FINAL EIR APPENDIX F
NOISE ANALYSIS IMPACT REPORT

FINAL

NOISE IMPACT ANALYSIS
LOS ANGELES STATE HISTORIC PARK
MASTER DEVELOPMENT PLAN
LOS ANGELES, CALIFORNIA

Prepared for:

California State Parks
Southern Service Center
8885 Rio San Diego Drive, Suite 270
San Diego, California 92108

Prepared by:

AECOM
1420 Kettner Boulevard, Suite 500
San Diego, California 92101
(619) 233-1454

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CHAPTER 1.0
INTRODUCTION

The Los Angeles State Historic Park (LASHP) Master Development Plan (proposed project) is located in the northwestern portion of the city of Los Angeles, approximately 2 miles northeast of downtown Los Angeles. The proposed project site encompasses the entire LASHP (approximately 32 acres), which is bordered by North Broadway to the north and west, and North Spring Street to the south and east. A regional map and a vicinity map of the proposed project site and its vicinity are provided as Figures 1 and 2, respectively.

The 32-acre park site is a flat, elongated, grass-covered area traversed with paved and unpaved walkways, and a few picnic amenities. The park is primarily used for picnicking, jogging, running, biking, and activities that need large open areas. The LASHP also hosts a number of small and large special events that attract individuals from outside of the area.

The LASHP Master Development Plan includes the potential re-creation of natural habitats and blends the historical importance and narratives of the site with programs, environments, and built structures to establish a major public open space and destination for future generations to celebrate the past, present, and future of Los Angeles. The site would include gateways, cultural and ecological demonstration projects, a cultural ecology center, civic gathering and play areas, pathways, a lawn with a performance venue, and cultural interpretive theme areas and sites.

The LASHP General Plan/Environmental Impact Report (EIR) was approved by the State Park and Recreation Commission on June 10, 2003. The proposed project synthesizes the General Plan/EIR goals and guidelines into design concepts that will be implemented in phases as funding becomes available. Interim park uses have provided for immediate public use of LASHP as permanent planning and a long-term vision are developed. The phased LASHP Master Development Plan represents the design footprint of the long-term vision. Proposed project uses on the site include gateways, cultural and ecological demonstration projects, a cultural ecology center, civic gathering and play areas, a lawn and performance venue, and cultural interpretive theme areas and sites.

The proposed project's scope includes utility infrastructure (water, electricity, sewer, telephone, data), landscaping, irrigation systems, site drainage improvements, a multi-use plaza, flexible outdoor spaces to accommodate a variety and size of public events, a "great lawn" featuring an amphitheater/stage space for special events/performances for up to 25,000 people and for

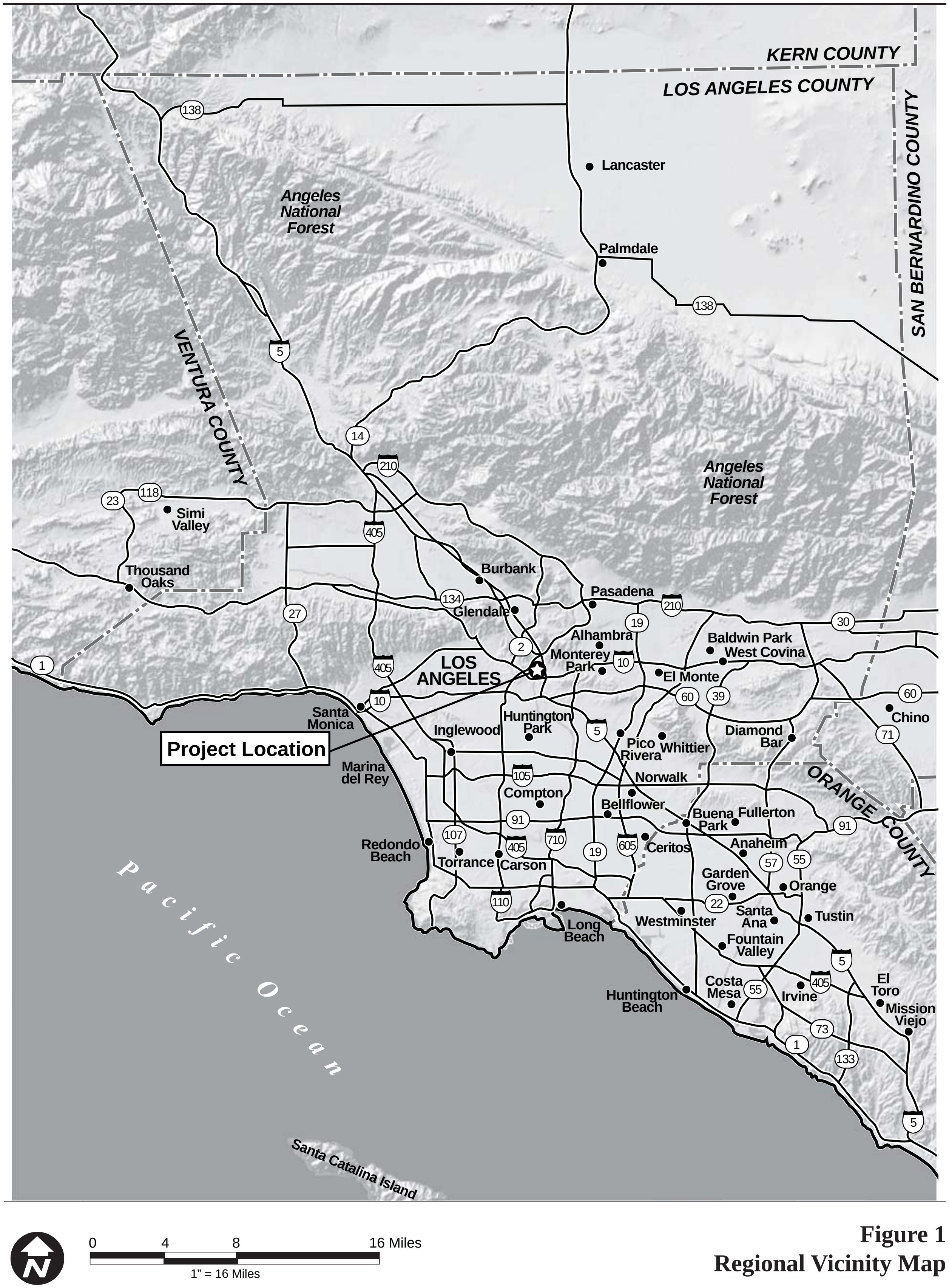
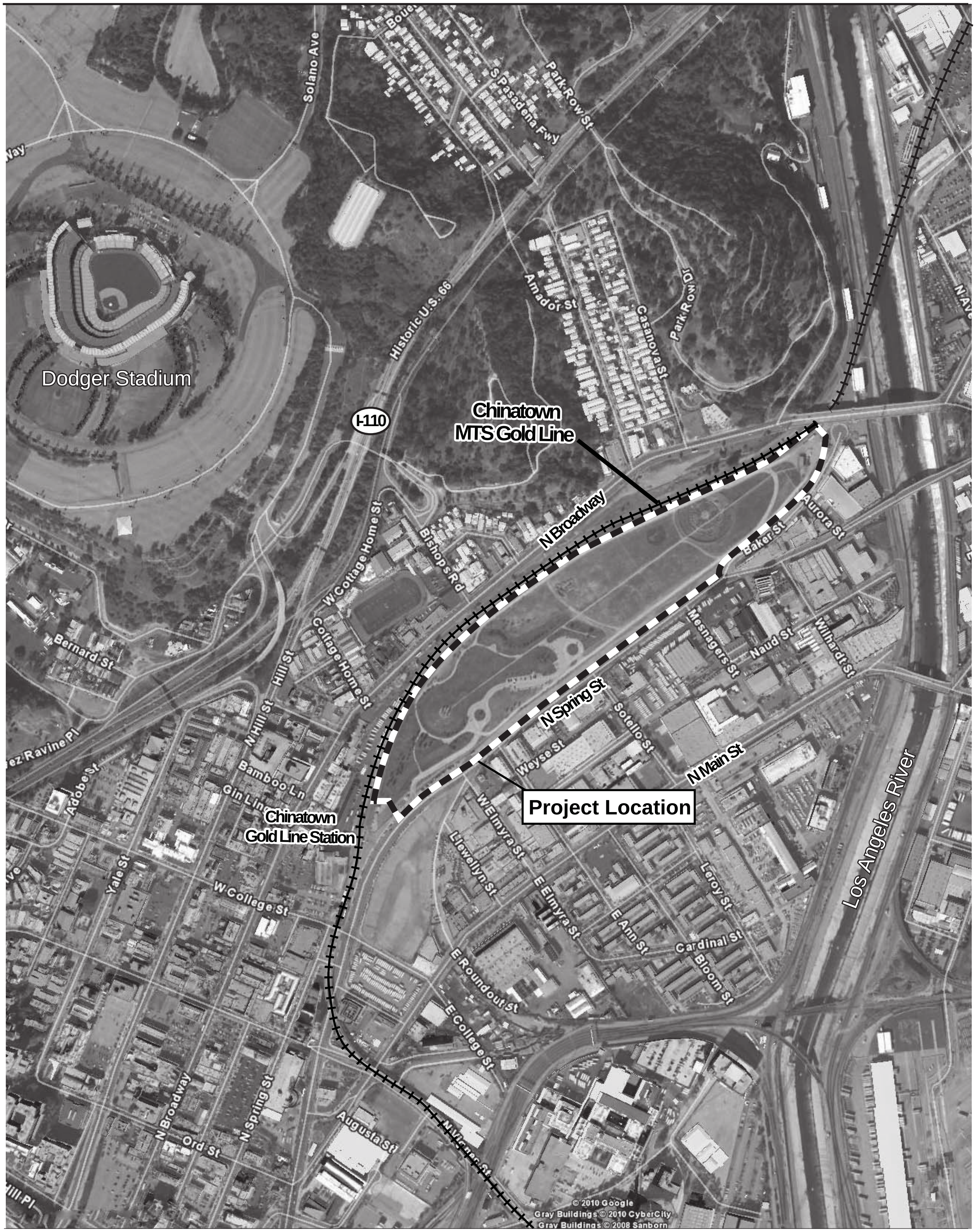


Figure 1
Regional Vicinity Map



NO SCALE

Figure 2
Local Vicinity Map

unstructured activities, interpretive paths and portals for engaging historic themes and content using traditional and new technologies, site lighting, site furnishings and signs, permanent restrooms, an operations yard with access road, a "Welcome Station" structure, an interpretive and administration center, shade structures, pedestrian and vehicle circulation systems, an interactive fountain/water feature(s), a children's play area, and cultural gardens.

This noise analysis provides a brief discussion of noise terminology; the existing ambient noise levels on the park and in its immediate surroundings; plans, policies, and regulations that govern noise levels on the park and at surrounding land uses; and the potential noise impacts from project construction, on-site daily activities, and large special events with concerts and the potential of hosting up to 25,000 people. Mitigation measures are recommended for project noise impacts found to be potentially significant.

CHAPTER 2.0
PROJECT DESCRIPTION

2.1 PROJECT LOCATION

The proposed project is located in northwestern Los Angeles, approximately 2 miles northeast of downtown Los Angeles, and immediately northeast of the community of Chinatown.

The project site is bordered by North Broadway to the north and west, and North Spring Street to the south and east.

Public vehicular access to the park is from North Spring Street at the southwestern end of the park, while access to the park's administrative office is from Baker Street to the northwest. Regional access to the park is from the Arroyo Seco Parkway State Route 110–Pasadena Freeway (SR-110) to the northwest, Interstate 5 (I-5) to the east, Interstate 10/Santa Monica Freeway to the southeast, and Highway 101 to the southwest. Each of these freeways is within 1.5 miles of the park site.

