions in an acoustical laboratory, the trained, healthy human ear is able to discern 1-dB changes in sound levels, when exposed to steady, single-frequency ("pure-tone") signals in the mid-frequency (1,000 Hz–8,000 Hz) range. In typical noisy environments, changes in noise of 1 to 2 dB are generally not perceptible. It is widely accepted, however, that people begin to detect sound level increases of 3 dB in typical noisy environments. Further, a 5-dB increase is generally perceived as a distinctly noticeable increase, and a 10-dB increase is generally perceived as a doubling of loudness.

The CNEL is a 24-hour average A-weighted hourly sound level for a given day, after addition of 5 dB to sound levels for the evening hours of 7:00 p.m. to 10:00 p.m., and 10 dB to sound levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. CNEL is used to evaluate transportation noise sources. The result of this weighting is that noise levels produced during the evening and nighttime hours are factored in more significantly due to the disruption of an otherwise quiet time of the day. This is similar to the Day-Night Sound Level (L_{DN}), which is a 24-hour average with 10 dB added weighting on the same nighttime hours but no added weighting on the evening hours. These data unit metrics are used to express noise levels for both measurement and municipal noise ordinances and regulations, for land use guidelines, and enforcement of noise ordinances.

No known studies have directly correlated the ability of a healthy human ear to discern specific levels of change in traffic noise over a 24-hour period. Many ordinances, however, specify a change of 3 CNEL as the significant impact threshold. This is based on the concept of a doubling in noise energy resulting in a 3-dBA change in noise (which is the amount of change in noise necessary for the increase to be perceptible to the average healthy human ear).

1.2 Project Location

The Proposed Project is located in the unincorporated portion of northern San Diego County, near the cities of Escondido and San Marcos. Please see Figures 1 and 2, for the regional location and an aerial photograph of the Project site, respectively. The site includes 13 individual parcels, with the following Assessor's Parcel Numbers (APNs): 228-313-13, 232-013-01 through 232-013-03, 232-020-55, 232-492-01, 232-500-18 through 232-500-23, and 232-500-24. The approximately 239-acre Project site is generally divided into two areas, a larger northwestern portion of approximately 191 acres and a smaller southeastern portion of approximately 48 acres. The two areas connect corner to corner at Mt. Whitney Road. Country Club Drive is the primary north-south roadway in the vicinity of the Proposed Project; the southwestern portion of the Project site borders this roadway. State Route (SR-) 78) is located approximately 0.8 mile to the north and Interstate 15 (I-15) is located approximately 1.7 miles to the east. The Project site is zoned Semi-Rural Residential, with one dwelling unit (DU) allowed either per acre (zoned SR-1) or per 2 acres (zoned SR-2), depending on the parcel. Development would be primarily located on the more gentle slopes and valley portion contained between the hills to the west and Country Club Drive to the east. A few residences would be located on the steeper western hills. As a conservative (worst-case) projection, the Proposed Project would grade approximately 127 acres, or approximately 52 percent, of the overall Project site, resulting in a total of 928,000 cubic yards (cy) of balanced cut and fill for the site proper. Grading would be done by individual neighborhood, beginning with Neighborhood 5, followed by Neighborhoods 1, 2, 3 and 4.

1.3 Project Description

The Proposed Project consists of a residential community with 326 single-family dwelling units (DUs) and related facilities within a total disturbance area of approximately 127 acres. Note that some single family units may include small Second Dwelling Units. Second Dwelling Units within the Valiano Specific Plan could provide one parking space instead of two because they are expected to house extended family members instead of two-car families.

The residential development is divided into five distinct neighborhoods. The proposed development also incorporates a number of related amenities and facilities, including a community recreation area, an on-site wastewater treatment and water reclamation facility (WTWRF) and wet weather storage area, three pump (lift) stations, an existing barn complex in the southeastern portion of the site that would be retained, a small booster pump station (as part of the water circulation system), and a number of off-site roadway improvements. Refer to Appendix A, *Site Plan Including Pump/Lift Stations*, for the Project's planning areas.

1.3.1 Community Recreation Areas

The Project would include a 2.7-acre public neighborhood park in the southeastern corner of the site within Neighborhood 5 and adjacent to Country Club Drive. The park would include turf areas, picnic facilities, a group shade structure, half-court basketball, a small tot-lot or playground, connections to multi-use trails, and a parking lot.

The existing equestrian complex previously used in association with the Harmony Grove Equestrian Center, located in the southern portion of Neighborhood 5, would be retained, open to the public and privately maintained. Portions of the existing equestrian training and boarding facility would accommodate private horse boarding. The site would be reconfigured to allow public horse trailer parking and use of an exercise ring for the public to access the multi-use trail.

Additionally, an approximately 2.3-acre private community recreation center would be located within Neighborhood 1, and an existing grove of mature oaks within Neighborhood 2 (approximately 1.2 acres) would be retained and protected as a private park, "Central Oak Park."

