5.6 NOISE

This section of the DSEIR describes the noise impacts of the Proposed Project, as compared to the Certified EIR. It reviews the fundamentals of sound; reviews federal, state, and local noise guidelines, policies, and standards; reviews noise levels at existing off-site receptor locations; evaluates potential noise impacts associated with the Proposed Project as compared to the Certified EIR; and recommends additional mitigation measures, where necessary, to reduce noise impacts of the Proposed Project. This evaluation uses procedures and methodologies as specified by the City of Irvine. This section is based, in part, on the following technical studies and these studies are incorporated herein by reference.

- *Irvine Unified School District High School No. 5 Project Traffic Impact Analysis*, IBI Group, August 30, 2013 (Traffic Study for the Proposed Project, included as Appendix F of this DSEIR).

- *Heritage Fields Project 2012 General Plan Amendment / Zone Change Traffic Impact Analysis*, Urban Crossroads, June 21, 2012 (" Traffic Study for the 2012 Modified Project ").

5.6.1 Environmental Setting

Terminology/Noise Descriptors

Noise is most often defined as unwanted sound. Although sound can be easily measured, the perception of noise and the physical response to sound complicate the analysis of its impact on people. People judge the relative magnitude of sound sensation in subjective terms such as “noisiness” or “loudness.”

The following are brief definitions of terminology used in this section:

- Sound. A disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.

- Noise. Sound that is loud, unpleasant, unexpected, or otherwise undesirable.

- Decibel (“dB”). A unitless measure of sound on a logarithmic scale.

- A-Weighted Decibel (“dBA”). An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.

- Equivalent Continuous Noise Level (“L_{eq}”). The mean of the noise level averaged over the measurement period, regarded as an average level.

- Day-Night Level (“L_{dn}”). The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the sound levels occurring during the period from 10:00 PM to 7:00 AM.

- Community Noise Equivalent Level (“CNEL”). The energy average of the A-weighted sound levels occurring during a 24-hour period with 5 dB added to the levels occurring during the period from 7:00 PM to 10:00 PM and 10 dB added to the sound levels occurring during the period from 10:00 PM to 7:00 AM.

Note that L_{dn} and CNEL values rarely differ by more than 1 dB. As a matter of practice, L_{dn} and CNEL values are considered to be equivalent and are treated as such in this assessment.

Characteristics of Sound

When an object vibrates, it radiates part of its energy as acoustical pressure in the form of a sound wave. Sound can be described in terms of amplitude (loudness), frequency (pitch), or duration (time). The human hearing system is not equally sensitive to sound at all frequencies. Therefore, to approximate this human, frequency-dependent response, the A-weighted filter system is used to adjust measured sound levels. The normal range of human hearing extends from approximately 0 dBA to 140 dBA.

Unlike linear units such as inches or pounds, decibels are measured on a logarithmic scale, representing points on a sharply rising curve. Because of the physical characteristics of noise transmission and of noise perception, the relative loudness of sound does not closely match the actual amounts of sound energy. Table 5.6-1 presents the subjective effect of changes in sound pressure levels.

Table 5.6-1

Decibel Changes, Loudness and Energy Loss

Sound Level Change	Relative Loudness	Acoustic Energy Loss
0 dBA	Reference	0%
-3 dBA	Barely Perceptible Change	50%
-5 dBA	Readily Perceptible Change	67%
-10 dBA	Half as Loud	90%
-20 dBA	1/4 as Loud	99%
-30 dBA	1/8 as Loud	99.9%

Source: *Highway Traffic Noise Analysis and Abatement Policy and Guidance*, U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch, June 1995.

Sound levels are generated from a source and their decibel level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. This phenomenon is known as spreading loss. Generally, sound levels from a point source will decrease by 6.0 dBA for each doubling of distance. Sound levels for a highway line source vary differently with distance because sound pressure waves propagate along the line and overlap at the point of measurement. A closely spaced, continuous line of vehicles along a roadway becomes a line source and produces a 3.0 dBA decrease in sound level for each doubling of distance. However, experimental evidence has shown that where sound from a highway propagates close to "soft" ground (e.g., plowed farmland, grass, crops, etc.), a more suitable drop-off rate to use is not 3.0 dBA but rather 4.5 dBA per distance doubling (FHWA 2010).

When sound is measured for distinct time intervals, the statistical distribution of the overall sound level during that period can be obtained. The L_{eq} is the most common parameter associated with such measurements. The L_{eq} metric is a single-number noise descriptor that represents the average sound level over a given period of time. For example, the L_{50} noise level is the level that is exceeded 50 percent of the time. This level is also the level that is exceeded 30 minutes in an hour. Similarly, the L_{02}, L_{08} and L_{25} values are the noise levels that are exceeded 2, 8, and 25 percent of the time or 1, 5, and 15 minutes per hour. Other values typically noted during a noise survey are the L_{min} and L_{max}. These values represent the minimum and maximum root-mean-square noise levels obtained over the measurement period.

Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, State law requires that, for planning purposes, an artificial dB increment be added to quiet-time noise levels in a 24-hour noise descriptor called the CNEL or L_{dn}.

Effects of Noise Exposure

Human response to sound is highly individualized. Annoyance is the most comment issue regarding community noise. Physical damage to human hearing can occur with prolonged exposure to noise levels higher than 85 dBA. High ambient or background noise levels are widespread and generally more concentrated in urban areas than in less developed areas. Elevated ambient noise levels can result in noise interference (e.g., speech interruption/masking, sleep disturbance, disturbance of concentration) and cause annoyance. Table 5.6-2 shows the typical noise levels emitted by common noise sources.

Table 5.6-2
Typical Noise Levels and Their Subjective Loudness and Effects

Common Outdoor Activities	Common Indoor Activities	A-Weighted Noise Level (dBA)	Subjective Loudness	Effects of Noise
Threshold of Pain		140	Intolerable or deafening	Hearing Loss
Near Jet Engine		130		
		120		
Jet Flyover at 1,000 ft	Rock Band	110		
Loud Auto Horn		100	Very Noisy	
Gas Lawn Mower at three feet		90		
Diesel Truck at 50 feet at 50 mph	Food Blender at 3 feet	80		Speech Interference
Noisy Urban Area, Daytime	Vacuum Cleaner at 10 feet	70	Loud	
Heavy Traffic at 300 ft	Normal speech at 3 ft	60		
Quiet Urban Daytime	Large Business Office	50	Moderate	
Quiet Urban Nighttime	Theater, Large Conference Room (background)	40		Sleep Disturbance
Quiet Suburban Nighttime	Library	30	Faint	No Effect
Quiet Rural Nighttime	Bedroom at Night, Concert Hall (background)	20		
	Broadcast/Recording Studio	10	Very Faint	
Lowest Threshold of Human Hearing	Lowest Threshold of Human Hearing	0		

Source: Noise Technical Supplement by Caltrans, 2009.

Vibration Fundamentals

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Vibration is normally associated with activities such as railroads or vibration-intensive stationary sources, but can also be associated with construction equipment such as jackhammers, pile drivers, and hydraulic hammers. Vibration

displacement is the distance that a point on a surface moves away from its original static position. The instantaneous speed that a point on a surface moves is described as the velocity and the rate of change of the speed is described as the acceleration. Each of these descriptors can be used to correlate vibration to building damage, and acceptable equipment vibration levels.

During construction of a development project, the operation of construction equipment can cause groundborne vibration. During the operational phase of a project, receptors may experience annoyance due to noise generated from vibration of a structure or items within a structure. This type of vibration is best measured in velocity and acceleration.

The three main wave types of concern in the propagation of groundborne vibrations are surface or Rayleigh waves, compression or P-waves, and shear or S-waves.

- Surface or Rayleigh waves travel along the ground surface. They carry most of their energy along an expanding cylindrical wave front, similar to the ripples produced by throwing a rock into a lake. The particle motion is more or less perpendicular to the direction of propagation (known as retrograde elliptical).

- Compression or P-waves are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal, in a push-pull motion. P-waves are analogous to airborne sound waves.

- Shear or S-waves are also body waves, carrying their energy along an expanding spherical wave front. Unlike P-waves, however, the particle motion is transverse, or perpendicular to the direction of propagation.

The peak particle velocity ("PPV") or the root mean square ("RMS") velocity is usually used to describe vibration amplitudes. PPV is defined as the maximum instantaneous peak of the vibration signal and RMS is defined as the square root of the average of the squared amplitude of the signal. PPV is more appropriate for evaluating potential building damage.

The units for PPV velocity is normally inches per second (in/sec). Often, vibration is presented and discussed in dB units in order to compress the range of numbers required to describe the vibration. In this study, all PPV and RMS velocity levels are in in/sec and all vibration levels are in dB relative to one microinch per second (abbreviated as VdB). Typically, groundborne vibration generated by human activities attenuates rapidly with distance from the source of the vibration. Even the more persistent Rayleigh waves decrease relatively quickly as they move away from the source of the vibration. Human-made vibration problems are, therefore, usually confined to short distances (500 feet or less) from the source.

Construction operations generally include a wide range of activities that can generate groundborne vibration. In general, blasting and demolition of structures generate the highest vibrations. Vibratory compactors or rollers, pile drivers, and pavement breakers can generate perceptible amounts of vibration at distances within 200 feet of the vibration sources. Heavy trucks can also generate groundborne vibrations, which vary depending on vehicle type, weight, and pavement conditions. Potholes, pavement joints, discontinuities, differential settlement of pavement, etc., all increase the vibration levels from vehicles passing over a road surface. Construction vibration is normally of greater concern than vibration of normal traffic on streets and freeways with smooth pavement conditions. Trains generate substantial quantities of vibration due to their engines, steel wheels, and heavy loads.

Regulatory Setting

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise. The City regulates noise through the City of Irvine Municipal Code, Chapter 2, Noise (Sections 6-8-201 through 6-8-209), also known as the City's Noise Ordinance, discussed below. Potential noise impacts were evaluated based on the City of Irvine Municipal Code and General Plan, as well as with Federal Transit Administration ("FTA") methodology, to determine whether a significant adverse noise impact would result from the construction and operation of the Proposed Project as compared to the 2011 Approved Project.

State of California Noise Requirements

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise insulation standards, and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared according to guidelines adopted by the Governor's Office of Planning and Research. The purpose of the Noise Element is to "limit the exposure of the community to excessive noise levels."