The Metropolitan Transit Authority's (MTA) Gold Line is a light rail line adjacent to the Union Pacific Rail Line that runs along the northern boundary of the park. The Gold Line currently runs between East Los Angeles and Pasadena, passing through the communities of Boyle Heights, Little Tokyo, Downtown Los Angeles, Highland Park, and South Pasadena. The closest Gold Line station to the LASHP is the elevated Chinatown Station located just west of the LASHP at the intersection of North Spring Street and College Street. In addition to the Gold Line, MTA and Santa Clarita Transit bus routes serve the area along North Broadway.

2.2 PROJECT DESCRIPTION

The LASHP General Plan/Environmental Impact Report (EIR) was approved by the State Park and Recreation Commission on June 10, 2003. The proposed project synthesizes the General Plan/EIR goals and guidelines into design concepts that will be implemented in phases as funding becomes available. Interim park uses have provided for immediate public use of LASHP as permanent planning and a long-term vision are developed. The phased LASHP Master Development Plan represents the design footprint of the long-term vision. Proposed project uses on the site include gateways, cultural and ecological demonstration projects, a cultural ecology center, civic gathering and play areas, a lawn and performance venue, and cultural interpretive theme areas and sites.

Site development would include grading and construction of the grass and stone plaza, new ranger modular offices, restrooms, two new driveways, parking areas, pathways, and running tracks. Other on-site activities during project construction would include relocation of the maintenance buildings and installation of signage, water fountains, lighting, picnic tables, benches, and landscaping.

The proposed project's scope includes utility infrastructure (water, electricity, sewer, telephone, data), landscaping, irrigation systems, site drainage improvements, a multi-use plaza, flexible outdoor spaces to accommodate a variety and size of public events, a "great lawn" featuring an amphitheater/stage space for special events/performances for up to 25,000 people and for unstructured activities, interpretive paths and portals for engaging historic themes and content using traditional and new technologies, site lighting, site furnishings and signs, permanent restrooms, an operations yard with access road, a "Welcome Station" structure, an interpretive and administration center, shade structures, pedestrian and vehicle circulation systems, an interactive fountain/water feature(s), a children's play area, and cultural gardens.

The proposal for LASHP's organizational structure is derived from the linear grain of the Railyard, with more hardscape park uses grouped closer to downtown and more resource-based uses proposed towards the river. The downtown end of LASHP would include a Welcome Station/café (park orientation and food), a large interactive interpretive fountain, civic gathering area (water play and visual gateway), and an interpretive play area (exercise and education). A "Railyard Plaza" would span the length of the North Spring Street frontage, unifying this long edge of the proposed project as a linear garden environment. LASHP is planned to extend the pedestrian orientation to the street and to accommodate on-site parking and flexible areas for special events, markets, and festivals.

The river end of LASHP draws its inspiration from the Los Angeles River as a center of local biodiversity, with a proposal to create over 5 acres of wetland and riparian habitats and an additional 5 acres of transitional and upland habitats. These wet and dry ecologies would allow visitors to experience the biological richness of the historic river corridor and may incorporate water cleansing bio-swales as a sustainability feature at this natural gateway into the site. Working in concert with these habitat zones, an ecology center along the edge of North Spring Street will facilitate public access to a wide range of indoor and outdoor interpretive, educational, community, and recreational programs as well as provide a possible restaurant venue.

In the center of the LASHP, the proposed project would construct a 5-acre multi-use lawn and performance venue that is oriented to a new plaza stage that would sit above the exact location of the archaeological remains of the historic turntable and roundhouse of the Railyard. Spanning across the LASHP from the top of the Welcome Station to North Broadway, a fountain bridge would be constructed to allow access from the neighborhoods atop the adjacent bluff and Elysian Park, and will provide shade and interpretive viewpoints (CSP 2008).

The proposed project would be built in phases. The first phase will allow LASHP to become fully functional and lay the foundation for work deferred to future phases. As a result, fundraising efforts will continue until enough private funding is raised to construct elements omitted from the first phase. Project construction is anticipated to occur over 12 months, beginning in the spring of 2013 and ending in the spring of 2014.

After completion of the proposed park improvements, average daily park usage is expected to increase and potentially include student daytime field trips and tourist trips to the site. Most daily park activities are assumed to occur between 8:00 a.m. and 10:00 p.m.

Friday night and weekend park usage and attendance are expected to increase, with as many as four daytime/evening/nighttime special events per year with attendance of up to 25,000 people. Smaller events of 500 to 5,000 people are expected to occur monthly on the site. Annual park attendance is expected to increase from approximately 125,000 people to 300,000 at buildout in 2014.

Special events at the park site are expected to include concerts and orchestras with the potential for fireworks, which would require a permit from the CDPR. Such events are anticipated to end at10 p.m. Sunday through Thursday and 11 p.m. on Friday or Saturday. No public address systems would be permanently installed at the park; however, special and other event organizers may employ amplifiers.

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CHAPTER 3.0
NOISE AND VIBRATION TERMINOLOGY AND CONCEPTS

3.1 AIRBORNE NOISE

Sound is a vibratory disturbance created by a moving or vibrating source, which may or may not be audible to the human ear. Noise is often defined as sound that is too loud, unpleasant, unexpected, and/or undesired by the human receptor. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance and, in the extreme, hearing impairment or loss (Caltrans 2009).

The degree to which noise affects people is highly subjective and may be influenced by a number of factors, such as the sensitivity of the individual human ear; the location, intensity, frequency and duration of the noise source; and the time of day. One key factor in the human response to noise is the intensity (i.e., loudness) of the new noise source in relation to the existing noise environment to which the individual has adapted. The louder the new noise source is relative to the existing noise environment, the more intolerable the new noise source would be.

Decibels and Frequency

In its most basic form, a continuous sound can be described by its frequency or wavelength (pitch) and its amplitude (loudness). Frequency is expressed in cycles per second, or hertz (Hz). Frequencies are heard as the pitch or tone of sound. High-pitched sounds produce high frequencies; low-pitched sounds produce low frequencies. Sound pressure amplitude is measured in micro-Pascals (mPa) and can range from 20 to 100,000,000 mPa. Because this huge range of values is cumbersome and difficult to use, a logarithmic scale is used to describe sound pressure in terms of decibels (dB). The threshold of hearing for young people is a sound pressure level (SPL) of about 0 dB, which corresponds to 20 mPa (Caltrans 2009).

Decibels are measured on a logarithmic scale and cannot be added or subtracted through ordinary arithmetic. A doubling of the sound pressure from a source, such as doubling of traffic volume, would increase the SPL by 3 dB; a halving of the energy would result in a 3-dB decrease. In way of example, if an air conditioner produces a SPL of 85 dB at 50 feet, two air conditioners at the same distance would produce 88 dB rather than 170 dB.

Perception of Sound at the Receiver and A-Weighting

The average healthy human ear can detect sounds that range in frequency from about 20 to 20,000 Hz. However, it is most sensitive to frequencies in the range of 1,000 Hz to 5,000 Hz (Caltrans 2009), and has a maximum sensitivity at around 3,000 Hz. Therefore, when measuring SPLs for the human ear, they are filtered to emphasize frequencies to between 3,000 and 6,000 Hz and to deemphasize very high and very low frequencies to which the ear is less sensitive. This filtering method is referred to as "A-weighting." An A-weighted decibel is abbreviated as dB(A) or dBA. The dBA curve is referenced to 20 mPa = 0 dB SPL (the threshold of hearing for the average healthy human ear). Table 1, Typical Sound Levels, identifies the typical sound levels to common outdoor and indoor activities.

Table 1
Typical Sound Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Fire Crackers[1]	— 110 —	Rock band
Jet fly-over at 1,000 feet		
	— 100 —	
Gas lawn mower at 3 feet		
	— 90 —	Orchestra at 10 feet[2]
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	— 80 —	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	— 70 —	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	— 60 —	
		Large business office
Quiet urban daytime	— 50 —	Dishwasher next room
Quiet urban nighttime	— 40 —	Theater, large conference room (background)
Quiet suburban nighttime		
	— 30 —	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	— 20 —	
		Broadcast/recording studio
	— 10 —	
Lowest threshold of human hearing	— 0 —	Lowest threshold of human hearing

1 Berger 2010

2 At 3 meters (approximately 10 feet), noise levels ranged from 103 to 122 L_{eq}, and peak noise levels ranged from 143 to 146 dBA L_{eq} (Berger 2010).

Source: Caltrans 2009, unless otherwise noted.

Because environmental SPLs fluctuate over time, they are often averaged over specific time intervals. This energy-averaged A-weighted sound level is called the Equivalent Sound Level (L_{eq}), and is equal to the level of a continuous steady sound containing the same total acoustical energy over the averaging time period as the actual time-varying sound. The acoustic range of the noise source being measured is represented by the L_{max} and L_{min} indicators, which represent the root-mean-square maximum and minimum noise levels obtained during the measurement interval. The L_{min} value obtained for a particular monitoring location is often called the "acoustic floor" for that location. The peak noise level is the non-root-mean-square maximum noise level obtained during the measurement interval.

A change in sound level of 1 dB is generally not perceptible to the average healthy human ear, except in controlled conditions and using pure tones. Outside of controlled laboratory conditions, the average human ear barely perceives a change of 3 dB. A change of 5 dB generally fosters a noticeable change in human response, and an increase of 10 dB is subjectively heard as a doubling of loudness (Caltrans 2009).

<u>Noise Propagation</u>

Sound pressure diminishes (attenuates) with distance. The degree to which sound pressure diminishes depends on geometric spreading, absorption, atmospheric effects, and shielding.

Geometric spreading from point and line sources: Noise sources occur in two forms: (1) point sources (e.g., stationary equipment and individual motor vehicles); and (2) line sources, such as a roadway with a large number of moving point sources (e.g., rail cars and vehicles). Sound waves from an individual (point) source radiates uniformly outward in a spherical pattern. The time interval for a point source can be instantaneous. Sound waves from line sources assume that the sources are moving in space over time and therefore appear to emanate from a line of spheres.

Ground absorption: Sound generated by a point source typically diminishes at a rate of 6.0 dBA for each doubling of distance from the source to the receptor at acoustically "hard" sites and 7.5 dBA at acoustically "soft" sites.[1] For example, a 60-dBA noise level measured at 50 feet from a point source at an acoustically hard site would be 54 dBA at 100 feet from the source. Sound generated by a line source typically attenuates at a rate of 3.0 dBA and 4.5 dBA per doubling of distance from the source to the receptor for hard and soft sites, respectively (FHWA 1980a).

[1] Examples of "hard" or reflective sites include asphalt, concrete, and hard and sparsely vegetated soils. Examples of acoustically "soft" or absorptive sites include sand, plowed farmland, grass, crops, and heavy ground cover.

Atmospheric effects: Wind speed will bend the path of sound to "focus" it on the downwind side and make a "shadow" on the upwind side of the source. At short distances, up to 164 feet, the wind has minor influence on the measured sound level. For longer distances, the wind effect becomes appreciably greater. Temperature gradients create effects similar to those of wind gradients, except that they are uniform in all directions from the source. On a sunny day with no wind, temperature decreases with altitude, giving a shadow effect for sound. On a clear night, temperature may increase with altitude, focusing sound on the ground surface (Caltrans 2009).

Shielding by natural and human-made features, noise barriers, diffraction, and reflection: Sound levels can also be attenuated by human-made or natural barriers (e.g., sound walls, berms, ridges) and elevation differences. A large object in the path between a noise source and a receiver can significantly attenuate noise levels at that receiver location. The amount of attenuation provided by this "shielding" depends on the size of the object and the frequencies of the noise levels. Natural terrain features such as hills and dense woods, as well as fabricated features such as buildings and walls, can significantly alter noise levels.

Barrier attenuation depends on the height, type of construction, and distance of the barrier relative to the noise source and the noise receptor, as well as surrounding reflective surfaces (FHWA 1980b). Sound levels may also be attenuated 3.0 to 5.0 dBA by a first row of houses and 1.5 dBA for each additional row of houses (FHWA 2010). Furthermore, the type of building construction and whether or not doors and windows are opened will affect interior noise levels to varying degrees.