1.3.2 Water Booster Pump Station

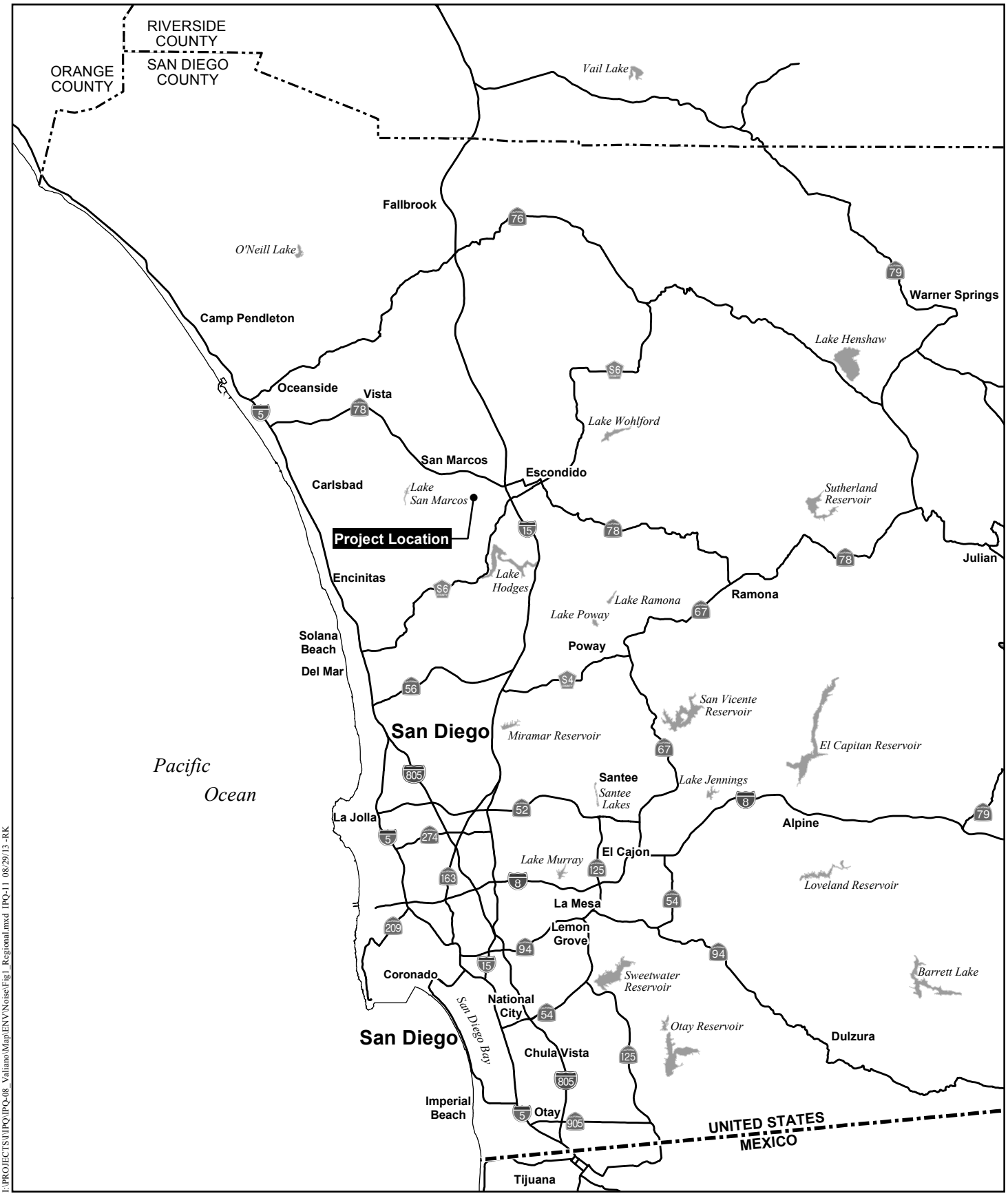
A small booster pump station would be required to service approximately 75 homes. The pump station would be owned and operated by Rincon MWD and would be housed in a small building. The pump station would include a total of four pumping units, two small domestic pumps (100 gallons per minute [gpm] each) and two dedicated fire flow pumps (2,500 gpm each). A generator would be housed in an enclosure adjacent to the pump building.

1.3.3 WTWRF/Pump Stations and Wet Weather Storage Area

The Project design includes a 0.4-acre on-site WTWRF and pump station located in the southeastern-most portion of the site, within Neighborhood 5. This facility would provide treatment for all wastewater generated on site, and would produce reclaimed effluent per applicable regulatory standards for irrigation of on-site landscaping. Based on the loading and design criteria used in the 180,000 gallons per day (gpd) Harmony Grove plant design, a scaled-down version could be constructed to serve the Proposed Project. Such a plant (with three active treatment trains and one standby train), as is provided in the design for the Harmony Grove WTWRF, would include numerous very small tanks at the Proposed Project's WTWRF.

In addition, a wet weather storage area would be located in the northwest corner of Neighborhood 5, to provide storage for excess treated effluent when required (e.g., during winter months when irrigation demand is lower).

In addition to the pump station located at the WTWRF noted above, two additional lift (pump) stations would be located in the northern and eastern portions of the site. Each of these sites would include an area of approximately 400 square feet and would contain a building housing the pump equipment to deliver wastewater flows to the on-site plant. The building would be approximately 200 square feet in size, no higher than 16 feet, and would resemble a barn or other farm outbuilding consistent with architectural treatments proposed for the WTWRF. The pump



I:\PROJECTS\UIPQ\IPQ-08_Valiano\Map\ENV\NoiseFig1_Regional.mxd 1PQ-11 08/29/13 -RK

