CALIFORNIA CROSSPOINT MIDDLE/HIGH SCHOOL NOISE AND VIBRATION ASSESSMENT

25500 Industrial Boulevard Hayward, California

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Project: 16-020

INTRODUCTION

This report summarizes the assessment of potential noise and vibration impacts resulting from the project to be located at 25500 Industrial Boulevard in Hayward, California. The project proposes to convert the former Heald College campus into a middle and high school in three phases over a period of about five years. Phase 1 will utilize the existing facility, which contains more than 32 move-in ready classrooms, to host California Crosspoint's existing 200 high school students plus an additional 50 middle school students anticipated to attend in the fall of 2016. No major upgrades or renovation will be necessary to open the school and welcome students. Minor upgrades will include renovation of the former dental and medical tech labs to become laboratory classrooms and the construction of a perimeter fence. Phase 2 will construct a 42,000 ft^2 community center with gymnasium, fitness center, multipurpose assembly hall, commercial kitchen, and multi-use classrooms. Phase 3 will construct a student residence hall, dining hall, recreation room, and lounge area. A fourth phase (Phase 4) would potentially acquire adjacent land for the construction of outdoor athletic facilities and additional parking. Phase 4 is still in early planning stages and is not assessed in this document.

This report evaluates the project's potential to result in significant impacts with respect to applicable California Environmental Quality Act (CEQA) guidelines. The report is divided into three sections: 1) the Setting Section provides a brief description of the fundamentals of environmental noise, summarizes applicable regulatory criteria, and discusses the results of the ambient noise monitoring survey completed to document existing noise conditions; 2) the General Plan Consistency Section discusses noise and land use compatibility utilizing policies in the City's General Plan; and 3) the Impacts and Mitigation Measures Section describes the significance criteria used to evaluate project impacts, provides a discussion of each project impact, and presents mitigation measures, where necessary, to provide a compatible project in relation to adjacent noise sources and land uses.

SETTING

Fundamentals of Environmental Noise

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its *loudness*. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (*frequency*) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more

intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 1.

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level (dBA).* This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This *energy-equivalent sound/noise descriptor* is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the *sound level meter*. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level (CNEL)* is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 pm - 10:00 pm) and a 10 dB addition to nocturnal (10:00 pm - 7:00 am) noise levels. The *Day/Night Average Sound Level (*L_{dn} *or DNL*) is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

Effects of Noise

Sleep and Speech Interference

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noise of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for multi-family dwellings are set by the State of California at 45 dBA L_{dn}. Typically, the highest steady traffic noise level during the daytime is about equal to the L_{dn} and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12 to 17 dBA with open windows. With closed windows in good condition, the noise attenuation factor for residential construction is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Office and industrial structures typically provide about 30 dBA of noise attenuation. Sleep and speech interference is therefore possible when exterior noise levels are about 57 to 62 dBA L_{dn} with open windows and 65 to 70

dBA L_{dn} if the windows are closed. Levels of 55 to 60 dBA are common along collector streets and secondary arterials, while 65 to 70 dBA is a typical value for a primary/major arterial. Levels of 75 to 80 dBA are normal noise levels at the first row of development outside a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed; those facing major roadways and freeways typically need special glass windows.

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 50 dBA L_{dn}. At an L_{dn} of about 60 dBA, approximately 12 percent of the population is highly annoyed. When the L_{dn} increases to 70 dBA, the percentage of the population highly annoyed increases to about 25 to 30 percent of the population. There is, therefore, an increase of about 2 percent per dBA between an L_{dn} of 60 to 70 dBA. Between an L_{dn} of 70 to 80 dBA, each decibel increase increases by about 3 percent the percentage of the population highly annoyed. People appear to respond more adversely to aircraft noise. When the L_{dn} is 60 dBA, approximately 30 to 35 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 3 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase results in about a 4 percent increase in the percentage of the population highly annoyed.

Fundamentals of Groundborne Vibration

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One method is the Peak Particle Velocity (PPV). The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. In this report, a PPV descriptor with units of mm/sec or in/sec is used to evaluate construction generated vibration for building damage and human complaints. Table 3 displays the reactions of people and the effects on buildings that continuous vibration levels produce.

The annoyance levels shown in Table 3 should be interpreted with care since vibration may be found to be annoying at much lower levels than those shown, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage.

Construction activities can cause vibration that varies in intensity depending on several factors. The use of pile driving and vibratory compaction equipment typically generates the highest construction related groundborne vibration levels. Because of the impulsive nature of such activities, the use of the PPV descriptor has been routinely used to measure and assess groundborne vibration and almost exclusively to assess the potential of vibration to induce structural damage and the degree of annoyance for humans.

The two primary concerns with construction-induced vibration, the potential to damage a structure and the potential to interfere with the enjoyment of life, are evaluated against different vibration limits. Studies have shown that the threshold of perception for average persons is in the range of 0.008 to 0.012 in/sec PPV. Human perception to vibration varies with the individual and is a function of physical setting and the type of vibration. Persons exposed to elevated ambient vibration levels, such as people in an urban environment, may tolerate a higher vibration level.

Structural damage can be classified as cosmetic only, such as minor cracking of building elements, or may threaten the integrity of the building. Safe vibration limits that can be applied to assess the potential for damaging a structure vary by researcher and there is no general consensus as to what amount of vibration may pose a threat for structural damage to the building. Construction-induced vibration that can be detrimental to the building is very rare and has only been observed in instances where the structure is at a high state of disrepair and the construction activity occurs immediately adjacent to the structure.

TABLE 1 Definition of Acoustical Terms Used in this Report

Term	Definition
Decibel, dB	A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20 micro Pascals.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 pm and 7:00 am.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: Handbook of Acoustical Measurements and Noise Control, Harris, 1998.

TABLE 2 Typical Noise Levels in the Environment

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110 dBA	Rock band
Jet fly-over at 1,000 feet		
	100 dBA	
Gas lawn mower at 3 feet		
	90 dBA	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80 dBA	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	70 dBA	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60 dBA	
		Large business office
Quiet urban daytime	50 dBA	Dishwasher in next room
Quiet urban nighttime	40 dBA	Theater, large conference room
Quiet suburban nighttime		
	30 dBA	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20 dBA	
		Broadcast/recording studio
	10 dBA	
	0 dBA	

Source: Technical Noise Supplement (TeNS), Caltrans, November 2009.

TABLE 3 Reaction of People and Damage to Buildings from Continuous or Frequent Intermittent Vibration Levels

Velocity Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.01	Barely perceptible	No effect
0.04	Distinctly perceptible	Vibration unlikely to cause damage of any type to any structure
0.08	Distinctly perceptible to strongly perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
0.1	Strongly perceptible	Virtually no risk of damage to normal buildings
0.3	Strongly perceptible to severe	Threshold at which there is a risk of damage to older residential dwellings such as plastered walls or ceilings
0.5	Severe - Vibrations considered unpleasant	Threshold at which there is a risk of damage to newer residential structures

Source: Transportation and Construction Vibration Guidance Manual, California Department of Transportation, September 2013.

Regulatory Background

The State of California and the City of Hayward have established regulatory criteria that are applicable in this assessment. The State CEQA Guidelines, Appendix G, are used to assess the potential significance of impacts pursuant to local General Plan policies, Municipal Code standards, or the applicable standards of other agencies. A summary of the applicable regulatory criteria is provided below.

State CEQA Guidelines. CEQA includes qualitative guidelines for determining the significance of environmental noise impacts. A project will typically have a significant impact if it would result in:

(a) 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;

(b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;

(c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;

(d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;

(e) 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, if the project would expose people residing or working in the project area to excessive noise levels; or

(f) For a project within the vicinity of a private airstrip, if the project would expose people residing or working in the project area to excessive noise levels.

Pursuant to recent court decisions, the impacts of site constraints such as exposure of the proposed project to excessive levels of noise and vibration identified in Checklist Questions (a), (b), (e), and (f) are not included in the Impacts and Mitigation Section of this report. These items are discussed in a separate section addressing Noise and Land Use Compatibility for consistency with the policies set forth in the City's General Plan.