Noise Descriptors

The intensity of environmental noise typically fluctuates over time and several different descriptors of time-averaged noise levels are used. The selection of noise descriptor depends on the noise source, the time of day it is generated, its duration, and the purpose for collecting or predicting the noise levels (e.g., to determine if the noise source is in compliance with noise regulations or standards). The noise descriptors used in this report to describe environmental noise are defined below.

- L_{max} *(Maximum Noise Level):* The highest A-weighted integrated noise level occurring during a specific period of time.
- L_{eq} *(Equivalent Noise Level):* The energy mean (average) noise level. The steady-state sound level that, in a specified period of time, contains the same acoustical energy as a varying sound level over the same time period.

- L_{dn} *(Day-Night Noise Level):* The L_{dn} is the average A-weighted sound level measured over a 24-hour time period that is adjusted by 10 dBA upwardly during the nighttime noise-sensitive hours of 10 p.m. through 7 a.m. The L_{dn} attempts to account for the fact that noise during this specific period of time is a potential source of disturbance with respect to normal sleeping hours.
- *CNEL (Community Noise Equivalent Level):* CNEL is another average A-weighted sound level measured over a 24-hour time period, but it is adjusted during the evening and nighttime hours. A CNEL noise measurement is obtained after adding 5 dB to sound levels occurring during the evening from 7 p.m. to 10 p.m., and 10 dB to sound levels occurring during the nighttime from 10 p.m. to 7 a.m. The 5 dB and 10 dB are added to account for most people's increased noise sensitivity during the evening and nighttime hours[2] (Caltrans 2009). The CNEL is used by the State of California and the County of Los Angeles to evaluate land-use compatibility with regard to noise.
- SEL (Sound Exposure Level): The SEL describes the cumulative exposure to sound energy over a stated period of time.
- SENEL (Single Event Noise Exposure Level): The SENEL is an SEL where the measurement period is defined by the start and end times of a single noise event, such as an automobile or train pass-by, aircraft flyover, or individual industrial operations.

3.2 GROUNDBORNE VIBRATION AND NOISE

Groundborne vibration consists of oscillatory waves that propagate from the source through the ground to adjacent structures. The frequency of a vibrating object describes how rapidly it is oscillating. The number of cycles per second of oscillation is the vibration frequency, which is described in terms of Hz. The normal frequency range of most groundborne vibration that can be felt generally by the human body starts from a low frequency of less than 1 Hz to a high of about 200 Hz (Crocker 2007).

Perception of Vibration at the Receiver

While people have varying sensitivities to vibrations at different frequencies, in general they are most sensitive to low-frequency vibration. Vibration in buildings from construction activities may cause rattling of windows, items on shelves, and pictures hanging on walls. Vibration of building components can also take the form of an audible low-frequency rumbling noise, which

[2] The logarithmic effect of adding these decibels to the peak-hour L_{eq} measurement results in a CNEL measurement that is within approximately 3 dBA (plus or minus) of the peak-hour L_{eq}.

is referred to as groundborne noise. Groundborne noise is usually only a problem when the originating vibration spectrum is dominated by frequencies in the upper end of the range (60 to 200 Hz), or when foundations or utilities, such as sewer and water pipes, physically connect the structure and the construction activity (FTA 2006).

Although groundborne vibration is sometimes noticeable in outdoor environments, it is almost never annoying to people who are outdoors (FTA 2006). The primary concern from vibration is that it can be intrusive and annoying to building occupants and vibration-sensitive land uses.

Vibration Propagation

Vibration energy spreads out as it travels through the ground, causing the vibration level to diminish with distance away from the source. High-frequency vibrations diminish much more rapidly than low frequencies, so that low frequencies tend to dominate the spectrum at large distances from the source. Discontinuities in the soil strata can also cause diffractions or channeling effects that affect the propagation of vibration over long distances. When vibration encounters a building, a ground-to-foundation coupling loss will usually reduce the overall vibration level. However, under certain circumstances, the ground-to-foundation coupling may actually amplify the vibration level due to structural resonances of the floors and walls.

Vibration Descriptors

Vibration levels are usually expressed as a single-number measure of vibration magnitude in terms of velocity or acceleration, which describes the severity of the vibration without the frequency variable. The peak particle velocity (PPV) is defined as the maximum instantaneous positive or negative peak of the vibration signal, usually measured in inches per second. The threshold of human annoyance from vibration is 0.10 inch per second PPV (Jones & Stokes 2004:14).

CHAPTER 4.0
EXISTING CONDITIONS

4.1 PROJECT AREA

The project site encompasses the entire LASHP and is located in an urban area characterized by a mix of residential and nonresidential uses. The LASHP is immediately bound by the Union Pacific Rail Line (MTA Gold Line) to the northwest and North Spring Street and Baker Street to the southeast. Park elevation ranges between 295 to 305 feet above mean sea level (AMSL). The Gold Line along the project boundary is at-grade; however, the Gold Line is elevated to the southwest as it approaches the Chinatown Station, and to the northeast where it crosses the Los Angeles River.

North of this rail line is a narrow strip of undeveloped land with a steep elevation that rises approximately 40 feet between the rail line and North Broadway. Bordering North Broadway to the north is a mix of residential, institutional, and commercial uses. To the east lie the Atchison, Topeka, and Santa Fe Rail Line and the channelized Los Angeles River. Southeast of the park and Spring Street lies an area of predominantly industrial uses, while Chinatown and the Chinatown Community Redevelopment Area lie to the southwest and west.

Further north and northwest of the LASHP are Elysian Park, the Solano Canyon residential neighborhood, Radio Hill Gardens, SR-110, and Dodger Stadium. The stadium rises to approximately 500 feet AMSL, while the highest point in Elysian Park rises to over 700 feet amsl. Farther to the east are I-5/Golden State Freeway and the community of Lincoln Heights. Farther to the south is the William Mead Housing complex, while farther to the southwest is El Pueblo de Los Angeles, Highway 101, and downtown Los Angeles. These latter areas are at relatively the same elevation as the LASHP.

The north- and southbound Gold Line trains are a regular daily noise source adjacent to the park from early morning to after midnight. On weekdays (Monday through Friday), northbound trains run along the northern park boundary between the Chinatown Station and the Heritage Square Station at 7- to 20-minute intervals from 3:40 a.m. to midnight. The trains run at 7-minute intervals from approximately 6:30 a.m. to 8:30 a.m. and at 12-minute intervals from 8:30 a.m. to 8:00 p.m. Southbound weekday trains run from approximately 5:00 a.m. to 1:00 a.m. They run at 7-minute intervals from 6:30 a.m. to 8:40 a.m. and then from 4:40 p.m. to 8:00 p.m., and at 12-minute intervals from 8:40 a.m. to 8:00 p.m.

On Saturday, Sunday, and holidays, northbound trains run at 12- to 20-minute intervals from 3:40 a.m. to midnight. The 12-minute intervals occur from approximately 11:00 a.m. to 7:00 p.m. Southbound trains run at 12- to 20-minute intervals from 5:00 a.m. to 1:00 a.m., with the 12-minute intervals occurring from approximately 11:00 a.m. to 7:30 p.m. (MTA 2010).

Predominant sources of off-site noise that is audible within the LASHP are the Gold Line trains, local bus traffic on North Broadway, vehicular traffic (including heavy-duty truck traffic) along North Spring Street, and activities in the light industrial area south of North Spring Street. Less audible sources are passenger car traffic noise along North Broadway; activities at the residential, commercial, and institutional uses along North Broadway; and traffic along the I-5 to the east.

A traffic report, *Los Angeles State Historic Park, Draft Transportation Analysis, November 2011*, was prepared for the project. Traffic operations were analyzed at the intersections of roadways surrounding the LASHP, which currently operate at acceptable levels of service (LOS D or better) during both the weekday PM and Saturday midday peak hours.

Over-flights of airplanes and helicopters are short-term sources of noise that become distinctly audible, peak, and then dissipate over the course of less than 40 seconds.[3]Airports nearest the project site are Airports nearest the project site are Burbank, 12 miles to the northwest; Los Angeles International, 14 miles to the southwest; Long Beach 18 miles to the south; and Ontario 36 miles to the east.

4.2 PROJECT SITE

The 32-acre LASHP site is a flat, elongated, grass-covered area traversed with paved and unpaved walkways. Site elevation ranges between 295 to 305 feet amsl. A long, linear walkway connects the southwestern end of the park with its northeastern end where there is a small park administration building, a maintenance trailer, and a parking area near the terminus of Baker Street. A circular, mandala-like garden (referred to as the Anabolic Monument [CSP 2009]) occupies the northeastern quadrant of the park, while the southwestern 13 acres of the site are developed with a parking lot, curvilinear walkways, trees, and open grass play areas. Park amenities on the site include a small lunch stand, a drinking fountain, benches, picnic tables, and an information kiosk.

[3] This is based on data from a helicopter overflight on September 30, 2010. Other types of aircraft would be noticeably audible for a lesser period of time because they would travel at a faster speed and at a higher elevation than a helicopter.

From a planning perspective, the LASHP is within the Central City North Community Plan Area of the *City of Los Angeles General Plan* Land Use Element (City 2000), the Draft Cornfield Arroyo Seco Specific Plan (CASP) (City 2010a) area (classified as a community redevelopment area), and the Los Angeles River Revitalization Master Plan (City 2007) area. The Central City North Community Plan designates the site as Industrial; however, it is expected that, once adopted, the Draft CASP designations for the LASHP would become effective. None of these plans contain goals, objectives, or policies that pertain to noise control within the planning areas; however, the Draft CASP is expected to guide future growth in the project area, including the development of noise-sensitive residences southeast of the park. Therefore, the Draft CASP is briefly discussed below and is the basis of the cumulative noise impact analysis.

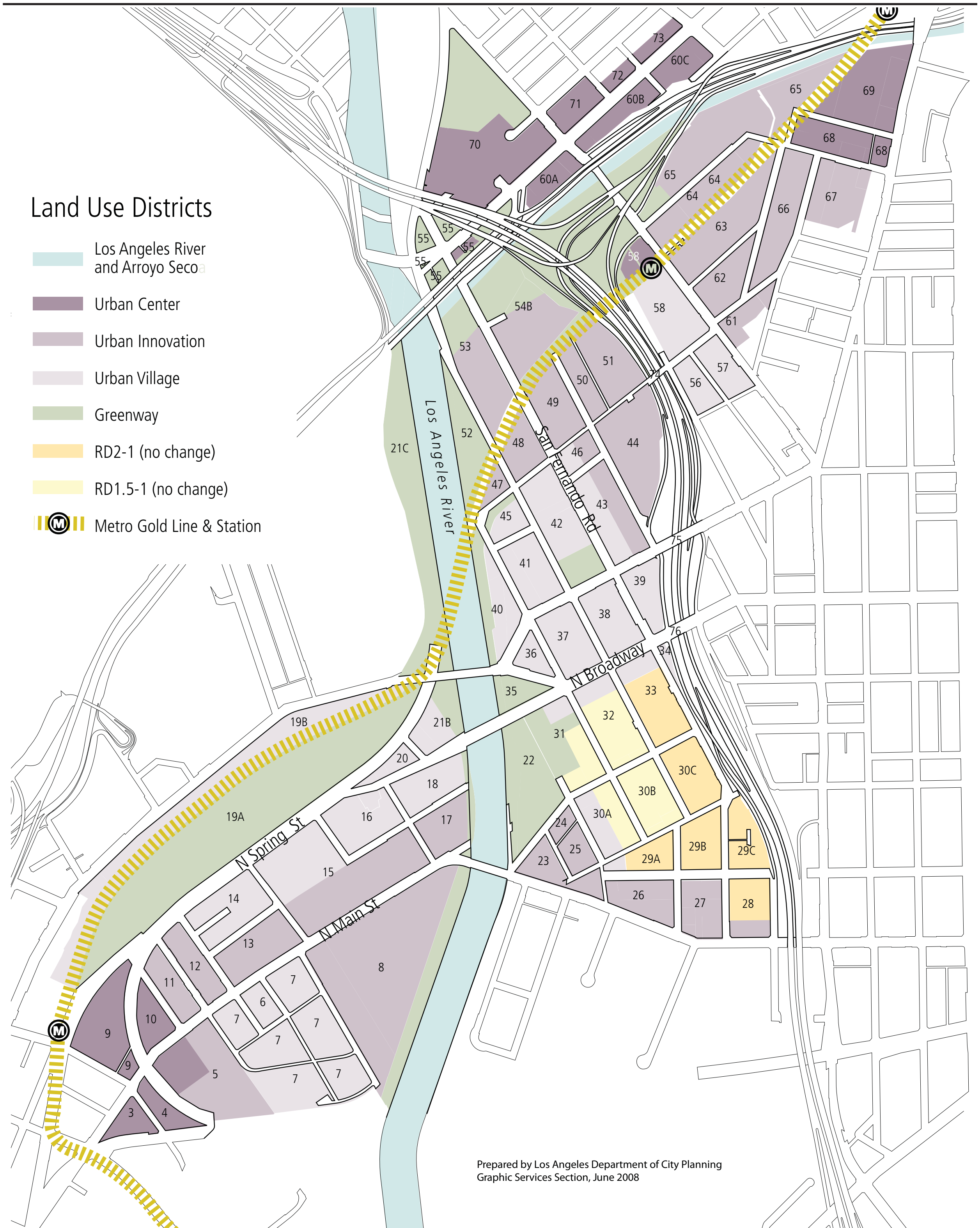
The Draft CASP area is 663 acres and located just 1 mile north of downtown Los Angeles and includes the communities of Lincoln Heights, Cypress Park, and Chinatown—including the areas around the Chinatown and Lincoln/Cypress Metro Gold Line Stations (see Figure 3, Cornfield Arroyo Seco Specific Plan Area). The purpose of the Draft CASP is to facilitate the transformation of the area from vehicle-oriented and primarily industrial uses to a mixed-use community oriented to pedestrian and multimodal uses that would ultimately accommodate 10,000 residential units and 24.7 million square feet of light industrial and commercial space. Within the Draft CASP, the LASHP is commonly referred to as the "Cornfield" or the "Cornfields Rail Yard."