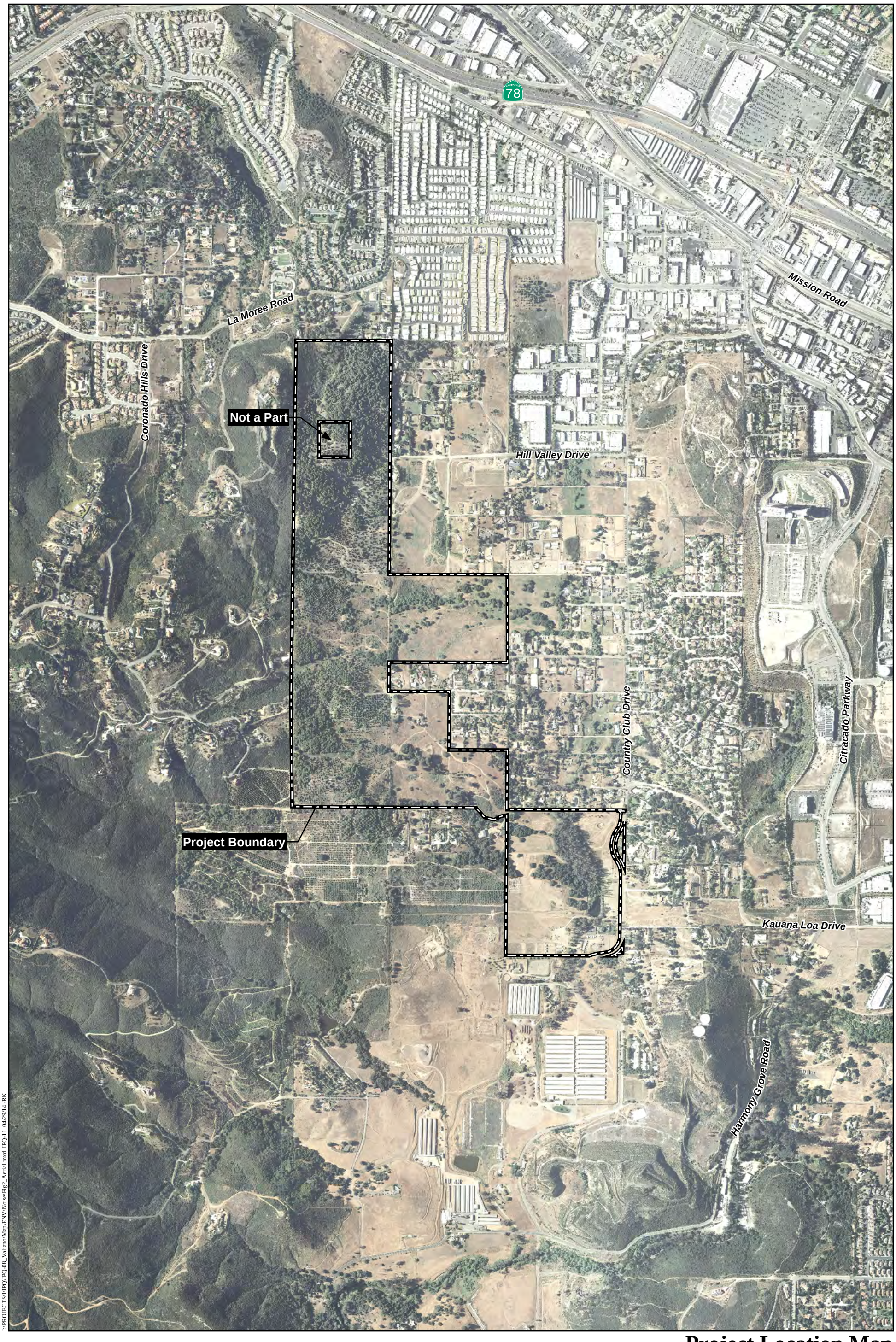
Regional Location Map

VALIANO

HELIX Environmental Planning

N 0 8 Miles

Figure 1



I:\PROJECTS\VIPQ\IPQ-08_Valiano\Map\ENV\Noise\Fig2_Aerial.mxd 1PQ-11 04/29/14 -RK

Project Location Map

VALIANO

HELIX Environmental Planning

N 0 1,000 Feet

Figure 2

stations would be equipped with backup generators to provide power to the pumps in case of a power outage.

Alternative service options to the on-site WTWRF are described under Section 5.2.4 of this report, *Wastewater Treatment Options*.

1.3.4 Off-site Improvements

The Project design includes a number of off-site improvements associated with relatively minor modifications along existing roadways. Specifically, these include minor widening, turn pockets and/or other modifications to Hill Valley Drive, Eden Valley Lane, Mt. Whitney Road and Country Club Drive in the vicinity of the Project site.

1.4 Noise-sensitive Receptors

Noise-sensitive land uses (NSLU) are land uses that may be subject to stress and/or interference from excessive noise. Noise receptors are individual locations that may be affected by noise. Existing residential development occurs north, east and west of the Project site. The area to the south of the Project site is currently being developed with the residential, 742-unit, Harmony Grove Village Specific Plan. All existing residential sites, the planned residential units within the Harmony Grove Village, and the proposed on-site housing units associated with this Project would be considered sensitive noise receptors. Additionally, livestock are located in the general vicinity of the Project site and could be potentially sensitive to noise generated during construction activities.

1.5 Applicable Noise Regulations and Standards

Applicable noise standards for the Project are codified in the following San Diego County code and regulations.

NSLUs are defined as any residence, hospital, school, hotel, resort, library, or similar facility where quiet is an important attribute of the environment.