CEQA does not define what noise level increase would be considered substantial. Typically, an increase in the L_{dn} noise level resulting from the project at noise sensitive land uses of 3 dBA or greater would be considered a significant impact when projected noise levels would exceed those considered acceptable for the affected land use. An increase of 5 dBA L_{dn} or greater would be considered a significant impact when projected noise levels would remain within those considered acceptable for the affected land use.

2013 California Building Code, Title 24, Part 2. The current (2013) California Building Code (CBC) does not place limits on interior noise levels attributable to exterior environmental noise sources. The July 1, 2015 Supplement to the 2013 CBC corrects this omission, reinstating limits on interior noise levels attributable to exterior environmental noise sources which had been contained in all prior versions of the CBC dating back to 1974. In keeping with the provisions of the 2015 supplement, this report considers interior noise levels attributable to exterior environmental noise sources to be limited to a level not exceeding 45 dBA L_{dn} in any habitable room for new dwellings other than detached single-family dwellings.

2013 California Green Building Standards Code. The State of California established exterior sound transmission control standards for new non-residential buildings as set forth in the 2013 California Green Building Standards Code (Section 5.507.4.1 and 5.507.4.2). The sections that pertain to this project are as follows:

5.507.4.1 Exterior noise transmission, prescriptive method. Wall and roof-ceiling assemblies exposed to the noise source making up the building envelope shall meet a composite STC rating of at least 50 or a composite OITC rating of no less than 40, with exterior windows of a minimum STC of 40 or OITC of 30 when the building falls within the 65 dBA CNEL noise contour of a freeway or expressway, railroad, industrial source or fixed-guideway noise source, as determined by the local general plan noise element.

5.507.4.2 Performance method. For buildings located, as defined by Section 5.507.4.1, wall and roof-ceiling assemblies exposed to the noise source making up the building envelope shall be constructed to provide an interior noise environment attributable to exterior sources that does not

exceed an hourly equivalent noise level ($L_{eq\ (1\text{-}hr)}$) of 50 dBA in occupied areas during any hour of operation.

California Department of Transportation – Construction Vibration. Caltrans recommends a vibration limit of 0.5 in/sec PPV for buildings structurally sound and designed to modern engineering standards. A conservative vibration limit of 0.3 in/sec PPV has been used for older buildings that are found to be structurally sound but cosmetic damage to plaster ceilings or walls is a major concern. For historic buildings or buildings that are documented to be structurally weakened, a conservative limit of 0.08 in/sec PPV is often used to provide the highest level of protection. All of these limits have been used successfully and compliance to these limits has not been known to result in appreciable structural damage. All vibration limits referred to herein apply on the ground level and take into account the response of structural elements (i.e. walls and floors) to groundborne excitation.

Hayward Executive Airport Land Use Compatibility Plan (2010). Noise compatibility policies are established in order to prevent the development of noise-sensitive land uses in portions of the airport environ that are exposed to significant levels of aircraft noise. Table 3-1 of the Compatibility Plan specifies that schools would be considered compatible in noise exposure areas of 60 dBA CNEL or less, assuming that the building structure is capable of attenuating exterior noise to the indoor CNEL of 45 dBA or less. Residences would be considered compatible in noise exposure areas of 65 dBA CNEL or less.

City of Hayward 2040 General Plan. The City of Hayward 2040 General Plan Hazards Element establishes policies to control noise within the community. Applicable goals and policies presented in the General Plan are as follows:

GOAL HAZ-8. Minimize human exposure to excessive noise and ground vibration.

Policy HAZ-8.1: Locating Noise Sensitive Uses. The City shall strive to locate noise sensitive uses (e.g., residences, schools, hospitals, libraries, religions institutions, and convalescent homes) away from major noise sources of noise.

Policy HAZ-8.2: Noise Study and Mitigation. The City shall require development projects in areas where they may be exposed to major noise sources (e.g., roadways, rail lines, and airport, or other non-transportation noise sources) to conduct a project level environmental noise analysis. The noise analysis shall determine noise exposure and noise standard compatibility with respect to the noise standards identified in Table HAZ-1 and shall incorporate noise mitigation when located in noise environments that are not compatible with the proposed use of the project. The study shall use Table HAZ-1 (Exterior Noise Standards for Various Land Uses) and Figure HAZ-1 (Future Noise Contour Map) to determine potential noise exposure impacts, noise compatibility thresholds, and the need for mitigation. The City shall determine mitigation measures based on project-specific noise studies, and may include sound barriers, building setbacks, the use of closed windows and the installation of heating and air conditioning ventilation systems, and the installation of noise attenuating windows and wall/ceiling insulation.

Policy HAZ-8.3: Incremental Noise Impacts of Commercial and Industrial Development. The City shall consider the potential noise impacts of commercial and industrial developments that are located near residences and shall require noise mitigation measures as a condition of project approval.

Policy HAZ-8.5: Residential Noise Standards. The City shall require the design of new residential development to comply with the following noise standards:

- The maximum acceptable interior noise level for all new residential units (single-family, duplex, mobile home, multi-family, and mixed-use units) shall be and L_{dn} of 45 dB with windows closed.

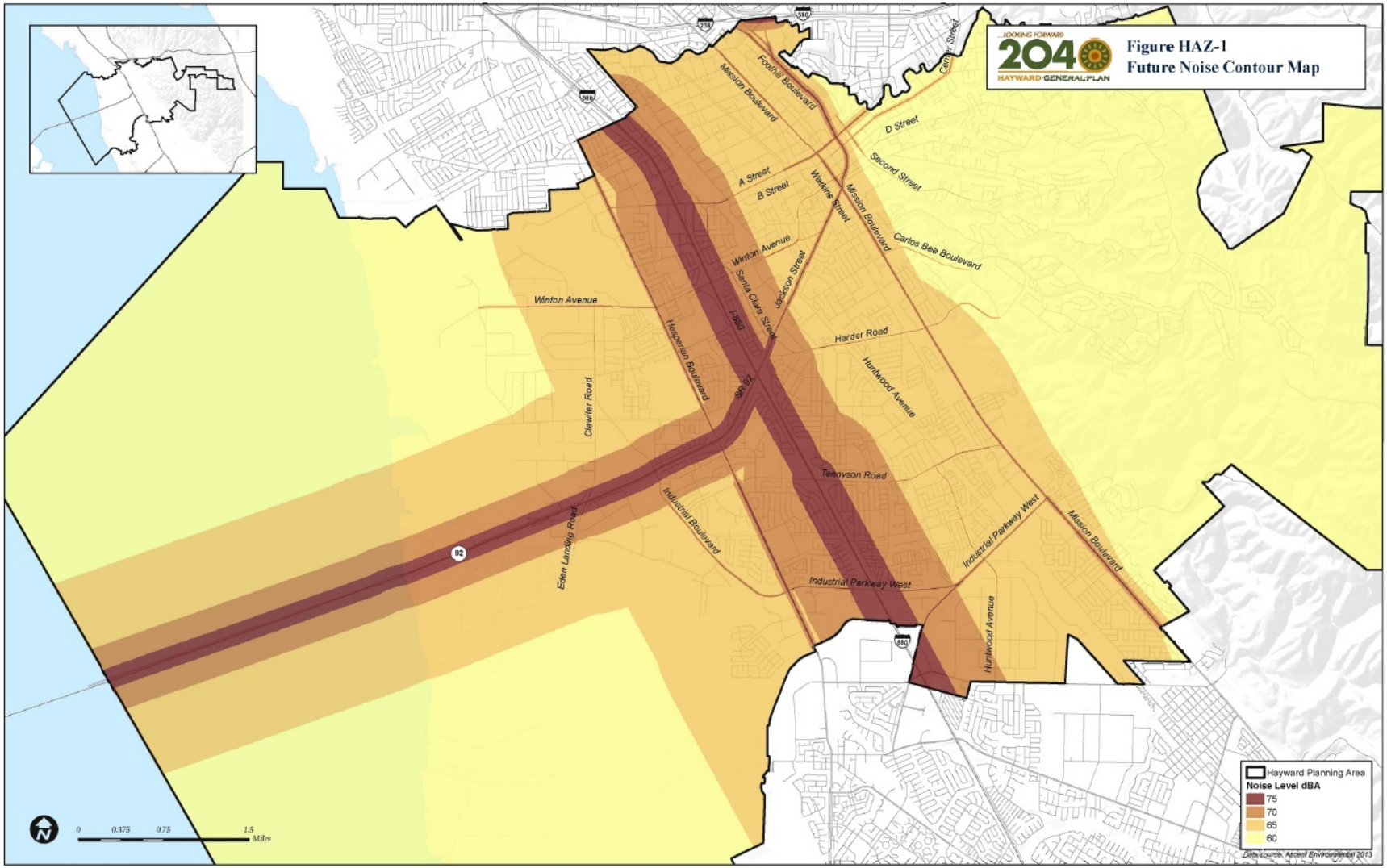
- The maximum acceptable exterior noise level for the primary open space area of a detached single-family home, duplex or mobile home, which is typically the backyard or a fenced side yard, shall be an L_{dn} of 60 dB. This standard shall be measured at the approximate center of the primary open space area. This standard does not apply to secondary open space areas, such as front yards, balconies, stoops, and porches.