The Draft CASP designates the LASHP as "Greenway," while the industrial area south of North Spring Street and east of Ann Street, and the strip of land between the Gold Line and North Broadway are designated as "Urban Village." Land to the west of Ann Street is designated as "Urban Innovation" and "Urban Center" (see Figure 4, Cornfield Arroyo Seco Specific Plan Districts).

The Greenway District designation is primarily for recreation or open space; limited development is permitted within this district if it provides for recreational, arts, educational, and/or community-related activities. The Urban Village designation provides for a mixture of residential and supporting, and compatible nonresidential land uses, while the Urban Innovation designation provides for a flexible range of light industrial uses, and research and development activities that benefit from proximity to community, entertainment, and recreational activities. Finally, the Urban Center Districts, located immediately adjacent to each of the three transit stations within the CASP area, would provide for a wide range of land uses including retail, offices, restaurants, light industrial, and limited residential. Lodging, entertainment, and civic uses are also encouraged within this district (City 2010a).

Source: Draft Cornfield-Arroyo Seco Specific Plan. November 2010

Figure 3
Cornfield Arroyo Seco Specific Plan Area



Source: Draft Cornfield-Arroyo Seco Specific Plan. November 2010

Figure 4
Cornfield Arroyo Seco Specific Plan Districts

4.3 NOISE SENSITIVE RECEPTORS

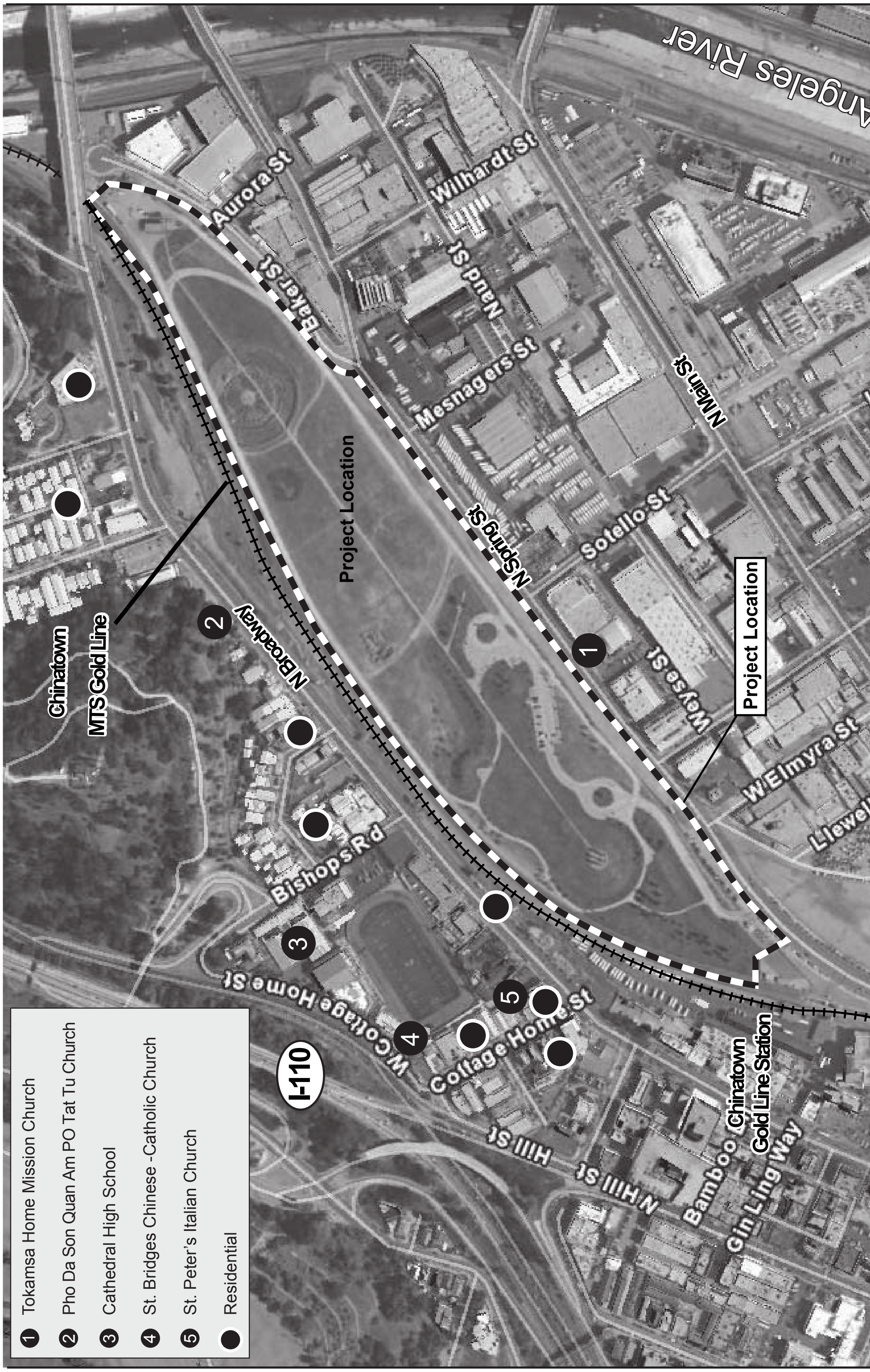
Some land uses are considered more sensitive to elevated noise levels than others based on the types of activities they support. The *L.A. CEQA Thresholds Guide: Your Resource for Preparing CEQA Analyses in Los Angeles* (City 2006) identifies residences, schools, motels and hotels, libraries, religious institutions, hospitals, nursing homes, auditoriums, concert halls, amphitheaters, and parks within Los Angeles as generally more sensitive to noise than commercial and industrial land uses.

Noise-sensitive receptors in the project area are residences, St. Peter's Italian Church, St. Bridges Chinese Catholic Church, Cathedral High School, and Pho Da Son Quan Am PO TatTu Church to the north of North Broadway. The Ttokamsa Home Mission Church is another noise-sensitive receptor to the south of the park and at the intersection of North Spring Street and Sotello Street (see Figure 5, Nearby Noise-Sensitive Land Uses).

4.4 EXISTING NOISE LEVELS

LASHP serves approximately 125,000 people per year and hosts special events during the warmer months with as many as 25,000 people in attendance (Brown 2010). Current daily sources of noise generated at the park are routine maintenance activities, vehicles in the parking lots, children playing, picnicking, runners and joggers, skateboarding, biking, informal ball games, and dogs barking. Additional noise sources that typically occur on Friday nights and weekends during the warmer seasons are smaller organized events, periodic concerts, and larger special events.

Noise from daily activities at the park is typical of a residential area and not incompatible with the residences located along North Broadway. Noise from large special events as described above, however, is not typical of most residential neighborhoods, but it is within the noise environment of the LASHP, which is composed of residential, commercial retail and restaurant, institutional, and light industrial uses. Large special event noise is compatible with the noise-generating attractions provided in Chinatown located to the immediate southwest of the LASHP, the Cathedral High School football field located 0.2 mile to the northwest, and Dodger Stadium located 0.5 mile to the northwest.



NO SCALE

Figure 5
Nearby Noise-Sensitive Land Uses

Short-term ambient[4] noise measurements were taken at seven locations on and near the park on Thursday, September 30, 2010, using a Larson-Davis sound level meter, which satisfies the American National Standards Institute for general environmental noise measurement instrumentation. The meter was mounted on a tripod approximately 5 feet above ground level to simulate the average height of the human ear, and was calibrated before and after each measurement. The weather was mostly sunny, approximately 90 degrees Fahrenheit, with wind speeds ranging from approximately 1 to 6.5 miles per hour. Each monitoring location is illustrated in Figure 6, Noise Monitoring Locations. Detailed measurement data are provided in Appendix A.

The measured data for each location are summarized in Table 2, Short-Term Noise Measurement Summary. As shown, noise levels at the park ranged from 54 to 66 dBA L_{eq}, depending on the distance between the noise meter and predominant off-site noise sources. Measured ambient noise levels at off-site sensitive receptors along North Broadway were 58 and 62 dBA L_{eq}, and higher than the on-site noise measurements.

The measured noise level along North Spring Street was 66 dBA L_{eq} due to the traffic (particularly heavy-duty truck traffic) along that roadway and the nearby light industrial activities. Noise levels in this area are expected to be lower during the weekend when many businesses are likely to be closed.

Measured ambient noise levels during the frequent train pass-bys ranged from 61 to 69 dBA L_{eq}. The duration of the train noise events depended upon whether a single train was passing the site, or whether the northbound and southbound trains were passing the site at the same time. As the weekday and weekend train schedules for the Gold Line are very similar, the frequency of occurrence of these train pass-by noise levels will be every day of the week, with a high likelihood of two trains passing the site at the same time.

4.5 APPLICABLE STANDARDS

While the park is within the City of Los Angeles, it is owned by the State of California and subject to state regulations. Nonetheless, this section acknowledges the following plans, policies, regulations, and guides that pertain to the noise in the project area: (1) the State of California,

[4] Ambient noise measurements were taken in accordance with Chapter XI, Article 1 of the *City of Los Angeles Municipal Code*, which requires that the ambient noise measurement be "averaged over a period of at least 15 minutes at a location and time of day comparable to that during which the measurement is taken of the particular noise source being measured."