Noise impacts would be considered significant if Project implementation would result in the exposure of any on- or off-site, existing or reasonably foreseeable future NSLUs to exterior or interior noise (including noise generated from the Project, together with noise from roads [existing and planned Mobility Element roadways], railroads, airports, heliports, and all other noise sources) in excess of any of the following:

San Diego County General Plan Noise Guidelines (Noise Element)

The Noise Element of the County of San Diego General Plan includes guidelines for noise compatibility (Tables N-1 and N-2 from the County of San Diego General Plan), as detailed below in Table 1-1, *San Diego County Noise Compatibility Guidelines*, and noise standards, as detailed below in Table 1-2, *San Diego County General Plan Noise Standards.*

Table 1-1
SAN DIEGO COUNTY NOISE COMPATIBILITY GUIDELINES

Land Use Category		Exterior Noise Level (CNEL)					
		55	60	65	70	75	80
A	Residential—single family residences, mobile homes, senior housing, convalescent homes						
B	Residential—multi-family residences, mixed-use (commercial/residential)						
C	Transient lodging—motels, hotels, resorts						
D[(1)]	Schools, churches, hospitals, nursing homes, child care facilities						
E[(1)]	Passive recreational parks, nature preserves, contemplative spaces, cemeteries						
F[(1)]	Active parks, golf courses, athletic fields, outdoor spectator sports, water recreation						
G[(1)]	Office/professional, government, medical/dental, commercial, retail, laboratories						
H[(1)]	Industrial, manufacturing, utilities, agriculture, mining, stables, ranching, warehouse, maintenance/repair						
	ACCEPTABLE—Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal construction, without any special noise insulation requirements.						
	CONDITIONALLY ACCEPTABLE—New construction or development should be undertaken only after a detailed noise analysis is conducted to determine if noise reduction measures are necessary to achieve acceptable levels for land use. Criteria for determining exterior and interior noise levels are listed in Table 3, Noise Standards. If a project cannot mitigate noise to a level deemed Acceptable, the appropriate County decision-maker must determine that mitigation has been provided to the greatest extent practicable or that extraordinary circumstances exist.						
	UNACCEPTABLE—New construction or development shall not be undertaken.						

Source: DPLU 2009a

(1) Denotes facilities used for part of the day; therefore, an hourly standard would be used rather than CNEL

Note: For projects located within an Airport Influence Area of an adopted Airport Land Use Compatibility Plan (ALUCP), additional Noise Compatibility Criteria restrictions may apply as specified in the ALUCP.

Table 1-2 COUNTY OF SAN DIEGO GENERAL PLAN NOISE STANDARDS
1. The exterior noise level (as defined in Item 3) standard for Category A shall be 60 CNEL, and the interior noise level standard for indoor habitable rooms shall be 45 CNEL.
2. The exterior noise level standard for Categories B and C shall be 65 CNEL, and the interior noise level standard for indoor habitable rooms shall be 45 CNEL.
3. The exterior noise level standard for Categories D and G shall be 65 CNEL and the interior noise level standard shall be 50 dBA L_{EQ} (one hour average).
4. For single-family detached dwelling units, "exterior noise level" is defined as the noise level 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 net lot area: (i) for lots less than 4,000 square feet in area, the exterior area shall include 400 square feet, (ii) for lots between 4,000 square feet to 10 acres in area, the exterior area shall include 10 percent of the lot area; (iii) for lots over 10 acres in area, the exterior area shall include 1 acre.
5. For all other residential land uses, "exterior noise level" is defined as noise measured at exterior areas which are provided for private or group usable open space purposes. "Private Usable Open Space" is defined as usable open space intended for use of occupants of one dwelling unit, normally including yards, decks, and balconies. When the noise limit for Private Usable Open Space cannot be met, then a Group Usable Open Space that meets the exterior noise level standard shall be provided. "Group Usable Open Space" is defined as 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.
6. For non-residential noise sensitive land uses, exterior noise level is defined as noise measured at the exterior area provided for public use.
7. For noise sensitive land uses where people normally do not sleep at night, the exterior and interior noise standard may be measured using either CNEL or the one-hour average noise level determined at the loudest hour during the period when the facility is normally occupied.
8. The exterior noise standard does not apply for land uses where no exterior use area is proposed or necessary, such as a library.
9. For Categories E and F the exterior noise level standard shall not exceed the limit defined as "Acceptable" in Table N-1 or an equivalent one-hour noise standard.

Note: Exterior Noise Level compatibility guidelines

The Noise Element states that noise impacts would be considered significant if Project implementation would result in the exposure of any on- or off-site, existing or reasonably foreseeable future NSLUs to exterior or interior noise (including noise generated from the Project, together with noise from roads [existing and planned Mobility Element roadways], railroads, airports, heliports, and all other noise sources) in excess of any of the following:

Exterior Locations:

i. 60 (CNEL) Single-Family; or 65 CNEL Multi-Family or Mixed Use,[1] or

ii. A significant cumulative impact would occur if the Project would contribute to a cumulative scenario that would result in the exposure of any on- or off-site, existing or reasonably foreseeable NSLU, to: (1) an increase of 10 CNEL over pre-existing noise levels of less than 50 CNEL resulting in a combined exterior noise level of 60 CNEL of greater, (2) an increase of 3 CNEL in existing plus project plus cumulative conditions if that total is above 60 CNEL, or (3) interior noise in excess of 45 CNEL. A "cumulatively considerable" project contribution to an identified significant cumulative noise impact would occur if the project would contribute more than a 1 dB increase.[2]

In the case of single-family residential detached NSLUs, exterior noise shall be 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:

1. Net lot area up to 4,000 square feet: 400 square feet
2. Net lot area 4,000 sq. ft. to 10 acres: 10 percent of net lot area
3. Net lot area over 10 acres: 1 acre

For all other land uses, exterior noise shall be measured at all exterior areas provided for group or private usable open space.