In addition, CEQA requires that all known environmental effects of a project be analyzed, including environmental noise impacts. Under CEQA, a project has a significant impact if the project exposes people to noise levels in excess of thresholds, which can include standards established in the local general plan or noise ordinance.

State of California Building Code

The State of California's noise insulation standards are codified in the California Code of Regulations, Title 24, Building Standards Administrative Code, Part 2, and the California Building Code. These noise standards are applied to new construction in California for the purpose of controlling interior noise levels resulting from exterior noise sources. The regulations specify that acoustical studies must be prepared when noise-sensitive structures, such as residential buildings, schools, or hospitals, are located near major transportation noise sources, and where such noise sources create an exterior noise level of 60 dBA CNEL or higher. Acoustical studies that accompany building plans must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. Section A5.507.5, Acoustical Control, of the California Green Building Code requires that the construction of new public schools and community colleges complies with acoustical standards. The maximum background noise level at unoccupied, furnished classrooms must have a maximum background noise level of no more than 45 dBA $L_{eq.}$

City of Irvine

Land Use Compatibility Criteria

The noise standards specified in the Noise Element of the City of Irvine General Plan are a guideline to evaluate the acceptability of the noise levels generated by traffic flow. These standards are used for assessment of long-term traffic-related noise impacts on land uses. The City uses the state's land use compatibility standards shown below in Table 5.6-3 to determine the compatibility of a proposed land use based on the exterior noise environment.

Table 5.6-3
State of California Land Use Compatibility for Exterior Community Noise

Land Use Category	Noise Range (L_{dn} or CNEL), dBA			
	I	II	III	IV
Passively used open spaces	50	50–55	55–70	70+
Auditoriums, concert halls, amphitheaters	45–50	50–65	65–70	70+
Residential: low-density single-family, duplex, mobile homes	50–55	55–70	70–75	75+
Residential: multifamily	50–60	60–70	70–75	75+
Transient lodging: motels, hotels	50–60	60–70	70–80	80+
Schools, libraries, churches, hospitals, nursing homes	50–60	60–70	70–80	80+
Actively used open spaces: playgrounds, neighborhood parks	50–67	–	67–73	73+
Golf courses, riding stables, water recreation, cemeteries	50–70	–	70–80	80+
Office buildings, business commercial and professional	50–67	67–75	75+	–
Industrial, manufacturing, utilities, agriculture	50–70	70–75	75+	–

Source: Office of Noise Control, California Department of Health, 1976.
Noise Range I—Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
Noise Range II—Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.
Noise Range III—Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
Noise Range IV—Clearly Unacceptable: New construction or development should generally not be undertaken.

Based on these standards, the City has developed policies to ensure land use compatibility when placing new land uses. For new schools, an ambient noise level ranging from 50 to 60 dBA CNEL is considered normally acceptable, between 60 and 70 dBA CNEL conditionally acceptable, between 70 and 80 dBA CNEL normally unacceptable, and over 80 dBA CNEL clearly unacceptable.

Transportation-Related Noise Standards

To control transportation-related noise, the Noise Element of the City of Irvine General Plan establishes guidelines, listed in Table 5.6-4, below, for acceptable community noise levels. The City of Irvine General Plan provides specific noise level standards for all land use categories that are used to regulate traffic-related noise level impacts (from noise sources such as arterial roads, freeways, airport and railroads). For noise-sensitive uses that contain habitable dwellings, the Noise Element establishes both exterior and interior noise level standards.

Table 5.6-4
City of Irvine Interior and Exterior Noise Standards

Land Use Categories		Energy Average (dBA CNEL)	
Categories	Uses	Interior[1]	Exterior[2]
Residential	Single family Multi-Family	45[3] / 55[4]	65[7]
	Mobile Home	–	65[5]
Commercial/Industrial	Hotel, motel, transient lodging	45	65[6]
	Commercial, retail, bank, restaurant	55	–
	Office building, professional office, research & development	50	–
	Amphitheater, concert hall, auditorium, meeting hall	45	–
	Gymnasium (Multipurpose)	50	–
	Health Clubs	55	–
	Manufacturing, warehousing, wholesale, utilities	65	–
Institutional	Hospital, school classroom	45	–
	Church, library	45	65
Open Space	Parks	45	–

Source: Table F-1 of the City of Irvine General Plan Noise Element.
Interpretation:
[1] Interior environment excludes bathrooms, toilets, closets, and corridors.
[2] Limited to private yard of single family homes, multifamily private patio or balcony served by a means of exit from inside, mobile home park, hospital patio, park's picnic area, school's playground, and hotel and motel recreation areas.
[3] Noise requirement with closed windows. Mechanical ventilation system or other means of natural ventilation shall be provided pursuant to Appendix Chapter 12, Section 1208 of the Uniform Building Code.
[4] Noise level with open windows, if they are used to meet natural ventilation requirement.
[5] Exterior noise level such that interior noise level will not exceed 45 dB CNEL.
[6] Except those areas affected by aircraft noise.
[7] Multi-family developments with balconies that do not meet the 65 CNEL are required to provide occupancy disclosure notices to all future tenants regarding potential noise impacts.

For schools, the Noise Element requires that exterior noise levels at school playgrounds not exceed 65 dBA CNEL, and that noise levels not exceed 45 dBA CNEL for classrooms.

Non-transportation/Stationary Source Noise Standards

The City's Noise Ordinance (Irvine Municipal Code, Title 6 [Public Works], Division 8 [Pollution], Chapter 2 [Noise]) (adopted in 1975 and revised in February 2005) establishes the maximum permissible noise level from a stationary source that may intrude into adjoining property. Section 6-8-204 (General Provision) of the City's Noise Ordinance establishes noise level standards for various land use categories affected by stationary noise sources. For residential properties and schools, the exterior noise level shall not exceed 55 dBA during daytime hours (7:00 AM to 10:00 PM) and shall not exceed 50 dBA during the nighttime hours (10:00 PM to 7:00 AM) for more than 30 minutes in any hour. For events with shorter duration, these noise levels are adjusted upwards accordingly, as shown in Table 5.6-5, *City of Irvine Exterior Noise Standards by Noise Zone*.

Table 5.6-5
City of Irvine Exterior Noise Standards by Noise Zone

Noise Zone	Time Interval	Noise Standard (L_{eq})				
		L_{50}	L_{25}	L_8	L_2	L_{max}
Zone 1: hospitals, libraries, churches, schools, and residential properties	7:00 AM to 10:00 PM	55	60	65	70	75
	10:00 PM to 7:00 AM	50	55	60	65	70
Zone 2: professional office and public institutional	Anytime	55	60	65	70	75
Zone 3: commercial, excluding professional office	Anytime	60	65	70	75	80
Zone 4: industrial	Anytime	70	75	80	85	90

Source: City of Irvine, Municipal Code, Title 6, Division 8, Chapter 2, Noise.
Noise standards shall be reduced by five dB for impact, or predominant tone noise or for noises consisting of speech or music. In the event that the noise source and the affected property are within different noise zones, the noise standards of the affected property shall apply.

Maintenance of property may exceed the noise standards, so long as maintenance activities that exceed the noise limits in Table 5.6-5 are restricted to the hours of 7:00 AM through 7:00 PM, Monday through Friday, or 9:00 AM through 6:00 PM on Saturdays.[1] In addition, the City further restricts the maximum noise levels of leaf blowers and hours of use to 8:00 AM through 5:00 PM, Monday through Friday, and 9:00 AM through 5:00 PM on Saturdays.[2]

Construction Noise Standards

The City's Noise Ordinance regulates the timing of construction activities and includes special provisions for sensitive land uses. Section 6-8-205.A (Special Provisions) of the Municipal Code states that construction activities and agricultural operations may occur between the hours of 7:00 AM and 7:00 PM, Monday through Friday, and 9:00 AM to 6:00 PM on Saturdays. No construction shall be permitted outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the Chief Building Official or authorized representative. Trucks, vehicles, and equipment that are making or involved with deliveries, loading, or transfer of materials, equipment service, or maintenance of any devices or appurtenances for or within any construction project in the City are also subject to these prohibitions.

Noise Standard Exemptions

The City's Noise Ordinance also determines what specific activities are exempt from the noise provisions. Section 6-8-205.D of the Municipal Code states that activities lawfully conducted on public parks, public playgrounds, and public or private school grounds are exempt from the Noise Ordinance's provisions.

Existing Ambient Noise

The project site is currently vacant. Traffic flows on Irvine Boulevard are the dominant noise source in the vicinity of the project site. To ascertain the existing noise at and adjacent to the project site, noise level measurements were take on August 28, 2013, between 7:40 and 8:15 PM. Noise monitoring was performed using a Larson-Davis Model 820 Type 1 integrating/logging sound level meter. The unit was

[1] City of Irvine Municipal Code, Section 6-8-205B.
[2] *Ibid.*, Section 6-8-205C.

field calibrated immediately prior to the first reading. The calibration was rechecked after the readings and no meter drift was noted. Short-term (approximately 15 minutes) noise readings were taken at two locations near the project site. The measurement data would be representative of existing ambient noise conditions in the vicinity of the project site during major events such as football games. The measurement locations are shown in Figure 5.6-1, *Noise Measurement Locations*, and the measurement results are summarized in Table 5.6-6, *Ambient Noise Level Measurements*.

Table 5.6-6
Ambient Noise Level Measurements

Monitoring Location	Start Time[1]	L_{min}	L_{eq}	L_{max}
Monitoring Location 1	7:40 PM	36.4	47.7	57.8
Monitoring Location 2	8:00 PM	40.2	64.3	74.9

[1] All noise level measurements were taken on August 28, 2013 and lasted for 15 minutes.

Monitoring Location 1. This reading was taken at the northwestern portion of the project site, approximately 500 feet south of Irvine Boulevard. This location is in the area where baseball fields would be constructed along the northwestern boundary of the project site. This location also represents the noise level at the portion of the site where the football stadium would be constructed. The primary source of noise was from traffic on Irvine Boulevard and aircraft over-flights.

Monitoring Location 2. This reading was taken at the northwestern portion of the project site, approximately 100 feet from the centerline of Irvine Boulevard. This location is in the area where baseball fields would be constructed along the northwestern boundary of the project site. This location also represents the noise level at the portion of the site where the tennis courts would be constructed. The primary source of noise was from traffic on Irvine Boulevard and aircraft overflights.

5.6.2 Thresholds of Significance

Based on Appendix G of the CEQA Guidelines, the District has determined that a project would normally have a significant effect on the environment if the project would result in:

N-1 Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

N-2 Is the proposed school site located adjacent to or near a major arterial roadway or freeway whose noise generation may adversely affect the educational program?