- The maximum acceptable exterior noise level for the primary open space area of townhomes and multi-family apartments or condominiums (private rear yards for townhomes; and common courtyards, roof gardens, or gathering spaces for multi-family projects) shall be and L_{dn} of 65 dB. This standard shall be measured at the approximate center of the primary open space area. This standard does not apply to secondary open space areas, such as front yards, balconies, stoops, and porches.

TABLE HAZ-1 Exterior Noise Compatibility Standards for Various Land Uses	
Land Use Type	**Highest Level of Exterior Noise Exposure that is Regarded as "Normally Acceptable"[a] (Ldn[b] or CNEL[c])**
Residential: Single-Family Homes, Duplex, Mobile Home	60
Residential: Townhomes and Multi-Family Apartments and Condominiums	65
Urban Residential Infill[d] and Mixed-Use Projects[e]	70
Lodging: Motels and Hotels	65
Schools, Libraries, Churches, Hospitals, Nursing Homes	70
Auditoriums, Concert Hall, Amphitheaters	Mitigation based on site-specific study
Sports Arena, Outdoor Spectator Sports	Mitigation based on site-specific study
Playgrounds, Neighborhood Parks	70
Golf Courses, Riding Stables, Water Recreation, Cemeteries	75
Office Buildings: Business, Commercial, and Professional	70
Industrial Manufacturing, Utilities, Agriculture	75

Source: Governor's Office of Planning and Research, *State of California General Plan Guidelines 2003,* October 2003.

a. As defined in the *State of California General Plan Guidelines 200,* "Normally Acceptable" means that the specified land uses is satisfactory, based upon the assumption that any building involved is of normal conventional construction, without any special noise mitigation. For projects located along major transportation corridors (major freeways, arterials, and rail lines) this "normally acceptable" exterior noise level may be exceeded for certain areas of the project site (e.g. the frontage adjacent to the corridor or parking areas) with the exception of primary open space areas (see policies HAZ-8.5 and HAZ-8.6).
b. Ldn or Day Night Average is an average 24-hour noise measurement that factors day and night noise levels.
c. CNEL or Community Noise Equivalent Level measurements are a weighted average of sound levels gathered throughout a 24-hour period.
d. Urban residential infill would include all types of residential development within existing or planned urban areas (such as Downtown, The Cannery Neighborhood, and the South Hayward BART Urban Neighborhood) and along major corridors (such as Mission Boulevard).
e. Mixed-Use Projects would include all mixed-use developments throughout the City of Hayward.



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City of Hayward Municipal Code. The City's Municipal Code contains a Noise Ordinance that limits noise levels during construction activities and at adjacent properties. Section 4-1.03.1 of the Municipal Code outlines residential and commercial property noise limits and Section 4-1.03.4 outlines construction noise limits. The applicable Municipal Code sections are presented below:

Section 4-1.03.1 Noise Restriction by Decibel

(a) Residential Property Noise Limits.

1. No person shall produce or allow to be produced by human voice, machine, device, or any combination of same, on residential property, a noise level at any point outside of the property plane that exceeds seventy (70) dBA between the hours of 7:00 am and 9:00 pm or sixty (60) dBA between the hours of 9:00 pm and 7:00 am.

2. No person shall produce or allow to be produced by human voice, machine, device, or any combinations of same, on multifamily residential property, a noise level more than sixty (60) dBA three feet from any wall, floor, or ceiling inside any dwelling unit on the same property, when windows and doors of the dwelling unit are closed, except within the dwelling unit in which the noise source or sources may be located.

(b) Commercial and Industrial Property Noise Limits. Except for commercial and industrial property abutting residential property, no person shall produce or allow to be produced by human voice, machine, device, or any other combination of same, on commercial or industrial property, a noise level at any point outside of the property plane that exceeds seventy (70) dBA. Commercial and industrial property that abuts residential property shall be subject to the residential property noise limits set forth in sections (a)(1) and (2) above.

Section 4-1.03.4 Construction and Alteration of Structures; Landscaping Activities

Unless otherwise provided pursuant to a duly-issued permit or a condition of approval of a land use entitlement, the construction, alteration, or repair of structures and any landscaping activities, occurring between the hours of 10:00 a.m. and 6:00 p.m. on Sundays and holidays, and 7:00 a.m. and 7:00 p.m. on other days, shall be subject to the following:

(a) No individual device or piece of equipment shall produce a noise level exceeding eighty-three (83) dBA at a distance of twenty-five (25) feet from the source. If the device or equipment is housed within a structure on the property, the measurement shall be made outside the structure at a distance as close as possible to twenty-five (25) feet from the equipment.

(b) The noise level at any point outside of the property plane shall not exceed eighty-six (86) dBA.

(c) During all other times, the decibel levels set forth in Section 4-1.03.1 shall control.

Existing Noise Environment

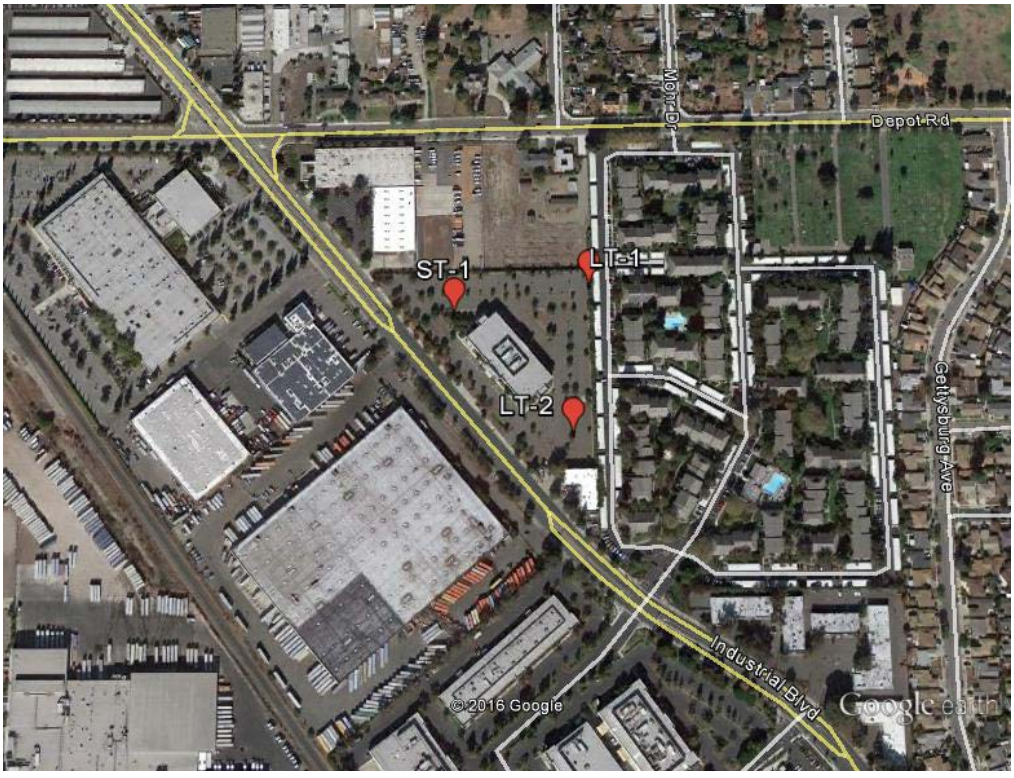
The project site is located east of Industrial Boulevard and south of Depot Road in Hayward, California. An ambient noise monitoring survey was conducted from Thursday, February 11th through Friday, February 12th, 2016 and included two long-term (24-hour) and one short-term (10-minute) measurements. Measurement locations are shown in Figure 1. The results of the long-term measurements are shown in Appendix A.