Interior Locations:

45 dB (CNEL) except for the following cases:

i. Rooms which are usually occupied only a part of the day (schools, libraries, or similar facilities); in such cases, the interior one-hour average sound level due to noise outside should not exceed 50 dBA.

ii. Corridors, hallways, stairwells, closets, bathrooms, or any room with a volume less than 490 cubic feet.

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 will exceed the applicable limits in Table 1-3.

[1] County General Plan 2011
[2] Report Format and Content Requirements 2009

Table 1-3 SAN DIEGO COUNTY CODE SECTION 36.404: SOUND LEVEL LIMITS		
Zone	**Time**	**One-Hour Average Sound Level Limits (dBA)**
(1) R-S, R-D, R-R, R-MH, A-70, A-72, S-80, S-81, S-87, S-90, S-92 and R-V and R-U with a density of less than 11 dwelling units per acre.	7:00 a.m. to 10:00 p.m. 10:00 p.m. to 7:00 a.m.	50 45
(2) R-RO, R-C, R-M, S-86, V5 and R-V and R-U with a density of 11 or more dwelling units per acre.	7:00 a.m. to 10:00 p.m. 10:00 p.m. to 7:00 a.m.	55 50
(3) S-94, V4 and all other commercial zones.	7:00 a.m. to 10:00 p.m. 10:00 p.m. to 7:00 a.m.	60 55
(4) V1, V2	7:00 a.m. to 7:00 p.m.	60
V1, V2	7:00 p.m. to 10:00 p.m.	55
V1	10:00 p.m. to 7:00 a.m.	55
V2	10:00 p.m. to 7:00 a.m.	50
V3	7:00 a.m. to 10:00 p.m. 10:00 p.m. to 7:00 a.m.	70 65
(5) M-50, M-52 and M-54	Anytime	70
(6) S-82, M-56 and M-58	Anytime	75
(7) S88 (see subsection (c) below)	-	-

(a) If the measured ambient level exceeds the applicable limit noted above, the allowable one-hour average sound level shall be the ambient noise level, plus 3 dB. The ambient noise level shall be measured when the alleged noise violation source is not operating.

(b) The sound level limit at a location on a boundary between two zones is the arithmetic mean of the respective limits for the two zones; 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 dB at the property line regardless of the zone which the extractive industry is actually located.

(c) S88 zones are Specific Planning Areas which allow for different uses. The sound level limits in Table 1-3 above that apply in an S88 zone depend on the use being made of the property. The limits in Table 1-3, subsection (1) apply to property with a residential,

agricultural, or civic use. The limits in subsection (5) apply to property with an industrial use that would only be allowed in an M50, M52, or M54 zone. The limits in subsection (6) apply to all property with an extractive use or a use that would only be allowed in an M56 or M58 zone.

(d) A fixed-location public utility distribution or transmission facility located on or adjacent to a property line shall be subject to the sound level limits of this section, measured at or beyond 6 feet from the boundary of the easement upon which the facility is located.

Section 36.409 states:

Except for emergency work, it shall be unlawful for any person to operate construction equipment or cause construction equipment to be operated, that exceeds an average sound level of 75 decibels for an 8-hour period, between 7:00 a.m. and 7:00 p.m., when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received.

Section 36.410 states:

In addition to the general limitations on sound levels in Section 36.404 and the limitations on construction equipment in section 36.409, the following additional sound level limitations shall apply:

(e) 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 shown in Table 1-4, when 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. The uses in Table 1-4 are as described in the County Zoning Ordinance.

Table 1-4
SAN DIEGO COUNTY CODE SECTION 36.410:
MAXIMUM SOUND LEVEL (IMPULSIVE) MEASURED
AT OCCUPIED PROPERTY

Occupied Property Use	Decibels (dBA)
Residential, village zoning or civic use	82
Agricultural, commercial or industrial use	85

(f) 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 Table 1-5, when 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. The uses in Table 1-5 are as described in the County Zoning Ordinance.

Table 1-5
SAN DIEGO COUNTY CODE SECTION 36.410:
MAXIMUM SOUND LEVEL (IMPULSIVE) MEASURED AT OCCUPIED PROPERTY FOR PUBLIC ROAD PROJECTS

Occupied Property Use	Decibels (dBA)
Residential, village zoning or civic use	85
Agricultural, commercial or industrial use	90

(g) 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.

Impacts associated with ground-borne vibration and noise would be significant if Project implementation would expose the uses listed in Tables 1-6 and 1-7 to ground-borne vibration or noise levels equal to or in excess of the levels shown. Note that the County guidelines for ground-borne vibration impacts state (in the footnote for Table 1-6 below) that "more specific criteria for structures and potential annoyance were developed by Caltrans (2004) and would be used to evaluate these continuous or transient sources in San Diego County." Table 1-8 presents the more specific Caltrans vibration impact criteria.

Table 1-6
GUIDELINES FOR DETERMINING THE SIGNIFICANCE OF GROUND-BORNE VIBRATION AND NOISE IMPACTS

Land Use Category	Ground-borne Vibration Impact Levels (inches/sec rms)		Ground-borne Noise Impact Levels (dB re 20 micro Pascals)	
	Frequent Events[1]	Infrequent Events[2]	Frequent Events[1]	Infrequent Events[2]
Category 1: Buildings where low ambient vibration is essential for interior operations (research and manufacturing facilities with special vibration constraints).	0.0018 [3]	0.0018 [3]	Not applicable[5]	Not applicable[5]
Category 2: Residences and buildings where people normally sleep (hotels, hospitals, residences, and other sleeping facilities). [6]	0.0040	0.010	35 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use (schools, churches, libraries, other institutions, and quiet offices). [6]	0.0056	0.014	40 dBA	48 dBA

Source: U.S. Department of Transportation, Federal Transit Administration, "Transit Noise and Vibration Impact Assessment," May 2006.