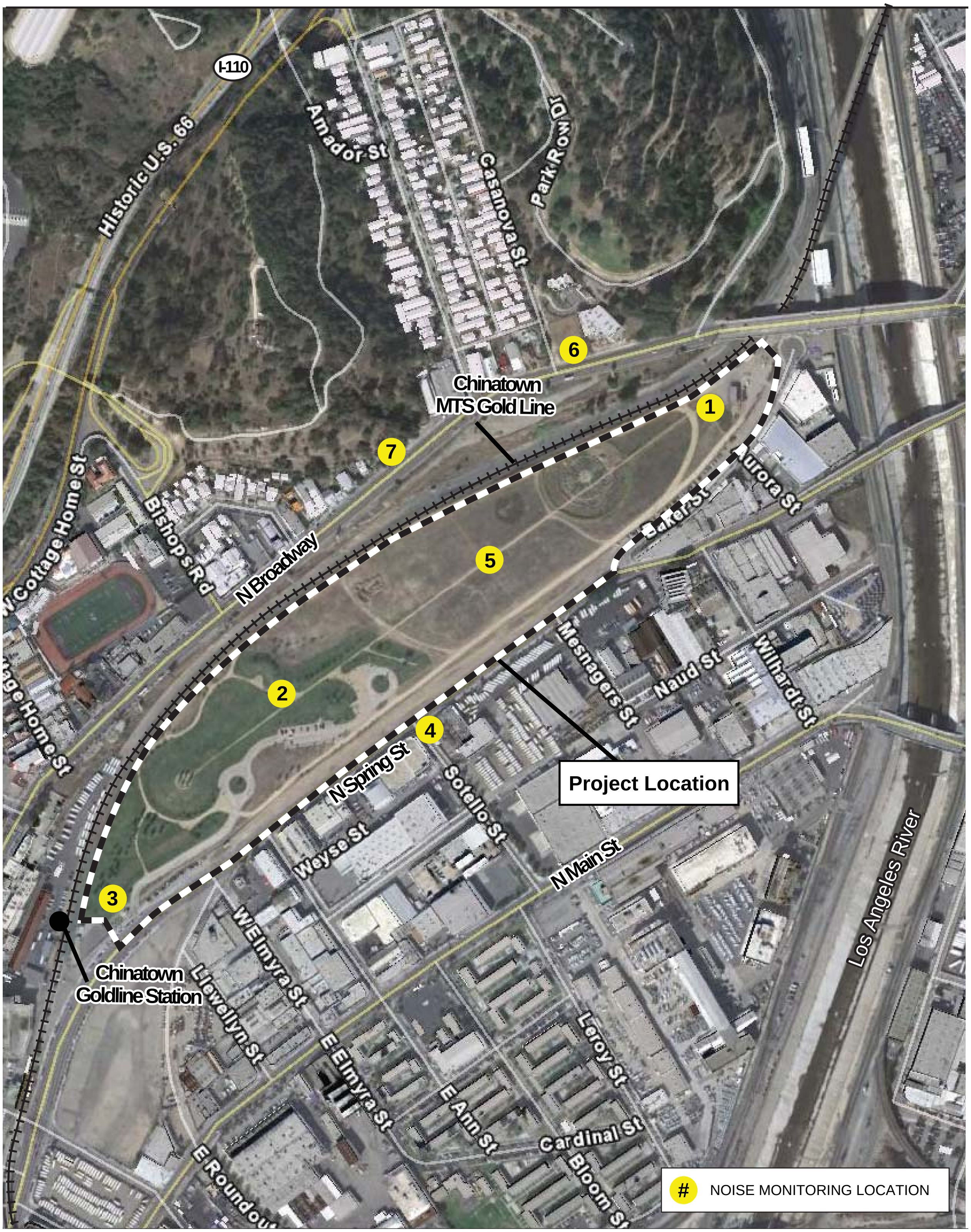


Figure 6
Noise Monitoring Locations

Table 2
Short-Term Noise Measurement Summary

Monitoring Location Number*	Primary Noise Sources	Monitoring Times	Distance to (feet)		Sound Level		
			Rail Line	N. Spring Street Centerline	L_{eq}	L_{max}	L_{min}
1	On-site Measurement Traffic on Baker St., heavy-duty truck traffic, airplanes, helicopters, trains	11:20–11:30	102	235	54	73[1]	51
Averaged Ambient Sound Level during Train Pass-bys 4 events)					69	--	--
2	On-site Measurement Traffic on N. Broadway and N. Spring St., helicopters, heavy-duty truck idling along N. Spring St., trains	13:23–13:41	280	360	56	76[2]	54
Averaged Ambient Sound Level during Train Pass-bys (3 events)					64	--	--
3	On-site Measurement Airplanes, trains, helicopters, freeway in distance	13:56–14:14	80	160	57	70[1]	55
Averaged Ambient Sound Level during Train Pass-bys (2 events)					64	--	--
4	Off-site Measurement Traffic on N. Spring St. and Sotello St., and nearby industrial uses	14:28–14:43	690	45	66	85[3]	56
5	On-site Measurement Traffic on N. Spring St., airplanes, and nearby industrial uses	11:44–12:03	285	310	56	73[4]	52
Averaged Ambient Sound Level during Train Pass-bys (4 events)					61	--	--
6	Off-site Measurement Traffic on N. Broadway and Casanova	15:00–15:15	270	715	58	80[5]	49
7	Off-site Measurement Traffic on N. Broadway	15:24–15:34	210	840	62	88[6]	56

Noise monitoring conducted by AECOM, September 30, 2010. Data and data sheets are provided in Appendix A.
* Monitoring location number correlates to Figure 6, Noise Monitoring Locations.
[1] Maximum noise level occurred during train pass-by.
[2] Maximum noise level occurred during helicopter fly-over.
[3] Maximum noise level was from heavy-duty truck traffic.
[4] Maximum noise level was from an ambulance along N. Spring St.
[5] Maximum noise level was from a garbage truck.
[6] Maximum noise level was from a public bus.

Department of Health Services, Environmental Health Division *Guidelines for Noise and Land Use Compatibility* (State Guidelines) (OPR 2003); (2) the *City of Los Angeles General Plan*; (3) the *City of Los Angeles Municipal Code* (City 2010b); and (4) the *L.A. CEQA Thresholds Guide* (City 2006).

The Federal Highway Administration (FHWA), Federal Transit Administration (FTA), State of California Department of Transportation (Caltrans), and City of Los Angeles have not adopted regulations for vibration. The FTA and Caltrans have, however, published standards that these agencies use in their own studies. These standards are discussed below.

Guidelines for Noise and Land Use Compatibility

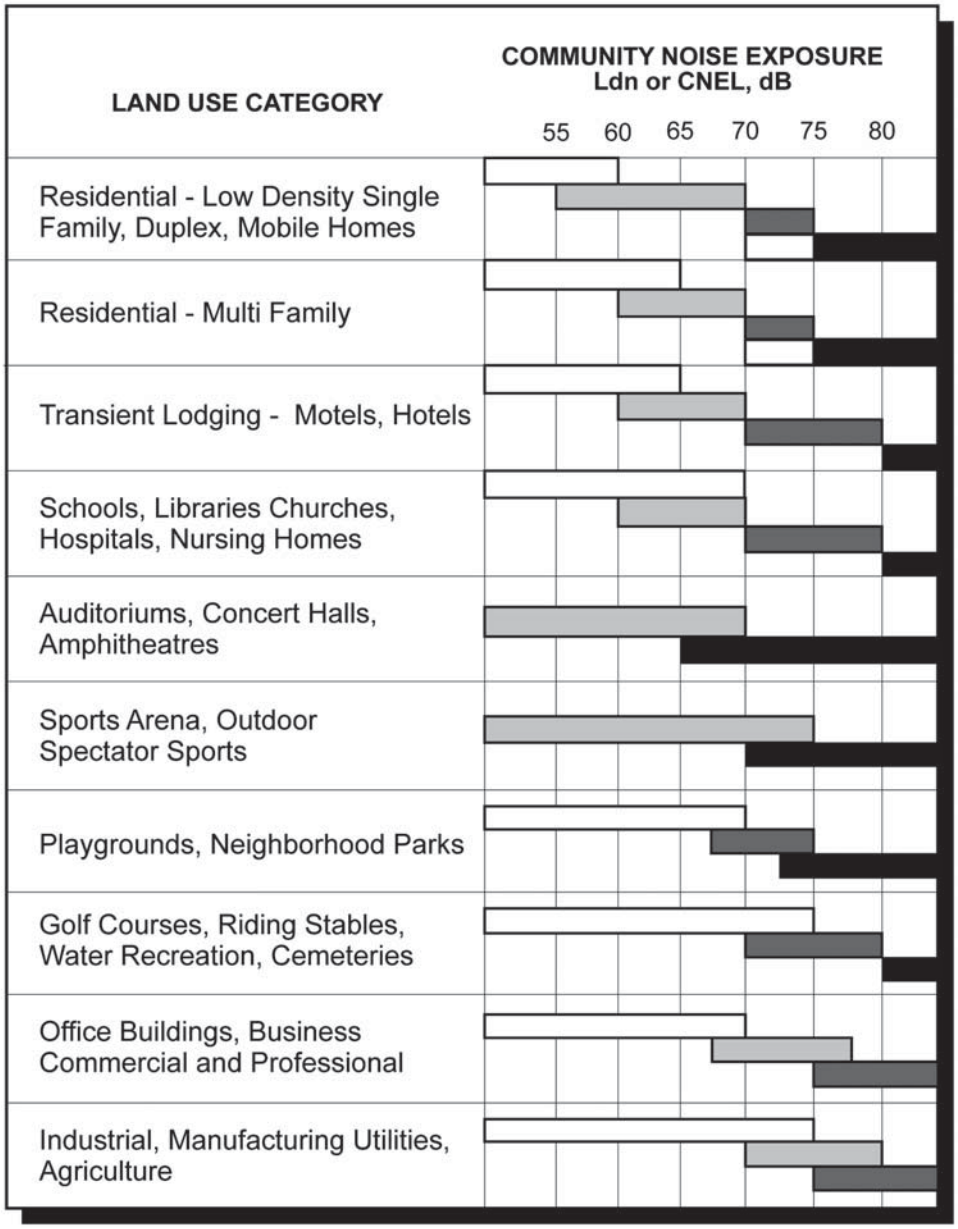
The State Guidelines[5] were published in 1976 as a requirement of Health and Safety Code §46050(g) (California Noise Control Act). Among other things, the guidelines recommend acceptable exterior noise levels for various land uses (see Figure 7, Guidelines for Noise and Land Use Compatibility). Under the State Guidelines, an exterior noise level of 70 dBA L_{dn}/CNEL is typically the dividing line between an acceptable and unacceptable exterior noise environment for all noise-sensitive uses, including schools, libraries, places of worship, hospitals, day care centers, and nursing homes of conventional construction. Noise levels below 75 dBA L_{dn}/CNEL are typically acceptable for office and commercial buildings, while levels up to 80 dBA L_{dn}/CNEL are typically acceptable for industrial uses.

Section 65302(f(1) of the California Government Code requires that each jurisdiction recognize the State Guidelines while preparing its general plan, but the California Government Code does not mandate application of the compatibility matrix to development projects.

City of Los Angeles General Plan

The Noise Element contained in the *City of Los Angeles General Plan* (City 1999) discusses the various sources of noise that affect land uses and land development within its jurisdiction, including airport and overhead flights, freight trains, light rail, vehicular traffic, and industrial activities. The Noise Element also lists goals, objectives, policies, and implementation programs that promote land use compatibility for noise-sensitive uses, which it defines as single-family and multiunit dwellings, long-term care facilities (including convalescent and retirement

[5] These guidelines are most currently published by California Governor's Office of Planning and Research in *State of California General Plan Guidelines*, Appendix C: Guidelines for the Preparation and Content of the Noise Element of the General Plan (OPR 2003).



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.

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 included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

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 reduction features included in the design.

CLEARLY UNACCEPTABLE
New construction or development should generally not be undertaken.

Source: L.A. CEQA Thresholds Guide, 2006

Figure 7
Guidelines for Noise and Land Use Compatibility

facilities), dormitories, motels, hotels, transient lodgings, and other residential uses; houses of worship; hospitals; libraries; schools; auditoriums; concert halls; outdoor theaters; nature and wildlife preserves; and parks (City 1999:3-1, 4-1). While these goals, objectives, policies, and implementation programs do not directly apply to the LASHP, which is under State of California jurisdiction, they are consistent with the State Guidelines published by the State Department of Health Services, and the implementation programs are consistent with the mitigation requirements of the *California Environmental Quality Act (CEQA) Statutes and Guidelines* (Public Resources Code 21000–21177 and California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000–15387).