Long-term measurement LT-1 was located in the northeastern corner of the site. The predominant noise source at this location was traffic along Industrial Boulevard and Depot Road. Daytime hourly average noise levels ranged from about 57 to 61 dBA L_{eq} and nighttime noise levels ranged from 47 to 58 dBA L_{eq}. The day/night average noise level at this location was 63 dBA L_{dn}.

Measurement LT-2 was situated at the south end of the site. The predominant noise source at this location was traffic along Industrial Boulevard. Daytime hourly average noise levels ranged from about 60 to 63 dBA L_{eq} and nighttime noise levels ranged from 53 to 63 dBA L_{eq}. The day/night average noise level at this location was 66 dBA L_{dn}.

Short-term noise measurement ST-1 was located in the existing student patio area on the north side of the school. The predominant noise source at this location was traffic along Industrial Boulevard. The 10-minute average noise level, measured from 12:30 pm to 12:40 pm on Thursday, February 11th, 2016, was 61 dBA L_{eq}. A comparison of the measurement results at ST-1 and LT-2 indicate that the day/night noise level at ST-1 is 66 dBA L_{dn}.

FIGURE 1 Noise Measurement Locations



GENERAL PLAN CONSISTENCY ANALYSIS –
COMPATIBILITY OF PROJECT WITH THE NOISE ENVIRONMENT

Noise and Land Use Compatibility

The City of Hayward 2040 General Plan sets forth policies to control noise within the community. The applicable General Plan policies were presented in detail in the Regulatory Background section and are summarized below for the proposed project:

- Multi-family residential uses are considered "normally acceptable" where exterior noise exposures are 65 dBA L_{dn} or less.

- Urban residential infill is considered "normally acceptable" where exterior noise exposures are 70 dBA L_{dn} or less.

- School uses are considered "normally acceptable" where exterior noise exposures are 70 dBA L_{dn} or less.

- Outdoor sports and recreations uses and playgrounds are considered "normally acceptable" where exterior noise exposures are 70 dBA L_{dn} or less.

- The City's standard for interior noise levels in residences is 45 dBA L_{dn}.

Future Exterior Noise Environment

Noise sensitive outdoor uses at the school include the student patio (existing to remain), a playground area with movable basketball courts (Phase 1), and a dormitory student plaza and social area (Phase 3). The student patio area is currently exposed to a day/night noise level of 66 dBA L_{dn} (see ST-1) with daytime levels in the range of 60 to 63 dBA L_{eq}. The noise exposure at the location of the dormitory student plaza and social area is similar (see LT-2). Noise levels at the locations of the movable basketball courts range from 63 to 66 dBA L_{dn}, with daytime levels in the range of 57 to 63 dBA L_{eq}, with lower noise levels at courts located further from Industrial Boulevard.

Based on the traffic volumes prepared for the project by *Fehr & Peers*, traffic noise levels are anticipated to increase by about 1 dB along Industrial Boulevard, south of Depot Road. As a result, future noise levels are anticipated to be 67 dBA L_{dn} in the existing student patio and proposed dormitory student plaza and social area. Future noise levels would range from 64 to 67 dBA L_{dn} at the movable basketball courts.

All exterior school use areas would meet the City of Hayward's 'normally acceptable' criteria of 70 dBA L_{dn} or less for school uses and for outdoor sports, recreations uses, and playgrounds. The dormitory student plaza and social area would meet the City's "normally acceptable" criteria of 70 dBA L_{dn} or less for urban residential infill, but would exceed the City's "normally acceptable" criteria of 65 dBA L_{dn} or less for multi-family residential uses.

Future Interior Noise Environment

The California Green Building Code would apply to the Community Center building, resulting in acceptable interior noise levels. Portions of the proposed three-story residential dormitory would be located as close as 75 feet from the center of Industrial Boulevard. At this distance, exterior noise levels are calculated to be about 73 dBA L_{dn}, taking into account a 1 dBA increase in noise levels under future conditions. Exterior noise levels at building facades setback further from Industrial Boulevard or in shielded locations would experience lower noise levels.

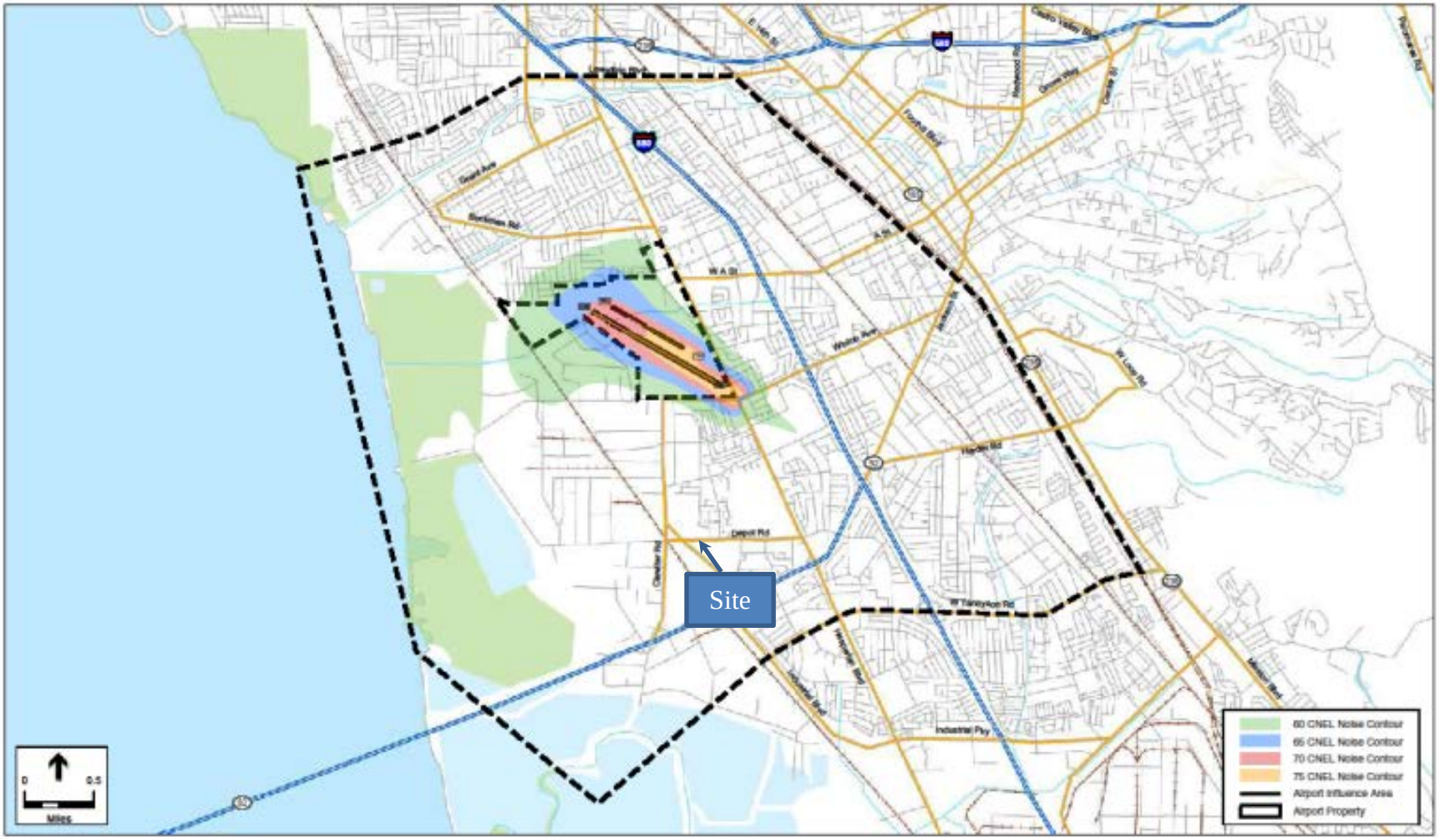
Interior noise levels would vary depending upon the design of the buildings (relative window area to wall area) and the selected construction materials and methods. Standard residential construction provides approximately 15 dBA of exterior-to-interior noise reduction, assuming the windows are partially open for ventilation. Standard construction with the windows closed provides approximately 20 to 25 dBA of noise reduction in interior spaces. Where exterior noise levels range from 60 to 65 dBA L_{dn}, the inclusion of adequate forced-air mechanical ventilation is often the method selected to reduce interior noise levels to acceptable levels by closing the windows to control noise. Where noise levels exceed 65 dBA L_{dn}, forced-air mechanical ventilation systems and sound-rated construction methods are normally required. Such methods or materials may include a combination of smaller window and door sizes as a percentage of the total building façade facing the noise source, sound-rated windows and doors, sound-rated exterior wall assemblies, and mechanical ventilation so windows may be kept closed at the occupant's discretion.