Notes:

[1] "Frequent Events" is defined as more than 70 vibration events per day. Most rapid transit Projects fall into this category.

[2] "Infrequent Events" is defined as fewer than 70 vibration events per day. This category includes most commuter rail systems.

[3] This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration sensitive manufacturing or research will require detailed evaluation to define acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.

[4] Vibration-sensitive equipment is not sensitive to ground-borne noise.

[5] There are some buildings, such as concert halls, TV and recording studios, and theaters that can be very sensitive to vibration and noise but do not fit into any of the three categories. Table 1-6 gives criteria for acceptable levels of ground-borne vibration and noise for these various types of special uses.

[6] For Categories 2 and 3 with occupied facilities, isolated events are significant when the peak particle velocity (PPV) exceeds one inch per second. Continuous or frequent intermittent vibration sources such as impact pile drivers are significant when their PPV exceeds 0.1 inch per second. More specific criteria for structures and potential annoyance were developed by Caltrans (2004) and will be used to evaluate these continuous or transient sources in San Diego County.

Table 1-7
GUIDELINES FOR DETERMINING SIGNIFICANCE OF GROUND-BORNE VIBRATION AND NOISE IMPACTS FOR SPECIAL BUILDINGS

Type of Building or Room	Ground-borne Vibration Impact Levels (inches/sec rms)		Ground-borne Noise Impact Levels (dB re 20 micro Pascals)	
	Frequent Events[1]	Infrequent Events[2]	Frequent Events[1]	Infrequent Events[2]
Concert Halls, TV Studios and Recording Studios	0.0018	0.0018	25 dBA	25 dBA
Auditoriums	0.0040	0.010	30 dBA	38 dBA
Theaters	0.0040	0.010	35 dBA	43 dBA

Source: U.S. Department of Transportation, Federal Transit Administration, "Transit Noise and Vibration Impact Assessment," May 2006.

Notes:

[1] "Frequent Events" is defined as more than 70 vibration events per day. Most rapid transit Projects fall into this category.

[2] "Occasional or Infrequent Events" are defined as fewer than 70 vibration events per day. This combined category includes most commuter rail systems.

[3] If the building will rarely be occupied when the trains are operating, there is no need to consider impact.

[4] For historic buildings and ruins, the allowable upper limit for continuous vibration to structures is identified to be 0.056 inches/second root mean square (rms). Transient conditions (single-event) would be limited to approximately twice the continuous acceptable value.

Table 1-8
CALTRANS GUIDELINE VIBRATION ANNOYANCE POTENTIAL CRITERIA

Human Response	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.1
Severe	2.0	0.4

Source: Transportation and Construction-Induced Vibration Guidance Manual, California Department of Transportation Environmental Program Environmental Engineering (2004).

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibrator pile drivers, and vibratory compaction equipment.

Sensitive Biological Species Noise Guidelines

Some studies, such as that completed by the Bioacoustics Research Team (1997), have concluded that 60 dBA is a single, simple criterion to use as a starting point for passerine impacts until more specific research is done (County 2010). Associated guidelines produced by the U.S. Fish and Wildlife Service (USFWS) require that noise be limited to a level not to exceed an hourly limit of 60 dBA L_{EQ} or the average ambient noise level, whichever is greater, at the edge of habitat during the breeding season. This threshold has consistently been applied to sensitive avian species by various jurisdictions, including San Diego County. Therefore, if proposed construction or operation occurs adjacent to an occupied habitat during the breeding season, planning for the control of potential noise impacts would be required.

2.0 ENVIRONMENTAL SETTING

2.1 Surrounding Land Uses

The area surrounding the Project site consists predominantly of single-family homes. Located to the northeast of the site is a light industrial business park, to the west are single-family homes, to the east are semi-rural single family homes, and to the south is the planned 742-residential unit Harmony Grove Village Specific Plan currently under construction.

2.2 Surrounding Roadway Descriptions

Eden Valley Lane, which runs between Country Club Drive and the Project entrance at Neighborhood 3, would provide primary access to the Project. Mt. Whitney Road, which lies immediately to the south of Neighborhoods 1 and 2, would provide secondary access to the Project site. Additionally, two new access roads would be paved in the southernmost section of the Project site (Street 5A [N] and Street 5A [S]), and would provide access to Neighborhood 5 from Country Club Drive. All of the aforementioned currently existing and planned access roads for this site are accessed via Country Club Drive, which lies to the east of the Project site. Country Club Drive is a two-lane roadway with a 45-mile per hour (mph) posted speed limit. Neither Eden Valley Lane nor Mt. Whitney Road has posted speed limit signs; however, the speed limit on these residential roads is assumed to be 25 mph.

2.3 Airport Noise

The Project site is not located near any active airports. The closest airport is the McClellan-Palomar Airport in Carlsbad, California, which is approximately 19 miles away from the Project site.

2.4 Existing Noise Environment

The dominant noise source in the vicinity of the Project site is the moderate traffic noise on Country Club Drive.