Exhibit I, Guidelines for Noise Compatible Land Use, located in the Appendix of the Noise Element is based on the State Guidelines. Consistent with Implementation Program 16, it is the intent of the Noise Element that the guidelines be used to **"**guide land use and zoning reclassification, subdivision, conditional use and use variance determinations and environmental assessment considerations, especially relative to sensitive uses" (City 1999).

City of Los Angeles Municipal Code

Chapter XI, Articles 1 through 6 of the *City of Los Angeles Municipal Code* (City 2010b) establishes acceptable ambient sound levels to regulate intrusive noise, and regulates noise by limiting hours of operation and setting performance standards for noise sources within various zones of Los Angeles. The City's Municipal Code does not apply on the LASHP, which is State-owned property; however, the Code is applicable off the LASHP.

City of Los Angeles CEQA Thresholds Guide

The *L.A. CEQA Thresholds Guide: Your Resource for Preparing CEQA Analyses in Los Angeles* (City 2006) is the City's initial effort to develop citywide guidance for CEQA impact analyses. The *Thresholds Guide* recommends methods and significance thresholds for assessing construction, project, and cumulative impact analyses for 46 of the most common environmental issues in Los Angeles, provides sample mitigation measures, and lists potentially helpful references. Guidance for assessing noise impacts within Los Angeles is provided in Chapter I, Noise of the *Thresholds Guide*, which incorporates the State Guidelines. The *Thresholds Guide* is not a regulatory mandate, but it does provide useful guidance for this LASHP noise impact analysis.

Airborne and Groundborne Vibration Standards

While not adopted, the FTA and Caltrans have published standards for airborne or groundborne vibration that these agencies use in their own studies. The FTA threshold for architectural damage for nonengineered timber and masonry buildings (e.g., most residential units) is 0.2 inch per second PPV (FTA 2006). Caltrans considers the architectural damage risk level for continuous vibrations, including pile driving, to be a PPV somewhere between 0.2 and 2.0 inches per second PPV (Caltrans 2004). The FHWA does not provide standards for traffic-related vibrations, since they do not consider highway traffic vibrations to pose a threat to buildings and structures (Jones & Stokes 2004:10).

CHAPTER 5.0
IMPACTS

5.1 METHODOLOGY

The analysis for future noise levels presented in this section is based on noise monitoring, published reports and data, mobile source noise prediction modeling, and traffic volume data provided in the project's *Transportation Impact Analysis* prepared by Fehr & Peers (2011).

Appendix G of the *CEQA Guidelines*[6] (State of California 2010) provides sample questions for use in an initial study to determine a project's potential for significant environmental impacts. According to the sample questions, a project would have a potentially significant noise impact if it would:

a) expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

b) expose persons to or generate excessive groundborne vibration or groundborne noise levels;

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

d) cause 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 2 miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels; and/or

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

The proposed project is not within 2 miles of a public airport or private airstrip; therefore, CEQA criteria e) and f) do not apply to the project and warrant no further discussion in this impact analysis.

[6] California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000–15387.

The following subsections address criteria a) through d) of the *CEQA Guidelines* while considering both the State's noise compatibility criteria and the average human response to changes in noise levels. These criteria apply to both project and cumulative impacts.

5.2 CONSTRUCTION NOISE AND VIBRATION IMPACTS

Significance Criteria

Although the LASHP is under jurisdiction of the CDPR and there are no State thresholds of significance for construction equipment noise, proposed project construction noise and vibration impacts would be significant if they would:[7]

- exceed the ambient noise level by 5 dBA at existing noise-sensitive receptors between the hours of 9:00 p.m. and 7:00 a.m. Monday through Friday, before 8:00 a.m. or after 6:00 p.m. on Saturday or at any time on Sunday,[8] and/or
- exceed the FTA vibration threshold for architectural damage of 0.2 inch per second PPV (FTA 2006:12–13).

Methodology

Construction Noise

Noise impacts from construction are a function of the noise generated by equipment, the location and sensitivity of nearby land uses, and the timing and duration of the noise-generating activities. Prediction of project construction noise impacts is based on the FHWA's Roadway Construction Noise Model. Maximum construction equipment noise levels used in the model and shown in Table 3, Typical Maximum Construction Equipment Noise Levels, are based on data collected during construction of the Central Artery/Tunnel in Boston, Massachusetts, which is the largest urban construction project ever conducted in the United States. The model also employs an "acoustic usage factor" to estimate the percentage of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction phase. As shown in Table 3, maximum noise levels generated by typical construction equipment operating at full power ranges from approximately 70 dBA to 95 dBA at 50 feet.

[7] These thresholds are consistent with the noise thresholds in L.A. CEQA Thresholds Guide: Your Resource for Preparing CEQA Analyses in Los Angeles(City 2006:I.1-2–I.103).
[8] These hours of construction activities are derived from the *City of Los Angeles Municipal Code*.

Table 3
Typical Maximum Construction Equipment Noise Levels

Equipment	Noise Level at 50 feet (dBA L_{max})	Acoustic Usage Factor[1]
Auger Drill Rig	85	20%
Backhoe	80	40%
Blasting	94	1%
Chain Saw	85	20%
Clam Shovel	93	20%
Compactor (ground)	80	20%
Compressor (air)	80	40%
Concrete Mixer Truck	85	40%
Concrete Pump	82	20%
Concrete Saw	90	20%
Crane (mobile or stationary)	85	20%
Dozer	85	40%
Dump Truck	84	40%
Excavator	85	40%
Front End Loader	80	40%
Generator (25 KVA or less)	70	50%
Generator (more than 25 KVA)	82	50%
Grader	85	40%
Hydra Break Ram	90	10%
Impact Pile Driver (diesel or drop)	95	20%
Insitu Soil Sampling Rig	84	20%
Jackhammer	85	20%
Mounted Impact Hammer (hoe ram)	90	20%
Paver	85	50%
Pneumatic Tools	85	50%
Pumps	77	50%
Rock Drill	85	20%
Roller	74	40%
Scraper	85	40%
Tractor	84	40%
Vacuum Excavator (vac-truck)	85	40%
Vibratory Concrete Mixer	80	20%
Vibratory Pile Driver	95	20%

[1] Acoustic Usage Factor represents the percent of time that the equipment is assumed to be running at full power.

KVA = kilovolt amps

Source: FTA 2006; Thalheimer 2000. These values are also used in the Roadway Construction Noise Model (FHWA 2006, Table 1).

Construction equipment noise attenuates at a rate of 4.5 to 6 dBA per doubling of distance over hard and soft sites, respectively.

Construction Vibration

Vibrations transmitted through the ground may annoy people and detrimentally affect structures and sensitive devices. Human annoyance by vibration is related to the number and duration of events. The more events or the greater the duration, the more annoying it will be to humans. The threshold of human annoyance from vibration is 0.10 inch per second PPV (Jones & Stokes 2004). Where construction vibration does cause structural damage, it is through direct damage and/or vibration-induced settlement. Structural damage depends on the frequency of the vibration at the structure, as well as the condition of the structure and its foundation.

Ground vibrations generated by construction machinery can be roughly separated into two categories: transient and steady-state vibrations. Impact pile drivers represent a source of transient vibrations, while vibratory pile drivers and heavy machinery represent a source of steady-state vibrations. Various types of construction equipment have been measured under a wide variety of construction activities; average source levels reported in terms of velocity levels are provided in Table 4, Vibration Source Levels for Construction Equipment.

Table 4
Vibration Source Levels for Construction Equipment

Equipment		PPV at 25 Feet (in/sec)	Approximate VdB at 25 Feet
Pile driver (impact)	upper range	1.518	112
	typical	0.644	104
Pile driver (sonic)	upper range	0.734	105
	typical	0.170	93
Clam shovel drop (slurry wall)		0.202	94
Hydro mill (slurry wall)	in soil	0.008	66
	in rock	0.017	75
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: FTA 2006

Construction Noise Impacts

Construction Equipment Noise

Site grading and trenching to extend surrounding utilities onto the park site would generate the maximum noise levels during construction. Backhoes, dozers, dump trucks, excavators, graders, and scrapers are expected to operate throughout the site for approximately 12 months until grading is complete. Noise levels from this equipment could generate maximum noise levels between 80 and 85 dBA at 50 feet.

There are a number of noise-sensitive receptors north of the park and along North Broadway. All of the receptors are elevated anywhere from 35 to 40 feet above the park and have a clear line-of-sight to the park. Ambient noise levels along North Broadway were measured at 58 and 62 dBA L_{eq} in September 2010 (see Table 2). The nearest noise-sensitive receptor to the project site is Saint Peter's Italian Church, which is 200 feet away from the LASHP property line. Assuming an attenuate rate of 6 dBA per doubling of distance, the maximum anticipated project construction noise of 85 dBA L_{max} at 50 feet would attenuate to approximately 73 dBA L_{max} at 200 feet, which is equivalent to 49 dBA L_{eq} assuming a daily acoustic usage factor of 40 percent (see Appendix B for construction noise calculations). Project construction at this location along the LASHP property line represents the worst-case construction noise scenario because individual pieces of construction equipment would be operating throughout the project site and at distances greater than 200 feet from the noise-sensitive receptors along North Broadway.

The maximum construction noise level of 73 dBA L_{max} would only be audible at Saint Peter's Italian Church when construction equipment operates at the park property line and between train pass-bys, which occur at 7- to 12-minute intervals daily (see discussion under Subsection 4.1, Project Area). When a train passes the park, it breaks the line-of-sight between the church and the park boundary, and the noise levels from the construction equipment at this location would attenuate by at least 5 dBA. The likelihood of the northbound and southbound trains passing the park site at the same time is high, so the intervals between train pass-bys would be shorter, thereby lessening the duration of maximum construction noise impact at receptors along North Broadway. Furthermore, the train noise, which produced an on-site noise level of 73 dBA L_{max} and 69 dBA L_{eq} at Monitoring Location 1 and 105 feet from the rail line (see Table 2), would briefly exceed the attenuated construction noise level during the train pass-bys.

No project construction would occur on Sundays; therefore, no project construction noise impacts would occur at Saint Peter's Italian Church or the Ttokamsa Home Mission Church located at the intersection of North Spring Street and Sotello Street south of the park on Sundays.

Ambient noise levels along North Broadway were measured at 58 and 62 dBA L_{eq} in September 2010. Project construction would only occur between the hours of 7:00 a.m. and 9:00 p.m. Monday through Friday Monday through Friday, and between 8:00 a.m. and 6:00 p.m. on Saturdays, and would generate average noise levels less than existing ambient noise levels at nearby noise sensitive receptors. Project construction noise would, therefore, be **less than significant**.

Truck and Worker Commute Noise

During the 22-month project construction period, there would be a temporary increase in heavy-duty truck[9] and worker commute traffic on North Spring Street and other local roadways. Heavy-duty trucks would be used to deliver construction equipment and materials to the park and to haul away demolition and construction wastes. The larger pieces of construction equipment would be delivered to the site at the beginning of each construction phase and then removed when no longer necessary. Truck traffic to deliver materials to the site and to haul away wastes would occur frequently throughout project construction. There would also be an increase in traffic from worker commute trips.

Project construction traffic is expected to occur during project construction hours, is expected to travel primarily along highways and major arterials where few noise sensitive uses are located, and is not expected to traverse residential areas. Project workers are expected to drive light-duty pick-up trucks and passenger vehicles.

Receptors within 50 feet of the heavy-duty trucks would be exposed to a noise level up to 80 dBA $L_{eq(1h)}$ (FHWA 2004, Table 5). This is not unlike existing heavy-duty truck traffic noise along North Spring Street south of the park (see data for Monitoring Location 4 in Table 2).