Assuming standard construction methods, the interior noise levels in dormitory residences with windows open would be up to 58 dBA L_{dn}, which exceeds the City's threshold for interior noise.

Aircraft Noise

The project site is located about 1.1 miles south of the Hayward Executive Airport. The Alameda County Airport Land Use Commission (ALUC) has jurisdiction over new land uses in the vicinity of airports in Alameda County. Schools and residences are considered "generally acceptable" in noise environments of 60 dBA CNEL or less. The noise contours for Hayward Executive Airport (Figure 3-3 from the ALUC Plan) are shown in Figure 2, below. The project site is located outside the 60 dBA CNEL noise contour established for Hayward Executive Airport. Exterior and interior noise levels resulting from aircraft would be compatible with the proposed project.

FIGURE 2: Hayward Executive Airport Land Use Compatibility Plan Figure 3-3, Noise Compatibility Zones



Recommended Conditions of Approval

For consistency with the General Plan, the following Conditions of Approval are recommended for consideration by the City:

- Methods available to reduce exterior noise levels in dormitory student plaza and social area to meet the 65 dBA L_{dn} multi-family residential criteria include site planning alternatives (e.g., altering the orientation of the proposed building to use the proposed building as noise barriers) and/or the construction of sound walls.

    - A redesign of the dormitory building to shield the student plaza and social area from Industrial Boulevard would reduce the exterior noise environment to below 65 dBA L_{dn}.

    - Alternately, preliminary calculations indicate that the construction of 5 foot high sound barrier would reduce exterior noise levels to 65 dBA L_{dn} or less. The barrier could be constructed in the location of the portion of the proposed 'security fence' connecting the dormitory and the school building. To be effective, the wall must be constructed with a solid material with no gaps in the face of the wall or at the base. Openings or gaps between sound wall materials or the ground substantially decrease the effectiveness of the sound wall. Suitable materials for sound wall construction should have a minimum surface weight of 3 pounds per square foot (such as 1-inch-thick wood, ½-inch laminated glass, masonry block, concrete, or metal one-inch). The final recommendations for mitigation shall be confirmed when detailed plans are available.

- Provide a suitable form of forced-air mechanical ventilation, as determined by the local building official, for all dormitory residences, so that windows can be kept closed to control noise.

- Provide sound rated windows in dormitory rooms facing Industrial Boulevard to maintain interior noise levels at acceptable levels. Preliminary calculations show that sound-rated windows with minimum STC[1] Ratings of 28 to 32 would be satisfactory for rooms to achieve acceptable interior noise levels. The specific determination of what noise insulation treatments are necessary shall be conducted on a room-by-room basis during final design of the project.

- A qualified acoustical specialist shall prepare a detailed analysis of interior residential noise levels resulting from all exterior sources during the design phase pursuant to requirements set forth in the State Building Code. The study will review the final site plan, building elevations, and floor plans prior to construction and recommend building treatments to reduce residential interior noise levels to 45 dBA L_{dn} or lower. Treatments

[1] **Sound Transmission Class (STC)** A single figure rating designed to give an estimate of the sound insulation properties of a partition. Numerically, STC represents the number of decibels of speech sound reduction from one side of the partition to the other. The STC is intended for use when speech and office noise constitute the principal noise problem.

would include, but are not limited to, sound-rated windows and doors, sound-rated wall and window constructions, acoustical caulking, protected ventilation openings, etc. Results of the analysis, including the description of the necessary noise control treatments, shall be submitted to the City, along with the building plans and approved design, prior to issuance of a building permit.

NOISE IMPACT AND MITIGATION MEASURES

Significance Criteria

Paraphrasing from Appendix G of the CEQA Guidelines, a project would normally result in significant noise impacts if noise levels generated by the project conflict with adopted environmental standards or plans, if the project would generate excessive groundborne vibration levels, or if ambient noise levels at sensitive receivers would be substantially increased over a permanent, temporary, or periodic basis. The following criteria were used to evaluate the significance of environmental noise resulting from the project:

- **Groundborne Vibration from Construction:** A significant impact would be identified if the construction of the project would expose persons to vibration levels exceeding 0.3 in/sec PPV because of the potential to result in cosmetic damage to buildings of normal conventional construction.

- **Permanent Noise Increase from Project Traffic and Operations.** The impact would be considered significant if:

    - Project operations would exceed the noise limits specified in the City's Municipal Code (60 dBA between the hours of 9:00 pm and 7:00 am and 70 dBA between the hours of 7:00 am and 9:00 pm at residential property), or if

    - Project traffic would increase noise levels at noise sensitive receptors by 3 dBA L_{dn} or L_{eq} or greater where exterior noise levels would exceed the normally acceptable noise level standard.[2] Where noise levels would remain at or below the normally acceptable noise level standard with the project, noise level increases of 5 dBA L_{dn} or L_{eq} or greater would be considered significant.

- **Temporary Noise Increase from Construction Noise.** Construction noise impacts would be considered significant if hourly average noise levels received at noise sensitive residential land uses exceed the thresholds specified in the Municipal Code or are 60 dBA L_{eq} and at least 5 dBA L_{eq} above the ambient noise environment when the duration of the noise-generating activities last for more than one year.

[2] Per the Hayward 2040 General Plan, residential land uses are considered "normally acceptable" in noise environments of 60 dBA L_{dn} or less.

Impact 1: **Groundborne Vibration from Construction.** Construction-related vibration would not be excessive at nearby land uses. **This is a less-than-significant impact.**

Construction of the project would occur in three phases over a period of about five years. Phase 1 would include interior renovation and the construction of a perimeter fence. No major upgrades or renovation are proposed for Phase 1 and groundborne vibration generated during this phase would be minimal. Phase 2 would construct a community center in the northeastern portion of the site over a period of about 12 months (March 2018 to February 2019). Phase 3 would construct a student residence hall in the southeastern portion of the site over a period of about 12 months (March 2020 to February 2021).

The closest structures to the project construction are residences located about 90 to 100 feet east of the site and a print shop located about 50 feet south of the project site. The California Department of Transportation uses a vibration limit of 0.3 in/sec PPV for buildings that are found to be structurally sound and designed to modern engineering standards. No sensitive historic structures or buildings that are documented to be structurally weakened adjoin the project site. Therefore, groundborne vibration levels exceeding 0.3 in/sec PPV would have the potential to result in a significant vibration impact.

Project construction activities, such as drilling, the use of jackhammers, rock drills and other high-power or vibratory tools, and rolling stock equipment (tracked vehicles, compactors, etc.) may generate substantial vibration in the immediate vicinity of the work area. Table 5 presents typical vibration levels that could be expected from construction equipment at a distance of 25 feet. Pile driving would not be expected as a foundation construction technique.

TABLE 5 Vibration Source Levels for Construction Equipment

Equipment		**PPV at 25 ft. (in/sec)**	**Approximate L_v at 25 ft. (VdB)**
Pile Driver (Impact)	upper range	1.158	112
	typical	0.644	104
Pile Driver (Sonic)	upper range	0.734	105
	typical	0.170	93
Clam shovel drop		0.202	94
Hydromill (slurry wall)	in soil	0.008	66
	in rock	0.017	75
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

Source: Transit Noise and Vibration Impact Assessment, United States Department of Transportation, Office of Planning and Environment, Federal Transit Administration, May 2006.