N-3 Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

N-4 A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

N-5 A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

N-6 For a project located within an airport land use plan or where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels.

N-7 For a project within the vicinity of a private airstrip, expose people residing or working the project area to excessive noise levels.

The Initial Study, included as Appendix A, substantiates that the following impacts of the proposed high school as compared to the 2011 Approved Project, would be than significant: N-6 and N-7. Therefore, Impacts N-6 and N-7 will not be addressed further in this section.

Applicable Thresholds

While the District does not have specific thresholds for noise and vibration, the following thresholds were utilized in this analysis to evaluate potential noise and vibration impacts with the project. These thresholds are consistent with criteria utilized by the City of Irvine to evaluate project impacts and are consistent with the thresholds included in the Certified EIR.

Noise Compatibility

The noise standards specified in the City's Noise Element are used to evaluate the acceptability of the noise levels under the thresholds stated above. These criteria are consistent with the State of California's noise/land use compatibility guidelines. The development of schools if considered "normally acceptable" for land uses exposed to noise levels of up to 60 dBA CNEL, "conditionally acceptable" for land uses exposed to noise levels between 60 and 70 dBA CNEL, and "conditionally unacceptable" for land uses exposed to noise levels between 70and 80 dBA CNEL. The exterior noise standard is 65 dBA CNEL for schools playground areas. Finally, the California Building Code requires classrooms to be exposed to less than 45 dBA.

Stationary Source Noise

The City's Noise Ordinance establishes the maximum permissible noise level that may intrude into an adjoining property or dwelling unit (see Table 5.6-5, above).

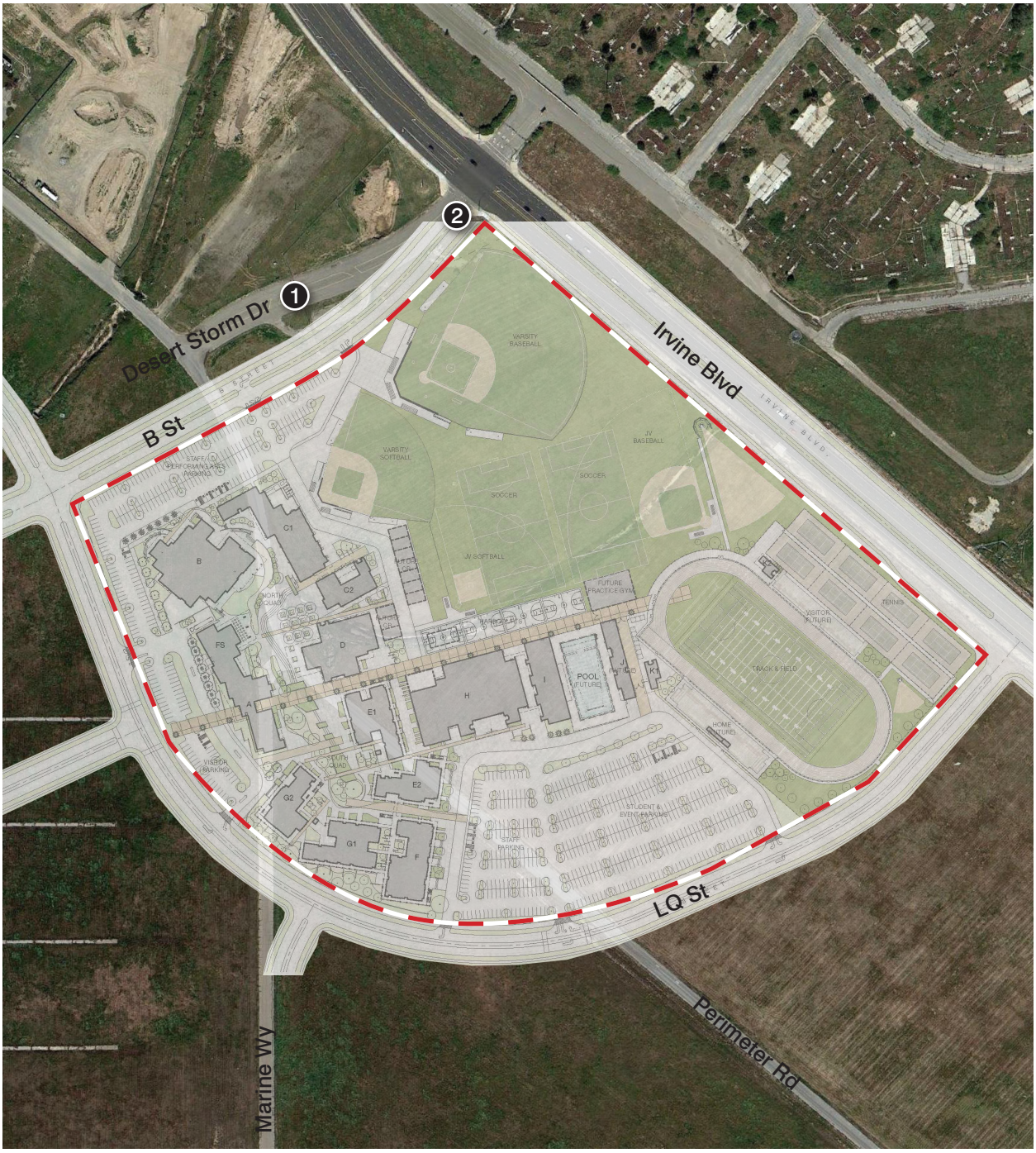
Substantial Increase in Traffic Noise Levels

Consistent with the noise analysis in the 2011 Certified EIR, a traffic noise screening analysis threshold of 1.5 dBA is used for all project-related traffic noise level increases where the resulting noise levels would be in excess of 65 dBA. Although changes in noise levels of 3 dBA are considered "barely perceptible," this DSEIR and the 2011 SEIR utilizes this 1.5 dBA noise level screening threshold to be conservative.

5.6.3 2011 Approved Project

The 2011 Approved Project includes 4,894 residential units, approximately 6,585,000 square feet of non-residential uses, and associated infrastructure within the Approved Project Site. Of the non-residential uses, 5,312,564 square feet are located within the Heritage Fields Development Districts and the balance of 1,273,030 square feet within the Great Park Neighborhoods, county parcels, and other areas.

Noise Measurement Locations



Project Site

1 Noise Measurement Locations (2)

0 400
Scale (Feet)

Source: Google Earth 2012

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Operational Mobile-Source Noise

The Certified EIR concluded that no increases of 1.5 dBA or greater were projected to occur with implementation of the 2011 Approved Project and, as a result, no project or cumulative noise impacts associated with any of the roadway segments analyzed would occur.

Operational Stationary Source Noise

Project-related sources of stationary noise would include activities associated with commercial and retail uses, including parking lots, mechanical equipment, and loading/unloading activities, and activities related to residential uses, including air conditioners, yard care equipment, and outdoor activities. However, the Certified EIR concluded that no significant impacts would occur, as stationary source noise is regulated by the City through the City's Municipal Code to ensure that they are controlled to acceptable levels. Consequently, the Certified EIR concluded that the 2011 Approved Project would not result in stationary source project-level or cumulative noise impacts.

Construction Noise and Vibration

As discussed in the Certified EIR, to minimize the potential construction noise impacts associated with the 2011 Approved Project and to ensure that the greatest distance between noise sources and sensitive receptors during construction activities, the project applicant or its successor will be required to implement plans, programs, or policies ("PPPs") 8-1 and 8-3 and project design features ("PDFs") 8-1 that were set forth in the 2011 SEIR. Future projects within the Approved Project Site and other off-site projects within the vicinity of the Approved Project Site will be required to comply with the City noise regulations or those of other adjacent jurisdictions, which reduce potential impacts to a less than significant level. Therefore, Certified EIR concluded that construction-related noise impacts would be controlled within the areas close to each construction site and would therefore be unlikely to combine with noise generated from other construction sites. The Certified EIR concluded that with implementation of the existing regulations, PPPs, PDFs and mitigation measures, potential noise impacts associated with 2011 Approved Project would be reduced to a level that is less than significant.

5.6.4 2012 Modified Project

The 2012 SSEIR concluded that the overall noise impact of the 2012 Modified Project would be similar to the impact of the 2011 Approved Project.

5.6.5 Environmental Impacts of High School No. 5

Existing Plans, Programs, and Policies

The following measures are existing PPPs and PDFs that were developed as a result of the Certified EIR, which will help to reduce and avoid potential impacts related to noise. Note that the Mitigation Agreement between the District and Heritage Fields provides for the site to be delivered to the District after mass grading and with utilities and road network installed. These mitigation measures are applicable to the community developer and not directly to the District.

PPP 8-1 Title 6 (Public Works), Division 8 (Pollution), Chapter 2 (Noise) of the Irvine Municipal Code, also known as the City's Noise Ordinance, outlines the regulations necessary to control

unnecessary, excessive and annoying noise in the City. The provisions of this chapter are applicable to non-transportation-related stationary noise sources. It outlines the noise level measurement criteria; establishes the noise zones and the maximum permitted exterior and interior noise standards in each zone; and discloses special noise provisions for construction, truck delivery, and maintenance activities. For example, as outlined in Section 6-8-205 of the Noise Ordinance, no construction shall be permitted outside of the hours of 7:00 AM to 7:00 PM Monday through Friday and 9:00 AM to 6:00 PM Saturdays, unless a temporary waiver is granted by the Chief Building Official or authorized representative. Trucks, vehicles, and equipment that are making, or are involved with, material deliveries, loading, or transfer of materials, equipment service, maintenance of any devices or appurtenances for or within any construction project in the City shall not be operated or driven on City streets outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the City. Any waiver granted shall take impact upon the community into consideration. No construction activity will be permitted outside of these hours except in emergencies including maintenance work on the City rights-of-way that might be required.

PPP 8-2 Prior to the issuance of building permits for each structure or tenant improvement, other than a parking structure, the applicant shall submit a final acoustical report prepared to the satisfaction of the Director of Community Development. The report shall demonstrate that the development will be sound attenuated against present and projected noise levels including stationary, roadway, aircraft, helicopter, and railroad noise to meet City interior and exterior noise standards. The final acoustical report shall include all information required by the City's Acoustical Report Information Sheet (Form 42-48). The report shall be accompanied by a list identifying the sheet(s) of the building plans that include required sound attenuation measures (Standard Condition 3.5).