Receptors with a direct line-of-sight to the trucks would experience temporary, instantaneous noise levels up to 80 dBA at 50 feet from the roadway. Receptors located farther away would experience less noise due to their greater distance from the roadway and due to any intervening topography and/or structures that may exist between them and the noise source. This noise

[9] A heavy-duty truck is defined as all cargo vehicles with three or more axles—generally with gross vehicle weight more than 26,400 pounds (FHWA 2004).

impact would be temporary and instantaneous as the trucks pass by these receptors, and would diminish rapidly as the trucks travel away from the receptors.

Short-term heavy-duty truck and construction worker traffic would generate noise levels similar in nature to existing truck traffic along North Spring Street to the south and other roadways in the area. Therefore, project construction truck traffic would not result in a substantial or audible (3 dBA or greater) temporary or periodic increase in ambient noise levels along the traversed roadways. Construction traffic noise impacts would be **less than significant**.

Groundborne Noise

Groundborne noise refers to the vibration of building components that can also take the form of an audible low-frequency rumbling noise. Groundborne noise is usually only generated by equipment with frequencies in the range 60 to 200 Hz, or when foundations or utilities, such as sewer and water pipes, physically connect the structure and the construction activity.

Pile driving typically generates ground vibration with frequencies in the range of 4 to 30 Hz (Caltrans 2004:29); high-frequency blast vibrations are typically 40 Hz and above (Caltrans 2004:58). Project truck traffic and construction vibration frequencies are expected to range from 10 to 30 Hz (Caltrans 2004:6) and would not generate groundborne noise. Furthermore, the proposed project would not involve construction that would physically connect to structures occupied by off-site sensitive receptors. The project would not expose persons to or generate excessive groundborne noise. Construction groundborne noise impacts would be **less than significant**.

Construction Vibration

Project construction would employ loaded trucks, jackhammers, and small bulldozers, all of which have steady state vibration levels in the range of 0.003 to 0.076 inch per second PPV at 25 feet (see Table 4). Project construction equipment would not exceed the FTA vibration threshold for architectural damage of 0.2 inch per second PPV or the threshold of human annoyance of 0.10 inch per second PPV at 25 feet or at the nearest sensitive receptor located 200 feet from the park. The proposed project would not expose persons to or generate excessive groundborne vibration and construction vibration impacts would be **less than significant**.

5.3 OPERATIONAL NOISE AND VIBRATION IMPACTS

This operational noise and vibration impact analysis addresses future mobile source noise impacts along project area roadways at buildout of the LASHP and the Draft CASP. Also addressed are future stationary source noise and vibration impacts within the LASHP from on-site day-to-day activities and special events, as well as from off-site sources.

Significance Criteria

The LASHP is under the jurisdiction of the CDPR and there are no state thresholds of significance for operational noise. As discussed previously, changes in noise levels of less than 3 dBA are generally not discernable to most people, while changes greater than 5 dBA are readily noticeable and a 10-dBA increase is perceived as a doubling of noise. Therefore, the significance thresholds for project-related noise are based on the average human response to changes in noise levels and the State Guidelines (see Figure 7). A significant operational noise impact would occur if the project and/or buildout of the CASP would:[10]

- expose LASHP patrons to a noise level in excess of the normally acceptable noise level of 70 dBA CNEL/L_{dn} for parks per the State Guidelines, except during special events that may host concerts and/or fireworks;
- temporarily expose nearby noise-sensitive receptors to noise levels that are 10 dBA or greater over existing ambient noise levels during special events that may host concerts and/or fireworks;
- cause the existing ambient noise levels at a nearby noise-sensitive receptor to increase by 3 dBA in CNEL and change its land use noise category to "normally unacceptable" or "clearly unacceptable" as identified in the State Guidelines; and/or
- cause the existing ambient noise levels at a nearby noise-sensitive receptor to increase by 5 dBA in CNEL and not change its land use noise category as identified in the State Guidelines.

Methodology

Prediction of future noise levels at the park and the surrounding area are based on published reports and data, roadway segment traffic volumes derived from the project traffic report (Fehr &

[10] These thresholds are based on the Los Angeles CEQA Thresholds Guide (City 2006) and the FTA criteria for structural damage due to vibration (FTA 2006).

Peers 2011), and noise prediction modeling using the FHWA Highway Noise Prediction Model-FHWA-RD-77-108 (Barry and Reagan 1978). This model calculates the mobile source noise levels at specific locations along roadways based on average daily traffic volumes, vehicle fleet mix, average speeds, roadway geometry, and receptor site conditions. Results from the model in this impact analysis are in CNEL, which is compatible with the State Guidelines (see Figure 7).

Traffic from the LASHP at buildout would affect traffic volumes along the following roadway segments:

- Sotello Street between North Spring Street and Naud Street,
- North Spring Street between College Street and Sotello Street,
- North Spring Street between Sotello Street and Mesnegars Street, and
- North Spring Street between Mesnegars Street and Avenue 18.

To illustrate the relative noise impacts of the LASHP and buildout of the proposed CASP, the following traffic scenarios from the traffic report are used in this noise impact analysis:

- Existing Conditions
- Future (Year 2035) without Project Conditions
- Future (Year 2035) with Project Conditions

Future (2035) conditions represent the cumulative development scenario and are based on buildout of the Draft CASP, which would add over 7,000 households, 26,000 people, and 2,600 jobs to the entire 663-acre CASP area. Buildout of the proposed CASP area would create a more balanced land use mix and jobs-to-housing ratio than under existing conditions. This balance would encourage other modes of travel, such as walking, biking, and public transit. These land use pattern changes would also change travel patterns in the project area.

Table 5, Existing and Projected Average Daily Traffic Volumes on Local Roadway Segments, provides traffic volumes along the four roadway segments under the three traffic scenarios. Compared to existing conditions, average daily traffic from the LASHP at buildout would increase traffic along North Spring Street by less than 2 percent, and along Sotello Street south of the park by 13 percent. At Draft CASP buildout, LASHP average daily traffic would represent less than 3 percent of volumes along the five roadway segments.

Table 5
Existing and Projected Traffic Volumes on North Spring Street

Roadway Segment[1]	Existing	Year 2035 w/out Project	Year 2035 w/Project[2]	Project Contribution to Existing	Project Contribution to Year 2035
College Street to Sotello Street	1,694	1,694	1,724	30	39
Sotello Street to Mesnegars Street	1,688	1,688	1,934	246	-14
Mesnegars Street to Avenue 18	1,392	1,392	2,190	798	22

[1] See Figure 2, Local Vicinity Map, for roadway locations. The project would not generate measurable traffic along North Broadway.

[2] While the traffic report provided project weekday peak hour and mid-day weekend intersection turning movement volumes, this table is based on the highest traffic contributions by the LASHP along each roadway segment.

Source: Data derived by AECOM from Fehr & Peers 2011.

Future Daily On-Site Noise Levels

Under the proposed CASP Greenway designation for the LASHP, the park would remain recreation and open space. Park maintenance activities would continue and are expected to remain largely unchanged in terms of hours of operation and activities compared to existing conditions, and the types of day-to-day activities at the site would remain essentially unchanged. Most daily park activities would occur between 8:00 a.m. and 10:00 p.m. Future daily ambient noise levels at the park, however, would be affected by increases in the number of visitors to the park, changes in the surrounding land uses, and changes in surrounding roadway traffic. The land uses that would be permitted under the Draft CASP (subject to CASP restrictions) are listed in Section 4.2 of this report. Ancillary uses would be permitted on only 10 percent of the land area.

At buildout, average daily park usage is expected to increase There is potential for the increase in noise levels from typical daily activities to exceed 3 dBA and be perceptible to noise-sensitive receptors along North Broadway. Given the distance between the LASHP and the noise-sensitive receptors along North Broadway (200 feet or more), train noise levels and the increase in noise from on-site day-to-day activities would not cause a doubling of stationary source sound energy and would not cause existing ambient noise levels at the noise-sensitive receptors to increase by 3 dBA in CNEL. Off-site stationary source noise impacts from daily activities at the LASPH at buildout would be **less than significant**.

Cumulative Year 2035 average daily trips would add traffic to all of the roadway segments listed in Table 6, Existing and Projected Mobile Source CNEL at 100 Feet. Noise modeling using the Highway Noise Prediction Model and traffic data from Table 5 demonstrates that mobile source noise 100 feet from the centerline of North Spring Street and along the southern park boundary currently ranges from 68 to 69 dBA CNEL (see Table 6).[11]

At Draft CASP buildout with the project, mobile source noise along North Spring Street would not substantially increase. The normally acceptable noise level for parks under the State Guidelines is 70 dBA L_{dn}/CNEL[12] (see Figure 7). Future mobile source noise on North Spring Street would not cause existing noise levels on the southern park boundary to substantially increase and would not change the park's noise category. Year 2035 mobile source noise impacts on the LASHP are **less than significant**.

[11] These noise levels are consistent with the ambient noise measurements taken at Monitoring Location 2 (see Table 2).

[12] The State's *Guidelines* have been incorporated into the City's Noise Element (Exhibit I, Guidelines for Noise Compatible Land Use) and the L.A. CEQA Thresholds Guide (Chapter I, Noise).

Table 6
Existing and Projected Mobile Source CNEL at 100 Feet from edge of North Spring Street

Roadway Segment[1]	Existing dBA CNEL	Year 2035 w/out Project dBA CNEL	Year 2035 w/Project dBA CNEL	Project Noise Contribution dBA
Between College Street and Sotello Street	69	69	69	0
Between Sotello Street and Mesnegars Street	69	69	69	0
Between Mesnegars Street and North Avenue 18	68	70	70	2

[1] See Figure 2, Local Vicinity Map, for roadway locations. .
CNEL – community noise equivalent level
Source: Data derived by AECOM from Fehr & Peers, 2011. Noise model results shown in Appendix C.

Future Daily Off-Site Noise Levels

Table 6 demonstrates that future mobile source noise levels on project area roadways would increase by a maximum of 2 dBA CNEL, which is a less than significant increase in ambient noise levels. Additionally, the project would not increase future noise levels by a measurable amount and thus would not have a cumulatively considerable impact on future noise levels.

South of Spring Street, , future noise levels would be 69 to 70 dBA CNEL at approximately 100 feet from the edge of roadway the noise levels are acceptable industrial uses; however, future development along south of Spring Street, under the proposed CASP, would replace the industrial uses with predominantly multifamily residences. The projected 69 to 70 dBA CNEL is considered conditionally acceptable for multifamily residences and may require use of noise abatement measures and careful consideration of site design and placement of exterior uses, but would not preclude the envisioned development. Therefore. cumulative vehicular traffic noise impacts on future noise sensitive land use would be **less than significant**.

Operational Groundborne Vibration and Noise Impacts

Groundborne Vibration

Day-to-day activities within the LASHP at buildout would include routine maintenance operations, jogging, running, biking, skateboarding, picnicking, informal play, and activities that need large open areas. None of these activities would generate groundborne vibration within the threshold of human annoyance (0.10 inch per second PPV at 25 feet). Day-to-day activities within the LASHP would not expose persons to excessive groundborne vibration; project-generated operational vibration impacts would be **less than significant**.

Although vibration from loaded heavy-duty trucks is below the threshold of human annoyance (see Table 4), there is potential for these trucks to generate perceptible vibration when traveling over rough roads or an instantaneous impact when a truck hits a pothole (FTA 2006). This impact analysis assumes that all project area roadways would be well maintained and potholes, when they occur, would be repaired within a reasonable time period. Furthermore, heavy-duty truck traffic along project area roadways would decrease at Draft CASP buildout, thereby further reducing the potential for perceptible vibration impacts from heavy duty trucks. Heavy-duty trucks on North Spring Street would not generate excessive groundborne vibration on the park; heavy-duty truck vibration impacts would be **less than significant**.

Finally, near their tracks, light rail systems typically generate vibration levels that are just above the threshold of human perception; however, although groundborne vibration is sometimes noticeable in outdoor environments, it is almost never annoying to people who are outdoors (FTA 2006). Adjacent rail traffic would not generate excessive groundborne vibration on the park and it would not cause human annoyance. Vibration impacts from the adjacent light rail system would be **less than significant**.