Vibration levels would vary depending on soil conditions, construction methods, and equipment used. Detailed construction plans are unavailable at this time. Phase 1 construction is anticipated to generate minimal vibration off-site. Phase 2 construction would be located as close as 100 feet from adjacent residences to the east. Phase 3 construction would be located about 50 feet from the print shop building to the south and about 100 feet from residences to the east. Vibration levels from periods of heavy construction are anticipated to be 0.1 in/sec PPV or less at a distance of 50 feet from construction and 0.05 in/sec PPV or less at a distance of 100 feet from construction. These levels are well below the significance threshold. Vibration generated by construction activities near the common property lines would at times be perceptible, however, would not be expected to result in "architectural" damage to these buildings. This is a **less-than-significant** impact.

Mitigation Measure 1: None Required.

Impact 2: Permanent Noise Increases from Project Traffic and Operations. Project operations and traffic would not generate noise levels in excess of the City's Municipal Code noise limits or cause a substantial noise increase at nearby noise sensitive uses. **This is a less-than-significant impact.**

California Crosspoint High/Middle School's buildout enrollment would include 400 high school students, 150 middle school students, 50 preschool students, and 70 staff members. At full build out, the dormitory would house 150 high school students and staff. It is anticipated that 20 off-site students would commute by bicycle or on foot and 200 students would use the school buses and public transportation. Approximately 50 students would utilize carpool or ride share arrangements.

School would be in session roughly from mid-August through the end of May, with summer school running from mid-June through the end of July. Regular school hours would be weekdays from 8:15 am to 3:20 pm. Approximately 60 percent of the students are anticipated to stay after school extracurricular programs, which would extend until 5:30 pm.

The school would have a closed campus policy and students would be attending classes during all periods. Students would utilize the patio area and basketball courts during lunch periods, extending from approximately 12:05 pm to 1:10 pm each weekday. Physical Education (PE) classes of approximately 20 students would play either basketball or volleyball in the outdoor movable basketball court area or in one of the designated 'fitness training' classrooms during some morning periods (9:20 am to 10:10 am) and some afternoon periods (1:40 pm to 2:30 pm). Once the gymnasium and community center are completed, indoor activities would be moved to the new building. No other outdoor activities or events are anticipated as the campus does not have an outdoor play area. During periods when the school is not using the community center (i.e., evenings, weekends, and school breaks), the school may make it available for use by community organizations.

A significant impact would occur if project operations would exceed the noise limits specified in the City's Municipal Code (60 dBA between the hours of 9:00 pm and 7:00 am and 70 dBA between the hours of 7:00 am and 9:00 pm at residential property), or if project traffic would

increase noise levels at noise sensitive receptors by 3 dBA L_{dn} or L_{eq} or greater where exterior noise levels would exceed the normally acceptable noise level standard.[3] Where noise levels would remain at or below the normally acceptable noise level standard with the project, noise level increases of 5 dBA L_{dn} or L_{eq} or greater would be considered significant.

Project Traffic Noise

Vehicular traffic accesses the school via three driveways from Industrial Boulevard. Traffic volumes were supplied by *Fehr & Peers* for 11 intersections in the vicinity of the project. Traffic noise levels are anticipated to increase by 1 dBA or less at all study intersections as a result of the project. Slow moving vehicles entering, existing, and parking in the school parking lot would be similar in character, but considerably lower in level, to existing traffic noise generated by vehicles traveling along Industrial Boulevard or other local roadways. This is a **less-than-significant** impact.

Operational Noise Sources

Schools are considered to be compatible with residential land uses. On-site noise sources associated with school operations would include mechanical equipment noise, student activities such as sports, conversations, etc., and low speed vehicle noise associated with parking and student drop-offs and pick-ups (described above). The closest existing noise sensitive uses are residences located east of the site, which are exposed to existing noise levels ranging from 63 to 72 dBA L_{dn}. The construction of the community center and student residence hall buildings would provide acoustical shielding from Industrial Boulevard to existing residences located east of the site, resulting in reduced traffic noise levels in these areas.

The only proposed mechanical related improvements to the existing school building would be the installation of fume hoods in three to four science classrooms, which are not anticipated to be audible at adjacent residences. Specific details on mechanical equipment for the community center and student residence hall buildings have not been provided at this time. Indoor equipment would not generally be audible outside of the building envelope. Based on information from *Illingworth & Rodkin, Inc.* files, typical school building roof mounted heating, ventilation, and air conditioning equipment would be anticipated to generate a noise levels of 45 to 60 dBA L_{eq} at a distance of 50 feet from the equipment. Both of these buildings are proposed at a distance of about 110 feet from adjacent residences to the east. At a distance of 110 feet, noise levels would be about 38 to 52 dBA L_{eq}, not taking into account the noise reduction provided by any intervening structures and would not be anticipated to be audible above existing ambient noise (i.e., traffic noise from vehicles on Industrial Boulevard). Depending on the location and layout of the equipment, an additional 10 to 20 dBA or more could be anticipated due to shielding from the buildings and rooftop.

The school proposes movable basketball courts along the northwestern portion of the site, with the closest court located about 360 feet from the nearest residence. Lighting is not proposed for these courts and the courts would only be utilized during lunch and PE periods as described

[3] Per the Hayward 2040 General Plan, residential land uses are considered "normally acceptable" in noise environments of 60 dBA L_{dn} or less.

above. There are no sporting events or games planned for these courts and noise levels would be limited to ball bounces, the sound of the ball hitting the hoop or backboard, occasional whistles, and players' voices. The existing concrete wall located along the site property line is anticipated to provide about 5 dBA of noise reduction from these activities to residences to the east. Maximum noise levels of about 60 to 65 dBA L_{eq} could be anticipated at a distance of 100 feet from these activities. At 360 feet, noise levels would be about 11 dBA lower. Taking into account the noise reduction provided by the existing concrete barrier, maximum noise levels in the range of 44 to 49 dBA L_{max} would be anticipated at the nearest residences to the east. Hourly average noise levels would be considerably lower, depending on the use of the courts. Prior to construction of Phases 2 and 3, these noises are anticipated to be occasionally distinguishable from the other ambient noise sources due to the character of the noise, but would be below noise level generated by existing ambient noise sources. The proposed community center and student residence hall, once constructed, would provide considerable shielding from basketball activity noise to residences to the east. With the construction of the community center and student residence hall buildings in Phases 2 and 3, outdoor sports activities are not anticipated to be audible at residences.

The existing Student Patio Area and proposed Dormitory Student Plaza and Social Area are anticipated to be used by students and staff for eating, reading, studying, and small group discussions, primarily during lunch periods. Normal conversation typical generates noise levels of 60 to 65 dBA at a distance of 3 feet. Residences are located as close as 150 feet from the proposed Dormitory Student Plaza and Social Area and 400 feet from the Student Patio Area. Both of these social areas are oriented so as to provide shielding to residences from the building layouts. The existing concrete property line wall would also provide shielding to these residences. Not taking shielding into account, noise levels from conversations would be less than 30 dBA at these locations, which would be 20 to 30 dBA L_{eq} below ambient daytime hourly average noise levels. The existing school building and concrete wall and the proposed student residence hall would be anticipated to provide 10 to 20 dBA of additional acoustical shielding to these residences. As a result, student conversations and activities in these areas are not anticipated to be audible at adjacent residences.

School operations are not anticipated to be audible above existing ambient noise levels at the nearest existing noise sensitive land uses, located east of the site. Operations would not exceed the 60 dBA Municipal Code threshold at residences or cause a measureable increase in noise levels at these locations. This is a **less-than-significant** impact.

Mitigation Measure 2: None Required.

Impact 3: **Temporary Noise Increase from Construction.** Noise levels generated by construction activities on the site would result in a substantial temporary increase in noise. **This is a potentially significant impact.**

Project construction would occur in three phases over a period of about five years. Phase 1 would include interior renovation and the construction of a perimeter fence. No major upgrades or renovation are proposed for Phase 1. Phase 2 would construct a community center in the northeastern portion of the site over a period of about 12 months (March 2018 to February 2019).