PPP 8-3 Title 5 (Planning), Division 10 (Grading Code and Encroachment Regulations), Chapter 1 (Grading Code), Section 5-10-127.G (Import and Export of Earth Materials) of the Irvine Municipal Code, states that if a grading project includes the movement of earth material to or from the site in an amount considered substantial by the Chief Building Official, the permittee is required to submit the proposed haul route for review and approval by the Chief Building Official. Special conditions of the grading permit may be imposed that require alternate routes or other measures in consideration of the possible impact on the adjacent community environment or effect on the public right-of-way itself.

PDF 8-1 **Construction Noise:** Prior to issuance of grading permits, the project applicant or its successor shall incorporate the following measures as a note on the grading plan cover sheet to ensure that the greatest distance between noise sources and sensitive receptors during construction activities has been achieved, and that construction noise has been reduced.

- During construction activities, all construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers, consistent with manufacturers' standards. All stationary construction equipment shall be placed so that emitted noise is directed away from the noise-sensitive receptors nearest the Proposed Project Site boundaries.

- Equipment shall be staged in areas that will create the greatest distance between construction-related noise sources and the noise-sensitive receptors nearest the Proposed Project Site during all project construction.

- All construction-related activities shall be restricted to the construction hours outlined in the City's Noise Ordinance (Municipal Code Section 6-8-205).

- Haul truck and other construction-related trucks traveling to and from the Proposed Project Site shall be restricted to the same hours specified for the operation of construction equipment. To the extent feasible, haul routes shall not pass directly by sensitive land uses or residential dwellings.

- Where construction will occur adjacent to any developed/occupied noise-sensitive uses, a construction-related noise mitigation plan shall be submitted the Director of Community Development for review and approval prior to the issuance of grading permits. The plan must depict the location of construction equipment and how the noise from this equipment will be mitigated during construction of the 2012 Modified Project, through the use of such methods as: (1) temporary noise attenuation fences; (2) preferential location of equipment; and (3) use of current technology and noise-suppression equipment.

- Construction of planned sound walls that have been incorporated into the project design shall be installed prior to construction of the building foundation; or temporary sound blankets (fences typically composed of poly-vinyl-chloride-coated outer shells with absorbent inner insulation) shall be placed along the boundary of the Proposed Project Site facing the nearest noise-sensitive receptors during construction activities.

Additional Plans, Programs, and Policies

The District is not subject to the PPPs or PDFs identified above. However, as a means to ensure that construction-related noise does not create a significant impact, the District will follow the standards found in PPP-1 and PDF-1 as modified below as IUSD 6-1 and IUSD 6-2.

IUSD 6-1 The District shall follow the standards provided in the City's Noise Ordinance (Title 6 (Public Works), Division 8 (Pollution), Chapter 2 (Noise) of the Irvine Municipal Code). The provisions of this chapter are applicable to non-transportation-related stationary noise sources. It outlines the noise level measurement criteria; establishes the noise zones and the maximum permitted exterior and interior noise standards in each zone; and discloses special noise provisions for construction, truck delivery, and maintenance activities. For example, as outlined in Section 6-8-205 of the Noise Ordinance, no construction shall be permitted outside of the hours of 7:00 AM to 7:00 PM Monday through Friday and 9:00 AM to 6:00 PM Saturdays, unless a temporary waiver is granted by the City's Chief Building Official or authorized representative. Trucks, vehicles, and equipment that are making, or are involved with, material deliveries, loading, or transfer of materials, equipment service, maintenance of any devices or appurtenances for or within any construction project in the City shall not be operated or driven on City streets outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the City. Any waiver granted shall take impact upon

the community into consideration. No construction activity will be permitted outside of these hours except in emergencies including maintenance work on the City rights-of-way that might be required.

IUSD 6-2 **Construction Noise:** Prior to initiation of grading, the District shall incorporate the following measures as a note on the grading plan cover sheet to ensure that the greatest distance between noise sources and sensitive receptors during construction activities has been achieved, and that construction noise has been reduced.

- During construction activities, all construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers, consistent with manufacturers' standards. All stationary construction equipment shall be placed so that emitted noise is directed away from the noise-sensitive receptors nearest the Proposed Project Site boundaries.

- Equipment shall be staged in areas that will create the greatest distance between construction-related noise sources and the noise-sensitive receptors nearest the Proposed Project Site during all project construction.

- All construction-related activities shall be restricted to the construction hours outlined in the City's Noise Ordinance (Municipal Code Section 6-8-205).

- Haul truck and other construction-related trucks traveling to and from the Proposed Project Site shall be restricted to the same hours specified for the operation of construction equipment. To the extent feasible, haul routes shall not pass directly by sensitive land uses or residential dwellings.

- Where construction will occur adjacent to any developed/occupied noise-sensitive uses, a construction-related noise mitigation plan shall be submitted the Director of Community Development for review and approval. The plan must depict the location of construction equipment and how the noise from this equipment will be mitigated during construction of the Project, through the use of such methods as: (1) temporary noise attenuation fences; (2) preferential location of equipment; and (3) use of current technology and noise-suppression equipment.

IUSD 6-2 The stadium shall be designed similar to the District's facility at University High School; that is, with enclosed foot wells, and solid walls along the backs of the bleachers, and similar specifications for the PA system. The PA system shall be a 'localized' system to the extent feasible with speakers mounted on several poles/structures which are relatively close to the respective bleacher sections. The goal is to have appropriate audio coverage throughout each set of bleachers to facilitate proper intelligibility, yet keeping the acoustical output for any individual speaker as low as practical (to preclude undesirable 'spill-over' effects into the surrounding community). As with the University High School stadium project, the final design and installation of the PA system will be conducted following the physical construction of the stadium facilities such that the acoustical characteristics and limitations of the as-built stadium can be to effectively addressed.

IUSD 6-3 The District shall develop and enforce a good-neighbor policy for use of athletic fields. Signs shall be erected at entry points that state prohibited activities (e.g., use of air horns, unapproved audio amplification systems, bleacher foot-stomping, boisterous activity in parking lots, etc.).

The following impact analysis addresses impacts that the Initial Study for the Proposed Project disclosed could be potentially significant. The thresholds upon which these determinations were based are identified in brackets after the impact statement.

IMPACT 5.6-1 COMPARED TO THE 2011 APPROVED PROJECT, THE PROPOSED PROJECT WOULD NOT SUBSTANTIALLY ELEVATE TRAFFIC NOISE LEVELS ABOVE LOCAL NOISE STANDARDS AT NOISE-SENSITIVE RECEPTORS PROXIMATE TO THE PROJECT SITE. [IMPACTS N-1 AND N-4]

Impact Analysis:

2011 Approved Project

Based on the significance criteria presented earlier in Subsection 5.6-2, *Thresholds of Significance*, a significant off-site traffic noise impact would occur when a project creates a traffic-related noise level increase in the area adjacent to the roadway of 1.5 dBA and the resulting noise level exceeds the 65 dBA CNEL exterior noise standard.

For the 2011 Approved Project, a total of 10 segments are expected to experience an unmitigated exterior noise level that exceeds 75 dBA CNEL at a distance of 100 feet from centerline. The unmitigated 70 dBA CNEL exterior noise level is expected to be exceeded on a total of 121 segments for the 2011 Approved Project within the study area. The unmitigated 65 dBA CNEL exterior noise level is expected to be exceeded on 268 segments for the 2011 Approved Project. However, in each case, the traffic-related exterior noise level increases generated by the 2011 Approved Project are all less than 1.5 dBA and thus do not exceed the significance thresholds. Therefore, the 2011 Approved Project's traffic-related noise impacts on the surrounding communities would be less than significant. The 2011 Approved Project would not create a substantial permanent increase in exterior or interior traffic noise levels or expose persons to noise levels in excess of the exterior or interior noise level standards established in the City's Noise Ordinance and the Noise Element of the City of Irvine General Plan.

The IBI Group prepared a traffic impact analysis for the project. The traffic study for the project included traffic forecasts for the project's opening year 2017, as well as for long range 2035 and post-2035 periods. To assess potential traffic noise increases related to the project on the surrounding off-site areas, the changes in traffic noise levels on study area roadway segments surrounding the Proposed Project were evaluated based on the changes in average daily traffic volumes.

The purpose of the analysis is to assess the Proposed Project's incremental off-site traffic- related noise impacts at land uses adjacent to roadways conveying project traffic, when compared to the 2011 Approved Project.

A review of the traffic study for the project shows that the vast majority of project-related trips for typical school operations and for stadium special events are distributed to Irvine Boulevard between the project site and the 133 Freeway. Since noise is measured on a logarithmic scale, a doubling of traffic volumes

(i.e., a 100 percent increase) would be needed to cause a traffic noise-related increase of 3 dBA. Similarly, a traffic increase of at least 42 percent must occur to result in a noise level increase of 1.5 dBA. A review of the traffic volumes under the 2011 Approved Project background conditions shows that the Proposed Project would cause an increase in traffic on study area roadways of up to 22 percent with the greatest increases occurring along Irvine Boulevard. This would result in a noise increase of less than 1 dBA when compared to the traffic noise predictions analyzed under the Certified EIR.

Therefore, the overall noise increase related to project traffic would not cause a substantial noise increase compared to no-project conditions nor when compared to the assumptions in the 2011 Approved Project EIR. Because the Proposed Project's off-site traffic noise level impacts do not exceed the screening significance threshold, its off-site traffic-related noise impacts are considered less than significant.

Mitigation Program and Net Impact

No mitigation measures are introduced here in this DSEIR, because net impacts related to traffic noise would be less than significant.

2012 Modified Project

Under the 2012 Modified Project, the project site is designated as a 2,600-student high school. To assess the off-site traffic-related exterior noise level impacts associated with the 2012 Modified Project, the CNEL levels at a distance of 100 feet from the roadway segments in the traffic study area were developed for the General Plan Post-2030 With 2012 Modified Project for Option 1 and Option 2. Off-site traffic-related exterior noise impacts were analyzed for the 395 study area roadway segments. For both the 2011 Approved Project and the 2012 Modified Project Options 1 and 2, a total of 10 segments were expected to experience an unmitigated exterior noise level that exceeded 75 dBA CNEL at a distance of 100 feet from centerline. The unmitigated 70 dBA CNEL exterior noise level was expected to be exceeded on a total of 135 segments for the 2011 Approved Project, on 137 segments for the 2012 Modified Project Option 1, and on 137 segments for the 2012 Modified Project Option 2 within the study area. The unmitigated 65 dBA CNEL exterior noise level was expected to be exceeded on 322 segments for the 2012 Modified Project for both Option 1 and Option 2. In the vicinity of the Proposed Project site (the school), segments on Irvine Avenue would experience an increase of -0.2 to 0.1 dBA when compared to the 2011 Approved Project.