2.5 Future Noise Environment

The surrounding area is partially developed, and many of the roads in the immediate vicinity are currently dirt roads. It is reasonable to assume that the area would experience an increase in future roadway noise levels due to the development of nearby areas that currently consist largely of open space. The completion of the Harmony Grove Village Project, a large multi-family housing development immediately to the south of the Project site, would increase traffic volumes in the surrounding area. The traffic volume increases related to the Harmony Grove Village Project are included in the most recent draft of the Traffic Impact Analysis (TIA; Linscott, Law, and Greenspan [LLG], March, 2015) for the Project, and were incorporated in the modeling in this report.

3.0 STUDY METHODS, EQUIPMENT AND PROCEDURES

This section discusses the methods and procedures used in this Acoustical Report, including the selection of noise measurement and receiver locations, noise measurement procedures, and noise impact evaluation.

3.1 Methodology

A "one-hour" equivalent sound level measurement (L_{EQ}, A-Weighted) was recorded for two locations near the Project site. During the on-site noise measurements, start and end times were recorded and vehicle counts were made for cars, medium trucks (double-tires/two axles), and heavy trucks (three or more axles) for the corresponding road segment(s).

The measurement time was sufficiently long for a representative traffic volume to occur and the noise level (L_{EQ}) to stabilize. A 10-minute measurement was taken at the first noise monitoring site, and a 15-minute measurement was taken at the second site. The vehicle counts were then converted to one-hour equivalent volumes by applying an appropriate factor. Other field data gathered included measuring or estimating distances.

3.2 Equipment

The following equipment was used to measure existing noise levels at the Project site:

- Larson Davis System LxT Integrating Sound Level Meter
- Larson Davis Model CA250 Calibrator
- Windscreen and tripod for the sound level meter
- Digital camera

The sound level meter was field-calibrated immediately prior to the noise measurements to ensure accuracy. All sound level measurements conducted and presented in this report were made with a sound level meter that conforms to the American National Standards Institute (ANSI) specifications for sound level meters (ANSI SI.4-1983 R2001). All instruments were maintained with National Bureau of Standards traceable calibration per the manufacturers' standards.

3.3 Noise Modeling Software

Modeling of the outdoor noise environment for this report was accomplished using two computer noise models: Computer Aided Noise Abatement (CADNA) version 3.6 and Traffic Noise Model (TNM) version 2.5. CADNA is a model-based computer program developed by *DataKustik* for predicting noise impacts in a wide variety of conditions. CADNA assists in the calculation, presentation, assessment, and mitigation of noise exposure. It allows for the input of project-related information, such as noise source data, barriers, structures, and topography to create a detailed CADNA model, and uses the most up-to-date calculation standards to predict outdoor noise impacts. CADNA traffic noise prediction is based on the data and methodology used in the TNM. The TNM was released in February 2004 by the U.S. Department of

Transportation, and calculates the daytime average Hourly L_{EQ} from three-dimensional model inputs and traffic data. The TNM used in this analysis was developed from Computer Aided Design (CAD) plans provided by the Project Applicant. Input variables included road alignment, elevation, lane configuration, area topography, existing and planned noise control features, projected traffic volumes, estimated truck composition percentages, and vehicle speeds.

The one-hour L_{EQ} noise level is calculated utilizing peak-hour traffic; peak-hour traffic volumes can be estimated based on the assumption that 8 to 10 percent of the average daily traffic would occur during a peak hour. The model-calculated one-hour L_{EQ} noise output is the equivalent to the CNEL (Caltrans Technical Noise Supplement, November 2009).

3.4 Summary of Site-Specific Features Included in CADNA Model

The CADNA and TNM computer noise models include the existing area topography. Please refer to Appendix A for locations of on-site structures.

4.0 EXISTING NOISE ENVIRONMENT

As described in Section 2.4, the dominant existing noise source at the Project site is traffic noise from Country Club Drive to the east of the Project site.

4.1 Site Noise Measurements and Comparison Calculations

Traffic volumes for Country Club Drive at Mt. Whitney Road, and Country Club Drive just south of Hill Valley Drive near Dinara Drive were recorded for automobiles, medium-size trucks, and heavy trucks during the measurement period. Two locations were measured in the Project vicinity, because traffic volumes were too low to use for model correlation. After a continuous 5 to 15-minute sound level measurement, minimal changes in the L_{EQ} were detectable and the results were recorded. The measurement at each site was allowed to stabilize, and then was stopped; the measurement and count only provide background information, and will not be utilized in model correlation. The measured noise level and related weather conditions are shown in Table 4-1. Traffic counts for the timed measurement and the one-hour equivalent volumes are shown in Table 4-2.

Table 4-1
ON-SITE NOISE MEASUREMENT CONDITIONS AND RESULTS

Date	January 21, 2013
Conditions	Sunny, clear skies, 9 mph breeze from the west, temperature in the mid-70s with low humidity
Time: Measurement 1	12:45 p.m. – 12:55 p.m.
Location 1	Country Club Drive and Mt. Whitney Road
Distance to Edge of Roadway from Noise Monitor Microphone	~37 feet
Measured Noise Level 1	56.6 dBA L_{EQ}
Time: Measurement 2 (site visit 1)	1:30 p.m. – 1:35 p.m.
Location 2 (site visit 1)	Country Club Drive south of Hill Valley Drive (near Dinara Drive).
Distance to Edge of Roadway from Noise Monitor Microphone	~37 feet
Measured Noise Level 2 (site visit 1)	52.5 dBA
Date	February 7, 2013
Conditions	Low Fog, 3 mph breeze from the west-northwest, temperature in the low 40s
Time: Measurement 3 (site visit 2)	8:15 p.m. – 8:30 a.m.
Distance to Edge of Roadway from Noise Monitor Microphone	Approximately 32 feet