Phase 3 would construct a student residence hall in the southeastern portion of the site over a period of about 12 months (March 2020 to February 2021).

Residences to the east of the project site are located as close as 100 feet from proposed Phase 2 and 3 construction. The remaining surrounding uses would not be considered noise sensitive. Construction would be conducted in accordance with the Municipal Code limits. Construction noise impacts would be considered significant if hourly average noise levels received at noise sensitive residential land uses are 60 dBA L_{eq} and at least 5 dBA L_{eq} above the ambient noise environment when the duration of the noise-generating activities last for more than one year.

Construction equipment noise varies greatly depending on the construction activity performed, type and specific model of equipment, and the condition of equipment used. Noise impacts resulting from construction depend on the noise generated by various pieces of construction equipment, the timing and duration of noise generating activities, the distance between construction noise sources and noise sensitive receptors, any shielding provided by intervening barriers or structures, and existing ambient noise levels.

Each construction activity would include a different mix of equipment operating. Construction noise levels would vary based on the amount of equipment in operation and location where the equipment is operating. Typical construction noise levels at a distance of 50 feet are shown in Tables 6 and 7. Table 6 illustrates the average noise level range by typical construction phase type and Table 6 shows the maximum noise level range for different construction equipment. Table 7 levels are consistent with construction noise levels calculated for the project in the Federal Highway Administration (FHWA) Roadway Construction Noise Model, including the anticipated equipment that would be used for each phase of the project. Most demolition and construction noise is in the range of 80 to 90 dBA at a distance of 50 feet from the source. Noise levels would typically drop off at a rate of about 6 decibels per doubling of distance from the construction noise source.

TABLE 6 Typical Ranges of Construction Noise Levels at 50 Feet, dBA L_{eq}

Equipment	Domestic Housing		Office Building, Hotel, Hospital, School, Public Works		Industrial Parking Garage, Religious Amusement & Recreations, Store, Service Station		Public Works Roads & Highways, Sewers, and Trenches	
	I	II	I	II	I	II	I	II
Ground Clearing	83	83	84	84	84	83	84	84
Excavation	88	75	89	79	89	71	88	78
Foundations	81	81	78	78	77	77	88	88
Erection	81	65	87	75	84	72	79	78
Finishing	88	72	89	75	89	74	84	84

I - All pertinent equipment present at site, **II** - Minimum required equipment present at site.
Source: U.S. EPA., Legal Compilation on Noise, Vol. 1, p. 2-104, 1973

TABLE 7 Construction Equipment Noise Emission Levels (at 50 feet)

Equipment Category	L_{max} Level (dBA)[1,2]	Impact/Continuous*
Arc Welder	73	Continuous
Auger Drill Rig	85	Continuous
Backhoe	80	Continuous
Bar Bender	80	Continuous
Boring Jack Power Unit	80	Continuous
Chain Saw	85	Continuous
Compressor[3]	70	Continuous
Compressor (other)	80	Continuous
Concrete Mixer	85	Continuous
Concrete Pump	82	Continuous
Concrete Saw	90	Continuous
Concrete Vibrator	80	Continuous
Crane	85	Continuous
Dozer	85	Continuous
Excavator	85	Continuous
Front End Loader	80	Continuous
Generator	82	Continuous
Generator (25 KVA or less)	70	Continuous
Gradall	85	Continuous
Grader	85	Continuous
Grinder Saw	85	Continuous
Horizontal Boring Hydro Jack	80	Continuous
Hydra Break Ram	90	Impact
Impact Pile Driver	105	Impact
Insitu Soil Sampling Rig	84	Continuous
Jackhammer	85	Impact
Mounted Impact Hammer (hoe ram)	90	Impact
Paver	85	Continuous
Pneumatic Tools	85	Continuous
Pumps	77	Continuous
Rock Drill	85	Continuous
Scraper	85	Continuous
Slurry Trenching Machine	82	Continuous
Soil Mix Drill Rig	80	Continuous
Street Sweeper	80	Continuous
Tractor	84	Continuous
Truck (dump, delivery)	84	Continuous
Vacuum Excavator Truck (vac-truck)	85	Continuous
Vibratory Compactor	80	Continuous
Vibratory Pile Driver	95	Continuous
All other equipment with engines larger than 5 HP	85	Continuous

Notes:
*Impact activities impact the ground or construction surface, such as pile driving, while continuous activities emit more constant noise, such as construction vehicles.
[1]Measured at 50 feet from the construction equipment, with a "slow" (1 sec.) time constant.
[2]Noise limits apply to total noise emitted from equipment and associated components operating at full power while engaged in its intended operation.
[3]Portable Air Compressor rated at 75 cfm or greater and that operates at greater than 50 psi.
Source: FHWA

The nearest noise sensitive uses are residences located about 100 feet east of Phase 2 and 3 construction. As described in the Setting Section of this assessment, existing hourly average daytime noise levels at residences east of the site are in the range of 63 to 72 dBA L_{dn}, depending on the proximity to Industrial Boulevard, with daytime hourly average noise levels in the range of 57 to 72 dBA L_{eq}.

Detailed construction information is not available at this time. It is assumed that pile driving would not be needed for project construction. Noise from Phase 1 construction would be minimal at off-site locations. Phase 2 and 3 construction activities are anticipated to generate hourly average noise levels of 69 to 83 dBA L_{eq} at a distance of 100 feet during busy construction periods. Maximum instantaneous noise levels would be about 75 to 84 dBA L_{max} at a distance of 100 feet. Noise levels would typically drop off at a rate of about 6 decibels per doubling of distance from the construction noise source. The existing concrete property line barrier would provide about 5 dBA of noise reduction from ground level noise sources. The highest construction noise levels are typically generated during periods of heavy construction such as site work and excavation. Noise generated during interior building construction and renovations is typically minimal at off-site locations.

Phase 2 and 3 are each anticipated to be constructed over a period of 12 months, with a rest period of about 12 months occurring between Phase 2 and Phase 3 construction. Site work and excavation and building construction for Phases 2 and 3 would be anticipated to exceed 60 dBA L_{eq} and at least 5 dBA L_{eq} above the ambient noise environment at adjacent residences. It is not known at this time what portion of each phase would include exterior construction. Although exterior construction would be anticipated to take place over a period of less than 12 months for each individual phase and the two phases are separated by a period of about 12 months, the total period of construction exceeding these limits for both phases could exceed 12 months. This is a **potentially significant** impact.

Mitigation Measure 3: Develop a construction noise mitigation plan, which considers the following available controls to reduce construction noise levels as low as practical:

- Pursuant to the Hayward Municipal Code, restrict noise-generating activities including construction traffic at the construction site or in areas adjacent to the construction site to the hours of 7:00 am to 7:00 pm, Monday through Saturday, and 10:00 am to 6:00 pm on Sundays and holidays.

- Pursuant to the Hayward Municipal Code, no individual device or piece of equipment shall produce a noise level exceeding 83 dBA at a distance of 25 feet from the source. If the device or equipment is housed within a structure on the property, the measurement shall be made outside the structure at a distance as close as possible to 25 feet from the equipment.

- Pursuant to the Hayward Municipal Code, the noise level at any point outside of the property plane shall not exceed 86 dBA.

- Emphasize the importance of minimizing construction noise impacts at pre-bid conferences. Potential contractors should be requested to submit information on their

noise management procedures, and to demonstrate a successful track record of construction noise management on prior projects.

- Equip all internal combustion engine driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.

- Unnecessary idling of internal combustion engines should be strictly prohibited.

- Located stationary noise generating equipment such as air compressors or portable power generators as far as possible from sensitive receptors. Staging areas shall be located a minimum of 200 feet from residential units.

- Utilize “quiet” air compressors and other stationary noise sources where technology exists.