The 2012 Modified Project's traffic-related noise impacts on the surrounding communities would be less than significant. The 2012 Modified Project would not create a substantial permanent increase in exterior or interior traffic noise levels or expose persons to noise levels in excess of the exterior or interior noise level standards established in the City's Noise Ordinance and the Noise Element of the City's General Plan. None of the roadway segments evaluated in the vicinity of the proposed project would exceed the screening significance threshold.

The Proposed Project would cause a traffic increase of up to 21 percent on study area roadways, resulting in a noise increase of less than 1 dBA when compared to the 2012 Modified Project. Therefore, impacts would be less than significant.

Mitigation Program and Net Impact

No mitigation measures are introduced here in this DSEIR, because net impacts related to traffic noise would be less than significant.

IMPACT 5.6-2 LIKE THE 2011 APPROVED PROJECT, STATIONARY SOURCES OF NOISE GENERATED BY THE PROPOSED PROJECT WOULD COMPLY WITH APPLICABLE STANDARDS AND WOULD NOT SUBSTANTIALLY INCREASE AMBIENT NOISE LEVELS AT SENSITIVE RECEPTORS PROXIMATE TO THE PROPOSED PROJECT SITE. [IMPACTS N-1 AND N-4]

Impact Analysis:

2011 Approved Project

The 2011 Approved Project included two K–8 schools, but did not anticipate a high school as part of the project. At the time of the preparation of the 2011 Approved Project EIR, it was not possible to calculate the specific localized noise impacts from school uses in the absence of project-specific site plans.

Stadium Noise Levels

To characterize noise sources and to obtain maximum, future noise levels from bleacher facility activities for the proposed project, noise monitoring was conducted at an existing, comparable high school facility during a full-capacity football event. Table 5.6-7 shows noise levels observed during a football game at La Quinta High School (details on noise monitoring of several events can be found in Appendix D).

Table 5.6-7
Noise Monitoring at a La Quinta School Football Game

Monitoring Site	Noise Levels (dBA)						
	L_{max}	L_{02}	L_{08}	L_{25}	L_{50}	L_{min}	L_{eq}
Monitoring Site No. 1 – side of field at 350 feet	68.1	65.0	62.1	58.7	54.9	47.6	57.5
Monitoring Site No. 2 – side of field at 350 feet	71.1	63.3	60.1	56.1	53.3	47.6	56.7

Source: Noise monitoring at La Quinta High School conducted on 10/11/02.

As shown in Table 5.6-7 above, noise levels from a football event are in the range of 57 to 58 dBA L_{eq} and from 68 to 71 dBA L_{max} (all at approximately 350 feet from the side of the field). Noise at the facility would be highly variable during the game, depending on the type and level of activity in the bleachers and on the field. From observations and measurements at several high schools in the greater Los Angeles area, the following general statements can be made:

- Public Address (PA) systems create higher sound levels than does typical crowd reactions. PA noise (commentary, announcements, etc.) occurs far more often than crowd cheers. However, the typical stadium event would not be classified as consisting of exclusively speech content.

- Cheering is highly variable, depending on the particular moment-to-moment activity (a 'good' play versus a score), on whether the home team or visitor experience the activity, and on the number of the home or visitor attendees.

- Cheerleaders on portable PA systems and, sometimes, fireworks (often at homecoming games) during half-time generate noise.

- Foot-stomping on aluminum bleachers can generate substantial noise.

- Other noise sources during a stadium event include referee whistles, horns, and bells.

Bleacher Facility Noise Analysis

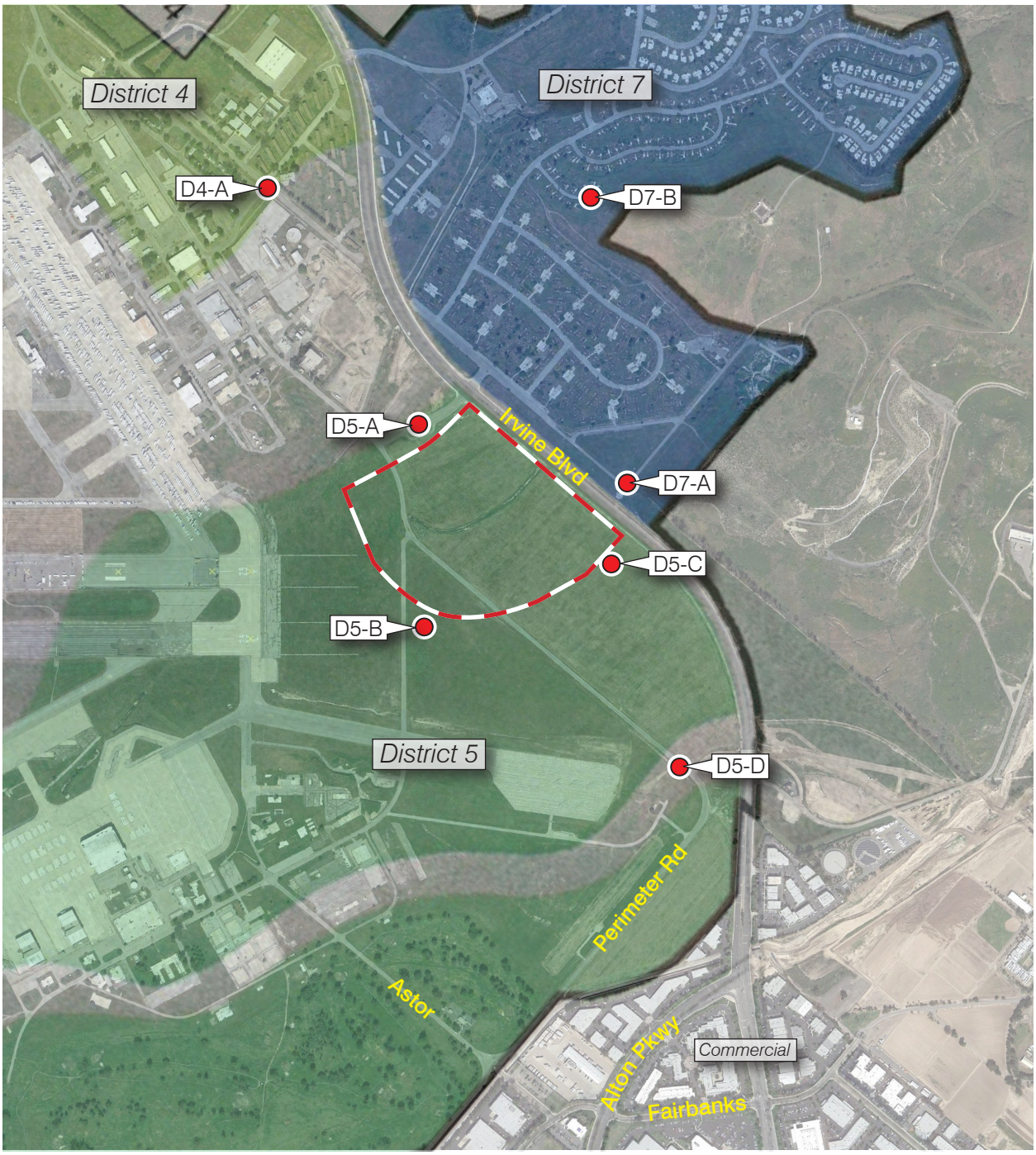
The proposed stadium/bleacher facility would be constructed toward the east corner of the campus, approximately 400 feet from the centerline of Irvine Boulevard (as measured to the center of the football field). The home viewing stands would be on the south side of the field and would have a projected capacity of 1,740 attendees. The visitor viewing stands would be on the north side of the field and would have a projected capacity of 1,200 attendees.

The future bleacher noise situation was modeled using SoundPLAN (version 7.1) noise analysis software. The stadium and bleacher configuration for the proposed project was assumed to be very similar to the design that was recently implemented at Irvine Unified School District's similarly sized University High School. Specifically, home-side bleachers were taken to be constructed out of aluminum, but they would include vertical paneling to enclose the foot wells as well as solid walls at the rear of the bleacher structure which would enclose storage and other utility spaces. The home bleachers would also incorporate a press box approximately 70 feet wide and 9 feet high at the top of the bleacher structure. Similarly to the home-side bleachers, the visitor-side bleachers would be constructed of aluminum and would also have vertical panels enclosing the foot wells. Thus, for both sets of bleachers, the foot well backing and/or structural wall would provide sound barrier shielding effects and would acoustically block a notable amount of the attended sound energy from traveling backwards from each set of stands. Details about the acoustical performance specifics of the proposed public address ("PA") system are not known at this juncture, but the PA contributions during a football game are part of the results for the La Quinta substitute data and are inherently included in the modeling for the situation at the proposed project.[3] The modeling was conducted to find the predicted event-related sound levels at several representative locations throughout adjacent area, as shown on Figure 5.6-2, *Noise Modeling Locations*. These modeling locations, labeled with their respective Development Districts, are representative of the future residential areas around the Proposed Project campus. The Heritage Fields Development Districts that are nearest to the Proposed Project campus are District 4 to the west, District 7 to the north across Irvine Boulevard, and District 5 that includes the Project Site. All these districts may contain residential development projects.[4] It should be noted, though, that the majority of these Development District areas are at considerable distances from the proposed project, such that sounds from the high school campus will be reduced to

[3] Note that adjustments were included in the modeling to account for the differences between the La Quinta High School event's actual attendance and the projected project's full-capacity (i.e., 3,600 total attendees). Provisions were also made in the modeling inputs to account for the 2-to-1 ratio of home-to-visitor seating at the proposed project.

[4] Please see Chapter 3 of this document, as well as Figure 3-3 for more information concerning the Heritage Fields Development Districts.