Table 4-1 (cont.) ON-SITE NOISE MEASUREMENT CONDITIONS AND RESULTS	
Location 2 (site visit 2)	Country Club Drive south of Hill Valley Drive (near Dinara Drive)
Measured Noise Level 2 (site visit 2)	56.4 dBA

*Noise Measurements conducted at Location 2 on two different days to provide a comparison

Note: A noise measurement was taken at Country Club Drive South of Hill Valley Drive on January 21, 2013 but repeated on February 7, 2013 as the first measurement was terminated after only 5 minutes. The traffic composition was calculated utilizing the two January 21 measurements; however most of the planning was based on the February 7 measurement at Country Club Drive South of Hill Valley Drive, and the January 21 measurement at the Country Club Drive and Mt. Whitney Road intersection.

Table 4-2
TRAFFIC COUNTS FROM SITE VISIT

Roadway	Traffic	Autos	MT[1]	HT[2]
January 21, Southern Measurement				
Country Club Drive and Mt. Whitney Road	10-minute Count	20	2	1
	One-hour Equivalent	120	12	6
Percent		87%	9%	4%
January 21, Northern Measurement				
Country Club Drive south of Hill Valley Drive (Near Dinara Drive)	5-minute Count	16	0	0
	One-hour Equivalent	192	0	0
Percent		100%	0%	0%
Average January 21 Traffic Composition – Country Club Drive		**94%**	**4%**	**2%**
February 7, Northern Measurement[3]				
Country Club Drive south of Hill Valley Drive (Near Dinara Drive)	15-minute Count	42	2	4
	One-hour Equivalent	168	8	16
Percent		**88%**	**4%**	**8%**

[1] Medium Trucks (double tires/two axles)
[2] Heavy Trucks (three or more axles)
[3] Traffic count from February 7,2013 site visit not utilized to calculate traffic composition for modeling

To determine the existing traffic composition percentages for the street segments analyzed, the composition data collected during the two noise measurements from the original site visit was utilized. These two noise measurements were both conducted on Country Club Drive approximately 0.6 miles apart. The traffic composition used for modeling was calculated by finding the average number of cars, medium trucks, and heavy trucks that were present on Country Club Drive at the two examined intersections during a one hour equivalent interval. This yielded a composition of 94 percent cars, 4 percent medium trucks, and 2 percent heavy trucks. Some of the truck traffic on this road could likely be attributed to the current

construction underway south of the Project site at the Harmony Grove Village project site; however to account for the worst-case scenario, all of these potentially temporary truck trips were included. Since Eden Valley Lane, Kauana Loa Drive, and Mt. Whitney Drive are currently residential roads and no trucks were seen traveling on these segments, these roadways were assumed to have 100 percent automobile vehicle traffic for existing conditions. Table 4-3 outlines the vehicle composition percentages utilized for modeling the existing conditions in the vicinity of the Project.

Table 4-3
EXISTING TRAFFIC COMPOSITION

Roadway	Cars (%)	MT (%)	HT (%)
Eden Valley Lane	100%	0%	0%
Country Club Drive	94%	4%	2%
Kauana Loa Drive	100%	0%	0%
Mt. Whitney Road	100%	0%	0%

MT = Medium truck, HT = Heavy truck

Future traffic composition was assumed to be the same as existing for Country Club Drive, as the existing conditions take into consideration truck trips that are likely occurring due to current construction (are already "worst-case" conditions). The other residential segments are assumed to have slightly more truck trips with future conditions than with existing conditions, so a worst-case vehicle mix assumption of 97 percent cars, 2 percent medium trucks, and 1 percent heavy trucks was used for modeling. Table 4-4 outlines the traffic composition percentages utilized for modeling the future conditions in the vicinity of the Project.

Table 4-4
FUTURE TRAFFIC COMPOSITION

Roadway	Cars (%)	MT (%)	HT (%)
Eden Valley Lane	97%	2%	1%
Country Club Drive	94%	4%	2%
Kauana Loa Drive	97%	2%	1%
Mt. Whitney Road	97%	2%	1%

Future Conditions with Project: Existing + Project, Existing + Cumulative + Project, Existing + cumulative projects (2020), Year 2035 w/project land use traffic volumes, Year 2035 w/general plan land use project traffic volumes.
MT = Medium truck, HT = Heavy truck

4.2 Calculated Noise Levels

As noted in the roadway description, Country Club Drive has a 45 mph posted speed limit, although observed traffic on this street typically travels at lower speeds and was modeled at 30 mph. Estimated and measured noise levels along Country Club Drive, as well as the difference between the two levels, are shown in Table 4-5. A difference of less than 2 dBA is

considered sufficiently accurate without an adjustment to the CADNA model. Accordingly, no correction was applied for this model.

Table 4-5
CALCULATED VERSUS MEASURED TRAFFIC NOISE DATA

Receiver Position	Calculated	Measured	Difference	Correction Factor
Country Club Drive and Mt. Whitney Road January 21, 2013	57.9 dBA L_{EQ}	56.6 dBA L_{EQ}	1.3 dBA L_{EQ}	none needed
Country Club Drive south of Hill Valley Drive (near Dinara Drive) January 21, 2013	54.4 dBA L_{EQ}	52.5 dBA L_{EQ}	1.9 dBA L_{EQ}	none needed