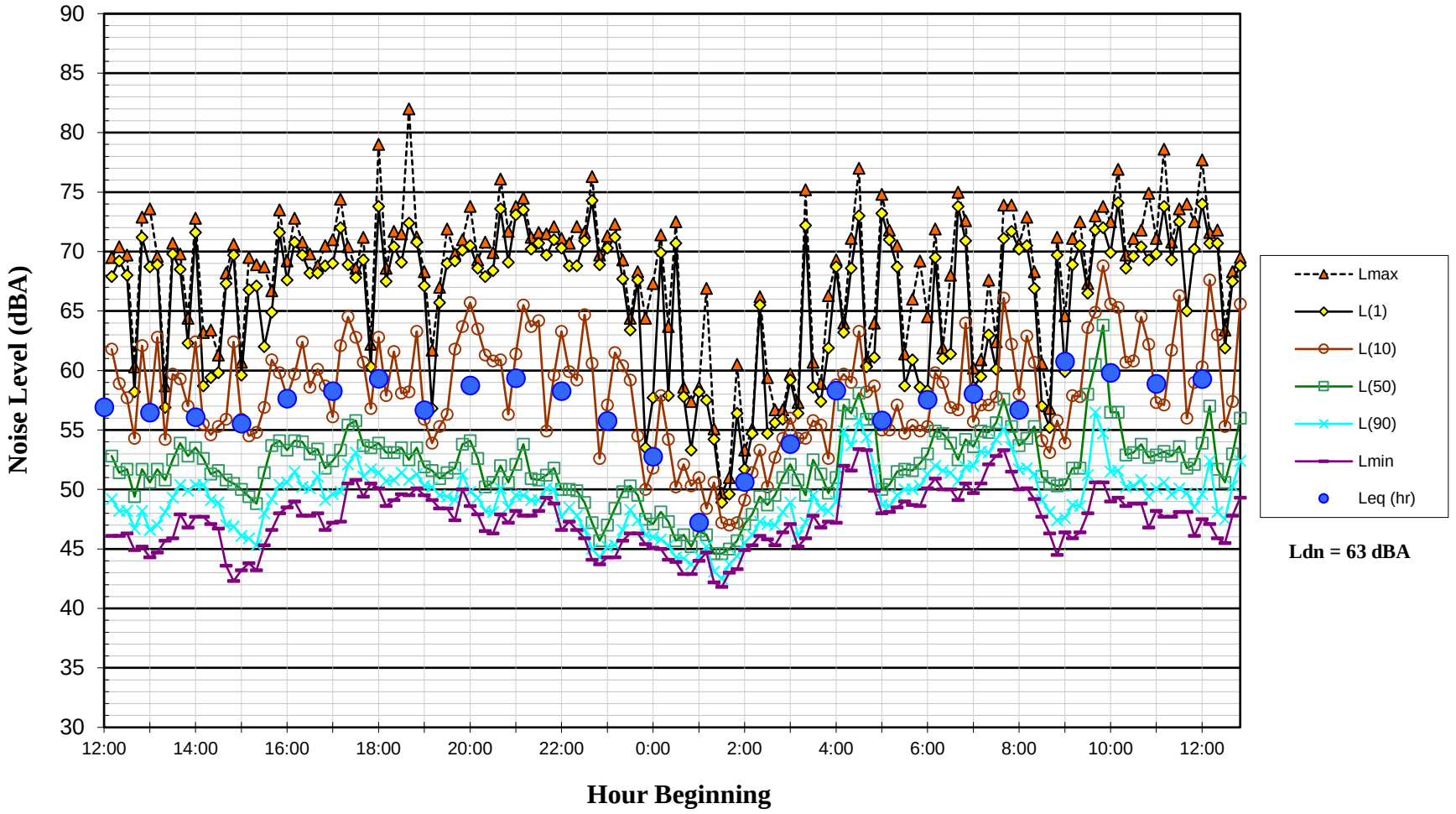
- Control noise from construction workers’ radios to a point where they are not audible at existing residences bordering the project site.

- Neighbors located adjacent to the construction site shall be notified of the construction schedule in writing.

- Designate a “disturbance coordinator” who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator will determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and will require that reasonable measures warranted to correct the problem be implemented. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include in it the notice sent to neighbors regarding the construction schedule.

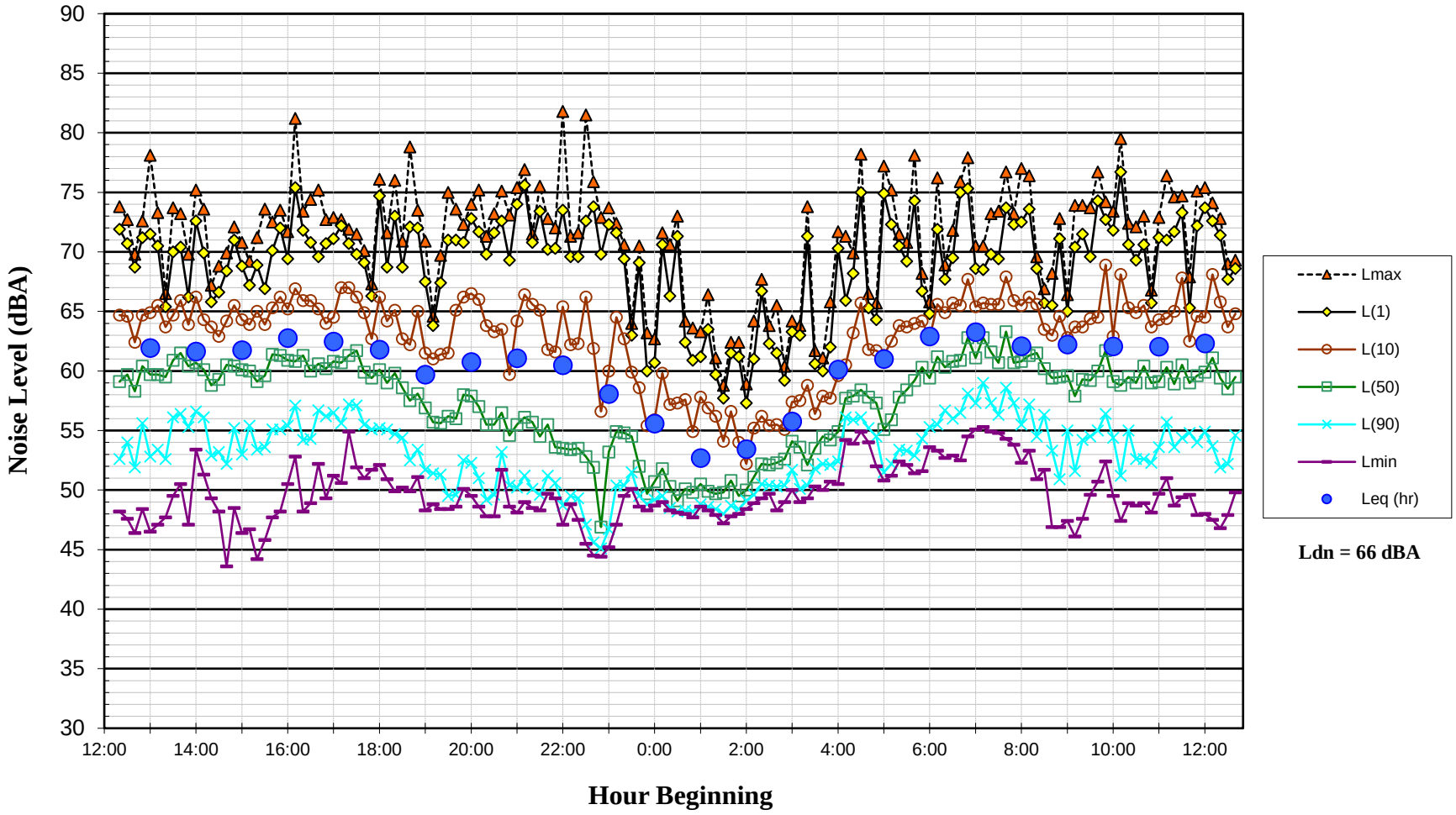
Implementation of the above standard controls would reduce construction noise levels emanating from the site, limit construction hours, and minimize disruption and annoyance. With the implementation of these controls, and recognizing that noise generated by construction activities would occur over a temporary period, the temporary increase in ambient noise levels would be **less-than-significant**.

Noise Levels at Noise Measurement Site LT-1
Northeastern Corner of Property
February 11 to 12, 2016



Ldn = 63 dBA

Noise Levels at Noise Measurement Site LT-2
South End of Property
February 11 to 12, 2016



Ldn = 66 dBA