Noise Modeling Locations



Project Site

Noise Modeling Locations (7)

0 500
Scale (Feet)

Source: Basemap from Google Earth 2011

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inaudibility by distance attenuation. A summary of these distances is given in Table 5.6-8, *Pertinent Distances from the Proposed Stadium to Potential Receptor Areas.*

Table 5.6-8
Pertinent Distances from the Proposed Stadium to Potential Receptor Areas

Potential Receptor Area or Location	Distance from Center of Football Field	
	Feet	Miles
Nearest edge of Development District 1N	7,060	1.3
Nearest edge of Development District 1S	8,020	1.5
Nearest edge of Development District 2	9,720	1.8
Nearest edge of Development District 3	8,680	1.6
Nearest edge of Development District 4	3,280	0.6
Modeling location D4-A	3,400	0.6
Nearest edge of Development District 5, east = D5-A	1,240	0.2
Modeling Location D5-B	1,140	0.2
Nearest edge of Development District 5, east = D5-C	440	0.1
Modeling Location D5-D	2,015	0.4
Nearest edge of Development District 6	6,980	1.3
Nearest edge of Development District 7 = D7-A	645	0.1
Modeling Location D7-B	2,520	0.5
Nearest edge of Development District 8	8,890	1.7
Nearest edge of Development District 9	7,440	1.4

Source: Distances found via Google Earth, 2013

The results of the predictive modeling process are shown graphically in Figure 5.6-3, *Predictive Modeling Noise Level Contour Map*, which depicts daytime, energy-averaged sound levels (L_{eq}) in terms of lines of constant sound level (in 5 dB divisions) for a full-capacity event (i.e., 1,740 attendees on the home side and 1,200 attendees on the visitor side). The associated numerical results at the selected, representative receptor locations are given in Table 5.6-9. This table provides the predicted L_{50} levels, along with estimated minima and maxima levels,[5] which would be produced by the event-long, averaged combination of crowd noise (cheering plus clapping plus stomping), band music, PA announcements, and referee whistles. The modeling took into account the essentially flat topographical characteristics of the area, as well as the relatively soft ground effects in the vicinity of the project site. For conservatism, buildings and structures on campus, as well as any off-site buildings, were not included in the modeling inputs. In reality, though, these on-campus buildings/structures would generally provide considerable sound attenuation (due to barrier effects) for receptors to the west and southwest of the stadium facility. Off-site buildings, such as potential homes across Irvine Boulevard (in District 7) or across the proposed project's eastern roadway (in District 5) would also provide notable barrier attenuation for receptors to the north and east, respectively, of the stadium facility.

[5] These minima and maxima were estimated by applying the relative differences between the key noise level metrics from the La Quinta reference measurements.

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Table 5.6-9
Predicted Community Noise Levels during a Capacity Bleacher Event at the Proposed Project

Modeling Receiver Location	Predicted High School Event Sound Level Contributions, dBA			Measured Ambient Sound Levels, dBA[2]			Future Sum of Ambient + High School Event, dBA[3]			Calculated Change due to High School Event, dB		
	L_{min} Estimated[1]	L_{50} Estimated[1]	L_{max} Estimated[1]	L_{min}	L_{50}	L_{max}	L_{min}	L_{50}	L_{max}	L_{min}	L_{50}	L_{max}
D4-A	33	40	55	32.9	43.2[4]	54.3	35.9	44.9	57.9	3.0	1.7	3.6
D5-A	43	50	66	36.4	46.7	57.8	43.9	51.7	66.3	7.5	5.0	8.5
D5-B	40	47	62	28.7	39.0[4]	50.1	40.0	47.4	62.5	11.3	8.4	12.4
D5-C	54	**61**	**77**	36.4	46.7	57.8	54.2	**61.3**	**76.7**	17.8	14.6	18.9
D5-D	38	45	60	36.4	46.7	57.8	40.2	48.9	62.2	3.8	2.2	4.4
D7-A	43	50	65	40.2	**61.3**	74.9	44.8	**61.6**	**75.4**	4.6	0.3	0.5
D7-B	36	43	59	28.0	38.3[4]	49.4	37.0	44.6	59.4	9.0	6.2	9.9

Source: SoundPLAN 7.1 and L_{eq} input data from La Quinta High School noise monitoring.
Numbers in **bold** font indicate sound levels greater than the City of Irvine Municipal Code limits for the L_{50} and L_{max} noise level metrics for Noise Zones 1 and 2 during the daytime hours (i.e., 7 AM to 10 PM).
[1] The minimum, L_{50}, and maximum levels for the project stadium were estimated using the respective differentials from the La Quinta High School noise monitoring.
[2] The existing conditions levels in plain text are from measurement locations that are very near the modeling locations. Those values in italics are estimated from comparable measurement locations.
[3] This is the predicted energy sum of the stadium noise contributions added to the measured, existing noise environments.
[4] Ambient noise levels at these locations were estimated by applying a distance propagation correction to the data at Measurement Location 1.

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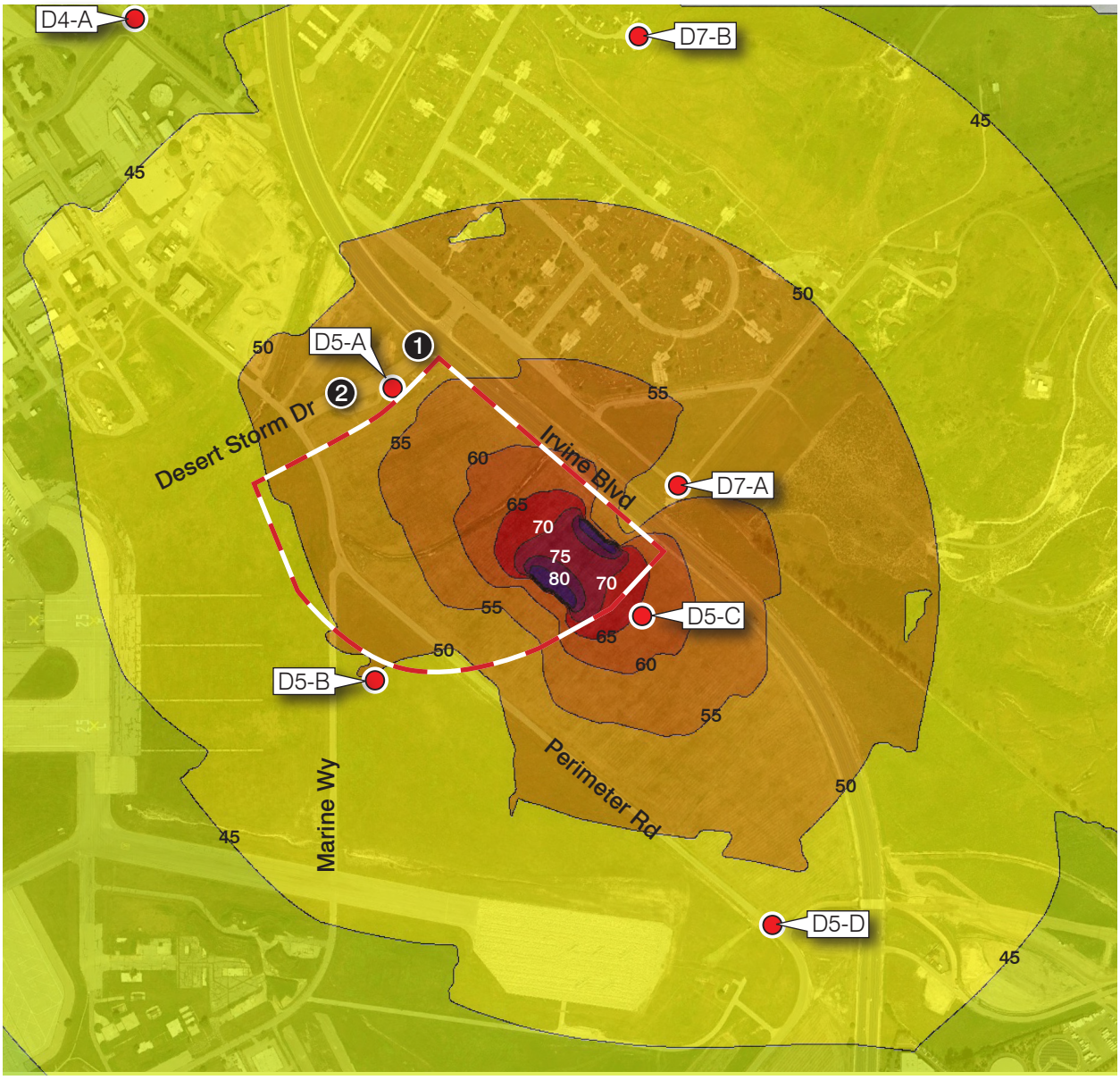
Predictive Modeling Noise Level Contour Map



Project Site

Noise Measurement Locations (2)

Noise Modeling Locations (7)

Noise Level Leq'd in dB(A)

85 80 75 70 65 60 55 50 45 40 35 30

85 80 75 70 65 60 55 50 45 40 35 30

0 400

Scale (Feet)

Source: The Planning Center|DC&E (SoundPLAN) 2013

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Given the above graphical and tabular results of the predictive modeling, the following summary statements can be made concerning the sound levels from a full-capacity event at the proposed project's stadium. The stadium-related sound levels are predicted to be:

- From 50 to 65 dBA L_{eq}[6] on the project site campus.
- From 55 to 61 dBA L_{50} for the closest, off-site areas to the north (across Irvine Boulevard) and to the east (across the proposed new street on the east side of the campus, represented by modeling location D5-C. Areas directly behind either set of bleacher structures (such as with modeling location D7-A) will experience lower sound levels (of about 5 dB), as compared to locations at comparable distances from the facility, since areas facing the backs of the bleachers will benefit from barrier attenuation effects.
- Approximately 50 dBA L_{50} in the narrow strip of District 5 that is immediately northwest of the proposed project site (represented by modeling location D5-A).
- In the range of 45 to 47 dBA L_{50} in District 5 at approximately 1,200 to 2,000 feet from the center of the football field (represented by modeling locations D5-B and D5-D). More distant areas within District 5 would have lower sound levels due to at least distance attenuation. These results do not include the potential benefits from shielding provided by intervening structures, such as multiple rows of houses. If and when District 5 is built out with residences, these values would be further reduced due to additional barrier attenuation effects.
- Between 43 and 55 dBA L_{50} in the southern portion of Development District 7 (within approximately ½ mile of the center of the football field, near modeling location D7-B). Again, these results do not include the potential benefits from shielding provided by intervening structures, such as multiple rows of houses. If and when District 7 is built out with residences, these values would be reduced due to additional barrier attenuation effects, with the exception of the very first row along the north side of Irvine Boulevard.
- Less than 40 dBA L_{50} at future receptor locations that are beyond approximately 3,400 feet (0.6 miles) from the center of the football field (represented by modeling location D4-A). Receptor locations beyond approximately 1 mile would have negligible contributions to their noise environments from the activities at the proposed facility, and even full-capacity events at the proposed stadium would not be expected to be audible. This is due to a combination of long propagation distances, ground attenuation effects over those distances, increased air absorption of sound energy, and, often, several intervening structures or topographical features that would serve to block the sound coming from the Project Site. Note that the nearest existing homes to the proposed stadium are located approximately 1.1 miles to the north off Portola Springs Road and approximately 1.2 miles away along Calle Celeste in Lake Forest.
- Based on reference information from the similar, full-capacity football event, the maximum noise levels associated with stadium events at the Proposed Project can be expected to be approximately 12 to 13 dB higher than for the above L_{50} noise level metric.

This table also shows that full-capacity events would increase ambient noise levels substantially in the vicinity of the bleacher portion of the proposed project so as to be clearly audible throughout the events'

[6] It is important to note that the L_{eq} and L_{50} noise level metrics are not equivalent. For typical, event-long football games, there is an approximate 3 dB difference between the two metrics (i.e., $L_{eq} - 3 \approx L_{50}$).

durations. People within approximately 2,000 feet of the stadium center may experience event-related sound levels that could be discernible and potentially annoying for the four- to five-hour event durations (including pre-event crowd arrivals and post-event departures). However, the City of Irvine Municipal Code standards for stationary noise sources exempts school functions from it limitations. Further, the District will implement Project Design Feature IUSD 6-2, and Mitigation Measures T-2 and T-3 to control noise at its source, including ending events prior to 10 PM. With these factors, combined with the limited number of maximum attendance events (typically five football games per year), the noise impact is considered less than significant.

Mitigation Program and Net Impact

No additional mitigation measures are introduced here in this DSEIR, as stadium event impacts would be less than significant.

2012 Modified Project

Under the 2012 Modified Project, a 2,600-student high school was included at its current location. However, the 2012 Modified Project EIR was prepared at a general community-wide level and did not address specific issues related to athletic facilities, including the football stadium. The conclusion under the 2012 Modified Project remains the same as under the 2011 Approved Project. The noise environment around the high school, and in particular the football stadium, should be accounted for in the final determination of compatible adjacent land uses and design requirements.

Mitigation Program and Net Impact

No mitigation measures are introduced here in this DSEIR, as stadium event impacts would be less than significant.

IMPACT 5.6-3 THE PROPOSED SCHOOL SITE WILL BE EXPOSED TO NOISE LEVELS THAT ARE COMPATIBLE WITH THE DEVELOPMENT OF SCHOOL USES, AND TRAFFIC NOISE WOULD NOT ADVERSELY AFFECT THE EDUCATIONAL PROGRAM. [IMPACT N-2]

Impact Analysis:

2011 Approved Project

The roadway noise impacts from vehicular traffic were projected using a computer program that replicates the FHWA Traffic Noise Prediction Model- FHWA-RD-77-108 ("FHWA Model"). The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (“REMEL”). Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial); the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway); the total average daily traffic (“ADT”); the travel speed; the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume; the roadway grade; the angle of view (e.g., whether the roadway view is blocked); the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping); and the percentage of total ADT that flows each hour throughout a 24-hour period. The long-range Post-2035 average daily traffic volumes for Irvine Boulevard in the areas adjacent to the project site are summarized

in Table 5.6-10, *Buildout Traffic Volumes on Pertinent Roadways Adjacent to the Project*. The highest average daily traffic volumes of 54,426 are anticipated to occur under the 2012 Modified Project (for Options 1 and 2). Due to low traffic volumes and speeds, traffic on local streets such as B Street and LQ Street would be negligible.

Table 5.6-10
Buildout Traffic Volumes on Pertinent Roadways Adjacent to the Project

Roadway	Segment	Daily Traffic Volumes	Noise Level at 100 ft (dBA CNEL)	Distance to Noise Contour (ft)		
				70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
Irvine Blvd	B St to LQ St	54,426	74.4	197	425	915

Source: The Planning Center|DC&E, 2013

As shown on Table 5.6-10, the noise levels for long range conditions in the northern portions of the project site adjacent to Irvine Boulevard would approach 75 dBA CNEL. While the noise exposure is high along Irvine Boulevard, the various athletic fields proposed along Irvine Boulevard are appropriate given this environment and do not represent a significant impact.

Interior Traffic-Related Noise Impacts

As traffic noise dissipates with distance at a rate of approximately 4.5 dBA per doubling distance, the build-out traffic volumes on Irvine Boulevard would result in the following noise levels (see Table 5.6-10 above):

- 70 dBA CNEL at 197 feet from the road centerline
- 65 dBA CNEL at 425 feet from the road centerline
- 60 dBA CNEL at 915 feet from the road centerline

As discussed previously, according to the noise and land use compatibility guidelines, the areas in the northern portions of the site are considered "normally unacceptable," and new construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design. The project's site plan, presented in Figure 3-5, shows that the nearest classrooms buildings would be located approximately 700 feet from Irvine Boulevard. At that distance, these nearest buildings would be exposed to noise levels at the building facades facing Irvine Boulevard of less than 65 dBA CNEL. To satisfy the City's 45 dBA CNEL interior noise level criterion, an exterior to interior noise reduction of up to 20 dBA would be required. Typical new building construction achieves an interior noise reduction of approximately 25 dBA with windows closed. Standard building construction with a means of ventilation to allow for a "windows closed" condition would therefore suffice to achieve the required 45 dBA CNEL interior noise level at the proposed school buildings.

Mitigation Program and Net Impact

No additional mitigation measures are introduced here in this DSEIR, as net impacts related to interior learning environments would be less than significant.

2012 Modified Project

The 2012 Modified Project DSSEIR included a high school at its current location, but no site-specific noise impacts were reviewed. Traffic volumes along Irvine Boulevard under the 2012 Modified Project would be similar to the 2011 Approved Project, and impacts would be less than significant for the Proposed Project. The net incremental impact related to construction noise would be less than significant, and the overall impact is similar to that analyzed for the 2011 Approved Project.

Mitigation Program and Net Impact

No additional mitigation measures are introduced here in this DSEIR, as net impacts related to interior learning environments would be less than significant.

IMPACT 5.6-4 CONSTRUCTION-RELATED ACTIVITIES OF THE PROPOSED PROJECT WOULD NOT RESULT IN A SUBSTANTIAL INCREASE IN TEMPORARY CONSTRUCTION NOISE AS COMPARED TO THE 2011 APPROVED PROJECT. [IMPACT N-5]

Impact Analysis:

2011 Approved Project

The 2011 Approved Project includes project design features to reduce noise impacts from construction activities adjacent to any developed/occupied noise sensitive land uses, including submission of a construction-related noise mitigation plan and proposed haul routes to the City for review and approval. The Certified EIR concluded that the 2011 Approved Project would not result in any significant construction noise impacts.

The Project Site is in Development District 5 of the Great Park Neighborhoods, which consists of nine Development Districts. The project site is surrounded by vacant properties previously developed as part of the MCAS El Toro. Currently there are no noise-sensitive land uses at least within a 1-mile radius of the project site boundary. The nearest residential areas are located approximately 1.1 miles to the north off Portola Springs Road.

The high school is estimated to start construction activities in March 2014 and be opened in 2016. Phase 1 would include site preparation, which would last for approximately 6 months in the second semester of 2014, and building construction which would last approximately 21 months from October 2014 through July 2016. Subsequent phases would be limited in scope and would include the construction of the pool and aquatics complex, an athletic stadium, portable classrooms, and practice gymnasium and fitness lab.

The future noise-sensitive uses in the vicinity of the project site that could be affected by project construction Phase 1 would be the residential areas in Development Districts 8 and 1. Development District 8, approximately 1.6 miles northwest of the Project Site, is currently under construction and is likely to be occupied prior to project opening. The next phase of development would occur in Development District 1, approximately 1.1 miles to the west. Subsequent phases of development would occur in District 4, then District 7, but the time frame of these activities is unknown at this juncture. The timing of development in other Great Park Neighborhoods Districts, including District 5, is also unknown.

Construction Noise Overview

Construction noise creates a temporary intermittent impact on ambient noise levels in the vicinity of the construction. Noise generated by construction equipment, including trucks, graders, bulldozers, concrete mixers and portable generators, can reach high levels. Grading activities typically represent one of the highest potential sources for noise impacts. The most effective method of controlling construction noise is through local control of construction hours and by limiting the hours of construction to normal weekday working hours.

Construction Noise Levels

In January 2006, FHWA published a national database of construction-equipment-reference noise emission levels. This database, which is included as part of the FHWA's Roadway Construction Noise Model ("RCNM"), provides a comprehensive list of the noise generating characteristics for specific types of construction equipment. In addition, the database provides an acoustical usage factor to estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation. Noise levels generated by heavy construction equipment can range from approximately 70 dBA to in excess of 100 dBA when measured at 50 feet. However, these noise levels diminish with distance from the construction site at a rate of 6 dBA per doubling of distance. For example, a noise level of 78 dBA measured at 50 feet from the noise source to the receptor would be reduced to 72 dBA at 100 feet from the source to the receptor, and would be further reduced to 66 dBA at 200 feet from the source to the receptor. As these noise levels diminish with distance from the construction site at a rate of 6 dBA per doubling of distance, at the nearest existing and reasonably foreseeable homes in Districts 1 and 8—located at least 1.1 miles away—noise levels from a piece of construction equipment operating at the nearest project site boundary would be less than 40 dBA. Even with multiple pieces of heavy construction equipment operating simultaneously, construction noise would not cause substantial noise impacts to nearby homes, due to distance attenuation.

The Mitigation Agreement between the District and Heritage Fields provides for the site to be delivered to the District after mass grading and with utilities and road network installed. So the loudest construction work—the mass grading—would be completed prior to initiation of high school construction, and the developer is responsible for noise attenuation measures as that work is completed (see PPP 8-3 and PDF 8-1).

The highest construction noise level is anticipated to generate up to 89.4 dBA Leq at 100 feet. Assuming all construction equipment is operating in the center of the site, approximately 1.3 miles from the nearest existing and future homes, the noise level at the nearest existing homes and at future receptors would reach 53 dBA L_{eq} during phase 1 grading construction. Subsequent phases for implementation of the gymnasium, pool, and other school facilities would be limited in scope, would be short term, and would cause limited temporary noise impacts during construction. Noise from construction activities would not interfere with speech nor cause disturbance at noise-sensitive uses in the vicinity of the project site.

While the City's Noise Ordinance does not specify a limit on construction noise levels, it does stipulate the days and hours during which construction activities may occur and when construction would not be allowed unless a temporary waiver is requested and granted. As with the 2011 Approved Project, construction activities associated with the Proposed Project would incorporate (see PPP 8-1) the requirements of Section 6-8-205(a) of the City's Noise Ordinance. As outlined in Section 6-8-205(a), construction activities may occur between the hours of 7:00 AM and 7:00 PM, Monday through Friday, and 9:00 AM and 6:00 PM on Saturday.

Trucks, vehicles, and equipment that are used at the Proposed Project Site or that are making or are involved with material deliveries, loading or transfer of materials, equipment service, and maintenance of any devices or appurtenances for or within the Proposed Project Site are not permitted to be operated or driven on Irvine's streets outside of these hours or on Sundays and federal holidays. No construction activity is permitted outside of these hours except in emergencies, including maintenance work on Irvine rights-of-way that might be required. Although the District is not subject to City ordinances, to minimize the potential construction noise impacts associated with the Proposed Project and to ensure that the greatest distance between noise sources and sensitive receptors during construction activities are achieved, the District will follow PPPs 8-1 and PDF 8-1 outlined above (numbered IUSD 6-1 and IUSD 6-2).

Construction noise would be temporary, intermittent, and of short duration. Thus, construction activities would not create any long-term impacts. For all of these reasons, and with implementation of PPPs 8-1 and PDF 8-1, the Proposed Project's construction noise impacts to off-site noise-sensitive receptors, as compared to those of the 2011 Approved Project, would be less than significant. The net incremental impact related to construction noise would be less than significant, and the overall impact is similar to that analyzed in the Certified EIR.

Mitigation Program and Net Impact

No mitigation measures are introduced here in this DSEIR, as net impacts related to vibration would be less than significant.

2012 Modified Project

The 2012 Modified Project would have a similar area of disturbance and a similar mix of construction equipment as assessed in the 2011 Approved Project. Peak noise levels would occur during grading, which would not change for the 2012 Modified Project (as compared to the 2011 Approved Project). The results of the construction noise analysis indicated that the 2012 Modified Project's off-site construction noise levels would range from 77.5 to 89.4 dBA L_{ea} at a distance of 100 feet. While the 2011 Certified EIR study included a detailed analysis of the potential temporary construction noise impacts, the City does not regulate construction activities under its Noise Ordinance so long as those activities occur only during the hours of 7:00 AM to 7:00 PM, Monday through Friday, and from 9:00 AM to 6:00 PM on Saturdays, absent a grant of a temporary waiver. With implementation of PPPs 8-1 and 8-3 and PDF 8-1, the 2012 Modified Project's construction noise impacts to off-site noise-sensitive receptors, as compared to those of the 2011 Approved Project, would be less than significant.

Mitigation Program and Net Impact

No mitigation measures are introduced here in this DSEIR, as net impacts related to vibration would be less than significant.

IMPACT 5.6-5 CONSTRUCTION-RELATED ACTIVITIES OF THE PROPOSED PROJECT WOULD NOT RESULT IN A SUBSTANTIAL INCREASE IN TEMPORARY CONSTRUCTION VIBRATION AS COMPARED TO THE 2011 APPROVED PROJECT. [IMPACT N-3]

Impact Analysis:

2011 Approved Project

Groundborne vibration would be generated by the 2011 Approved Project during construction activities, primarily during the demolition, site grading and foundation-construction phases. The Certified EIR concluded that due to distance and the anticipated construction equipment, the 2011 Approved Project development would not result in any significant construction vibration or groundborne noise impacts.

Construction operations can generate varying degrees of ground vibration, depending on the construction procedures and equipment. Construction equipment can produce vibration from vehicle travel, as well as from demolition, grading, and building activities. Operation of construction equipment generates vibrations that spread through the ground and diminish with distance from the source. As discussed previously in Impact Statement 5.6-4, the nearest existing and reasonably foreseeable homes in Districts 1 and 8 are located at least 1.1 miles away. Thus, there will be no sensitive receptors within one mile from the site during the proposed project's Phase 1 construction period.

Operation of construction equipment generates vibrations that spread through the ground and diminish with distance from the source. The effect on buildings in the vicinity of the construction site varies depending on soil type, ground strata, and receptor building construction. The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibrations at moderate levels, and slight structural damage at the highest levels. For example, a vibratory roller that can generate a Peak Particle Velocity ("PPV") of 0.21 inches per second (in/sec) at 25 away dissipates vibration with distance resulting in a PPV below 0.01 in/sec at 200 feet away. Because construction activities would use typical equipment and would occur at distances over 1 mile from the nearest structures, vibration levels from construction activities would not be substantial enough to cause annoyance or architectural damage. Subsequent construction phases for the proposed project would include the construction of the pool and aquatic complex, plus the stadium and would be limited in scope (as compared to the phase 1 construction activities). Consequently, no significant vibration impacts would occur. The net incremental impact related to vibration would be less than significant, and the overall impact is similar to that analyzed in the Certified EIR.

Mitigation Program and Net Impact

No additional mitigation measures are introduced here in this DSEIR, as net impacts related to vibration would be less than significant.

2012 Modified Project

Under the 2012 Modified Project, similar conditions and distances are present and vibration impacts would be less than significant. The overall impact of the Proposed Project would be the same as the analysis for the 2011 Approved Project, and no significant impacts are anticipated.

Mitigation Program and Net Impact

No mitigation measures are introduced here in this DSEIR, as net impacts related to vibration would be less than significant.

5.6.6 Cumulative Impacts

Cumulative noise impacts occur when multiple sources of noise, though individually not substantial, can combine and lead to excessive cumulative noise exposure at noise-sensitive uses.

Operational Mobile-Source Noise

The difference between the "2011 Approved Project" and "2012 Modified Project" scenarios represents the 2012 Modified Project's contribution to cumulative roadway noise increases. Project-related cumulative noise impacts could occur if the 2012 Modified Project contributes to substantial (1.5 dBA or more) cumulative noise increases resulting in noise levels above 65 dBA CNEL at a noise-sensitive receptor. However, as discussed under Impact 5.6-1, that circumstance would not occur on any of the roadway segments analyzed, and thus no significant cumulative noise impacts would occur.

Operational Stationary Source Noise

Unlike transportation noise, the effects of which can extend well beyond the limits of the Proposed Project Site, stationary source noise generated by the 2012 Modified Project or the proposed project would be limited to impacts to sensitive receptors immediately adjacent to or within the Proposed Project Site. Proposed Project-related sources of stationary noise would include building heating, ventilation, and air conditioning (HVAC) systems, school bells, and student movements and talking between classes or during the lunch period. Parking lot usage, including door closings/slams, horn honking, and theft alarms, could also be considered project-related stationary noise sources. Given the distances between these sources and potential off-site receptors, plus the fact that most of them are momentary or short-term, no significant impacts are anticipated to occur at adjacent receptor areas. Further, stationary noise sources at other, off-site projects (including air conditioners, yard care equipment, and residential outdoor activities) would be regulated by the City through the City's Municipal Code to ensure that they are controlled to acceptable levels. Consequently, like the 2011 Approved Project and the 2012 Modified Project, the proposed project would not result in cumulative stationary source noise impacts.

Construction Noise and Vibration

Like operational stationary source noise, cumulative construction noise impacts and vibration are confined to a localized area. Consequently, cumulative impacts would only occur if other projects are being constructed in the vicinity of the Proposed Project within the same time frame as construction of the Proposed Project so that they would cumulatively contribute to the local ambient noise environment. There are two potential projects in the vicinity of the Proposed Project: District 1 and District 8. However, these Districts are located approximately 1 mile away. Due to distance and because there are no existing homes in the vicinity of those areas where simultaneous grading and construction could occur, construction noise and vibration from the Proposed Project would not substantially elevate ambient noise levels nor significantly contribute to the cumulative noise environment.

5.6.7 Level of Significance Before Mitigation

Upon implementation of regulatory requirements, and PPPs, Impacts 5.6-1 through 5.6-5 would be less than significant for the Proposed Project.

5.6.8 Applicable Mitigation Measures from the 2011 Approved Project and 2012 Modified Project

The noise-related mitigation measures that were specified in the Certified EIR, adopted in the Mitigation Monitoring and Reporting Program (MMRP) for the 2011 Approved Project, and incorporated into the 2012 Modified Project are not directly applicable to the Proposed Project. Mitigation Measure N-1 deals with minimizing noise intrusion for exterior and interior spaces at single-family, detached residences, and Mitigation Measure N-2 deals with issuing occupancy disclosure notices for multi-family residential units that were projected to have balconies that did not meet the City's exterior 65 dBA CNEL standard.

N-1 Prior to the issuance of building permits for lots facing or located near major highways such as Irvine Boulevard, the project applicant or its successor shall provide a final noise study to the Director of Community Development that demonstrates how the exterior and interior noise requirements (65 dBA CNEL and 45 dBA CNEL, respectively) of the City of Irvine General Plan Noise Element will be met. To attain the exterior and interior noise requirements, the final noise study shall include, but not be limited to the following measures, in addition to such measures as the final noise study determines are required and shall be shown on the final map:

Exterior

- Provide a minimum six-foot high noise barrier for single-family detached residences shown in Figures 5.7-3 through 5.7-7 of this DSEIR.

Interior

- Provide a "windows closed" condition, requiring a means of mechanical ventilation (e.g., air conditioning) for all units.

- Provide standard and upgraded dual-glazed windows with a minimum Sound Transmission Coefficient rating of 26. Specific window recommendations shall be made once final architectural plans are available and detailed interior noise reduction calculations can be calculated based on actual building assembly details.

N-2 Prior to authorization to use, occupy and/or operate any multi-family residential unit, the project applicant or its successor shall submit evidence to the satisfaction of the Director of Community Development that occupancy disclosure notices for residential units with balconies that do not meet the City's exterior noise standard of 65 dBA CNEL will be provided to all future tenants pursuant to the City's Noise Ordinance.

5.6.9 Additional Mitigation Measures for the Proposed Project

No additional mitigation measures are required because all noise impacts from the proposed project would be reduced to a level of less than significant.

5.6.10 Level of Significance After Additional Mitigation

Upon implementation of the existing regulations and PPPs Impacts 5.6-1, 5.6-2, 5.6-3, 5.6-4, and 5.6-5 would be less than significant.