Groundborne Noise

As previously discussed, groundborne noise refers to an audible low-frequency rumbling noise experienced within a structure and is usually only generated by equipment with frequencies in the range 60 to 200 Hz (e.g., pile driving and high-frequency blasts), or when foundations or utilities, such as sewer and water pipes, physically connect the structure and the source of groundborne noise. While low frequency noise levels from train pass-bys were not measured within the LASHP, studies show a peak low frequency of 80 Hz for light rail transit (FTA 2006). This frequency would be perceptibly audible to the average healthy human ear, which can detect sounds that range in frequency from about 20 to 20,000 Hz. As with groundborne vibration, groundborne noise is not expected to be annoying to people who are outdoors. Adjacent rail traffic would not generate excessive groundborne noise on the park and the proposed project would not physically connect to off-site sources of low-frequency noise via foundations or utilities, such as sewer and water pipes. Operational groundborne noise impacts would be **less than significant**.

Special Event Noise Impacts

At project buildout, the LASHP would continue to host special events on that would attract individuals from outside of the area. As many as four daytime/evening/nighttime special events per year are expected with attendance of up to 25,000 people. Smaller events of 500 to 5,000 people are expected to occur monthly at the LASHP. Such events occur until 10 p.m. Sunday through Thursday and up to 11 p.m./a.m. on Friday or Saturday nights.

Evening special events are expected to include live and recorded music concerts of contemporary bands (e.g., rock, county, rhythm and blues, soul, hip-hop, jazz) and classical symphony orchestras with the potential for fireworks and would require a special event permit from the CDPR.

This impact analysis addresses potential noise impacts of concerts, fireworks, and public address systems on off-site noise-sensitive receptors along North Broadway.

Concerts

Sound levels from contemporary (e.g., rock) concerts can be as loud as 104 dBA L_{eq} at 50 feet from concert amplifiers, with maximum SPLs expected to range from 100 to 110 dBA L_{eq} (Hankard Environmental 2009,[13] Berger 2010). These noise levels include clapping, vocalizations, and other noise from the concert-goers.

Sound levels from a jazz and/or symphony orchestra performance can reach 90 dBA L_{eq} at 50 feet (Daum 2010, Berger 2010) with a maximum SPL of 98 dBA L_{max} (Sound Advice 2007). These noise levels do not include noise from the audience as the audience typically reserves its applause and appreciation until the end of these performances. Sound levels from this latter source are not expected to exceed sound levels of the performance.

The degree to which these noise levels would attenuate at the nearest noise-sensitive receptors would depend on the distance between the concert amplifiers and receptors, intervening structures and/or topography, the ground surface (i.e., soft or hard) between the amplifiers and the receptors, the direction in which the amplifiers face, and wind speed and direction.

[13] Concert noise data are from a noise study in a semi-rural area of Colorado where nighttime ambient noise levels ranged from 35 dBA to 43 dBA. Therefore, existing ambient noise levels did not affect the actual SPLs measured during the rock concert.

Assuming the concert location is on the central northern half of the LASHP, the closest distance between the amplifiers and the nearest noise-sensitive receptor would be residences at the intersection of Savoy Street and North Broadway, 350 feet north of the concert stage. Using an attenuation rate of 6.0 dBA for each doubling of distance over hard surfaces, noise levels of 104 and 90 dBA L_{eq} would attenuate to 87 and 70 dBA L_{eq}, respectively. Although the prevailing wind direction in the Los Angeles area is typically to the east-northeast (Pacific Environmental Services 1999), terrain north of the LASHP rises up 200 feet to Dodger Stadium and then another 200 feet to the highest point in Elysian Park. This terrain deflects evening wind currents in the project area to the south and could "bend" the path of the concert noise to "concentrate" it on the downwind side of the noise source (Hankard Environmental 2009) to the south. This atmospheric effect could likely have a measureable effect on concert noise levels along North Broadway.

Concert noise levels on the noise-sensitive receptors would also be periodically attenuated through shielding by trains along the Gold Line, which run at 12- to 20-minute intervals during the evenings to midnight on weekdays and to after 1:00 a.m. on Saturdays, Sundays, and holidays. When a train passes the park, it would break the line-of-sight between the concert and the noise-sensitive receptors, and would attenuate the noise level by at least 5 dBA. Furthermore, train noise, which produced an on-site noise level of 73 dBA L_{max} and 69 dBA L_{eq} at 105 feet from the rail line (see Table 2), would briefly exceed the attenuated noise level during pass-bys. Receptors along North Broadway may find the interruption in concert noise levels as a result of the train pass-bys more of an annoyance than a benefit.

Furthermore, the Draft CASP proposes development on the strip of land between the LASHP and North Broadway. This development, should it occur, would provide an intervening structure, which would be a potential barrier to noise to possibly further attenuate concert noise levels to the north.

The bass (low) end of the frequency spectrum is expected to be most audible in the project area because low frequency sound is not mitigated by the atmosphere as much as mid- and high-frequency sound levels are. The groundborne noise is not expected to be annoying to people at the concert, but may be perceptible in proximity to the concert location. Groundborne noise is not expected to adversely affect receptors along North Broadway because there is no structural connection between these uses and the LASHP.

Measured ambient noise levels at off-site noise-sensitive receptors along North Broadway on September 30, 2010, were 58 and 62 dBA L_{eq}. Concert noise levels at the nearest noise-sensitive receptor on North Broadway are anticipated to attenuate to 70 to 87 dBA L_{eq}. These noise levels are considered to be a worst-case scenario because they are expected to further attenuate due to southerly wind patterns away from the receptors, and the potential for train pass-by noise to exceed concert noise. Furthermore, land uses, traffic volumes, and vehicle fleet mix surrounding the LASHP would change as the project area builds out under the CASP. With these changes, surrounding ambient noise levels would also change. Therefore, depending on the ambient noise levels surrounding the LASHP at the time of a concert, the concert may or may not expose nearby noise-sensitive receptors to noise levels that are 10 dBA or greater than existing ambient noise levels. Nonetheless, the potential for such an increase exists along with the potential for annoyance to receptors along North Broadway who would be exposed to frequent interruptions in concert noise levels during train pass-bys. Special event concerts at the LASHP could result in a short-term **potentially significant noise impact**.

Public Address Systems

While no public address or sound amplification systems would be permanently installed at the park, these devices may be brought in by the special event organizer and set up in the park for making announcements and/or providing music. Because sound from portable amplification devices is highly variable, noise levels cannot be accurately predicted without specific knowledge of the equipment, its placement, and orientation in relation to surrounding sensitive receptors. Thus, the use of portable amplification devices could temporarily expose nearby noise-sensitive receptors to noise levels that are 10 dBA or greater over existing ambient noise levels, which would be a short-term **significant noise impact**.

Fireworks

Some special nighttime events at the LASHP may include fireworks. Fireworks are an impulsive noise source, which, for the purposes of this impact analysis, means that they are of short duration (ranging from microseconds to anything less than 2 seconds), are of high intensity, and have an abrupt onset and rapid decay (Niedzielski 1990). Fireworks also generate a dense and complex nonharmonic combination of frequencies, including low frequencies that could generate perceptible vibration.

Fireworks shells are available in a wide range of diameters from 2 to 36 inches. The smaller, 2- through 6-inch shells are expected to be used at the LASHP due to its relatively small size, the proximity of surrounding noise-sensitive receptors, and cost. Shells usually travel about 100 feet vertically for every inch they are in diameter, depending on the angle from which they are fired (Oracle ThinkQuest 2010). Therefore, the maximum height of the fireworks' explosion at the

LASHP would be 600 feet. While the distance of the midair explosion from the ground level at the LASHP would be 600 feet, the explosion would be approximately 725 feet from the nearest noise-sensitive receptor along North Broadway, which is approximately 350 away from the ground launching location and at an elevation 40 feet higher than the LASHP. At approximately 3 feet fireworks can generate between 103 and 122 dBA L_{eq} for the duration of the display (Berger 2010). At 725 feet, the fireworks noise would attenuate to between 55 and 74 dBA.

Land uses, traffic volumes, and vehicle fleet mix surrounding the LASHP would change as the project area builds out under the CASP. With these changes, surrounding ambient noise levels (measured at 58 and 62 dBA L_{eq} on September 30, 2010) are also expected to change. Therefore, depending on the ambient noise levels surrounding the LASHP at the time a fireworks display is planned, the display may or may not expose nearby noise-sensitive receptors to noise levels that are 10 dBA or greater over existing ambient noise levels. Nonetheless, the potential for such an increase exists. Fireworks displays at the LASHP would result in a **potentially significant noise impact**.

Summary of Significant Impacts

The proposed LASHP project would not result in less-than-significant construction noise and vibration impacts; however, concerts, use of portable public address or sound amplification systems, and fireworks at the LASHP could temporarily expose nearby noise-sensitive receptors to noise levels that are 10 dBA or greater over ambient noise levels, which would be a **short-term significant noise impact**.

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CHAPTER 6.0
MITIGATION MEASURES

The following mitigation measures are recommended to reduce the short-term significant noise impacts.

Special Event Noise Mitigation 1

Proposals to use an audio system with amplifiers within the LASHP shall require a special event permit from CDPR. The permit shall require a noise management plan that includes the following:

- short-term (no less than 20-minute) ambient noise measurements taken within 1 month of the event at the nearest noise-sensitive receptors to the LASHP (noise-sensitive receptors shall be as defined in the most recent L.A. CEQA Thresholds Guide and shall be approved by the CDPR);
- a site plan showing placement of the stage (if used) and each amplifier;
- predicted combined noise levels from the amplifiers at the noise sensitive receptors; and,
- if necessary, measures to reduce amplified noise levels to less than 10 dBA over the ambient noise levels at the receptors.

The event-specific noise management plan shall be incorporated into the special event permit prior to its issuance by the CDPR.

Special Event Noise Mitigation 2

Proposals to launch fireworks displays within the LASHP shall require a special event permit from CDPR. The permit shall require a noise management plan that includes the following:

- short-term (no less than 20-minute) ambient noise measurements taken within 1 month of the event at the nearest noise-sensitive receptors to the LASHP (noise-sensitive receptors shall be as defined in the most recent L.A. CEQA Thresholds Guide and shall be approved by the CDPR);
- a site plan showing placement of the launch area;

- predicted noise levels of the fireworks displays at the noise sensitive receptors; and
- if necessary, measures to reduce fireworks noise levels to less than 10 dBA over the ambient noise levels at the receptors.

The event-specific noise management plan shall be incorporated into the special event permit prior to its issuance by the CDPR.

Level of Impact after Mitigation

Implementation of the mitigation measures would reduce the short-term potential noise impacts from audio systems with amplifiers to less than significant. However, fireworks displays, which would occur at approximately 600 feet above the LASHP site, could remain potentially significant at existing nearby noise-sensitive receptors and at future noise-sensitive receptors at buildout of the Draft CASP. Furthermore, noise from fireworks may be considered a nuisance by nearby residents with small children, pets and/or sensitive car alarms. The noise may be particularly annoying if the displays are not visible from their homes. The following mitigation is recommended to ensure that residents within the area are informed about fireworks displays and other special events at the LASHP that could be audible at off-site locations:

Special Event Noise Mitigation 3

No less than 2 weeks before a special event that involves amplified sound and/or fireworks, the event organizer(s) shall inform individual property owners/tenants within 1,000 feet of the LASHP of the date and location of the event, the activities that would take place at the event, and the potential for the event to be audible at off-site locations. A telephone number shall be provided where an informed individual can respond to questions or comments about the event. This requirement shall be part of the special permit prior to its issuance by the CDPR.

Even with implementation of Special Event Noise Mitigation 3, fireworks noise at the LASHP during special events would remain **unavoidably significant**.

CHAPTER 7.0
REFERENCES

Barry, T. M., and J. A. Reagan

1978 *FHWA Highway Traffic Noise Prediction Model* (NTIS, FHWA-RD-77-108). Washington, D.C.: United States Department of Transportation, Federal Highway Administration, Office of Research, Office of Environmental Policy, December.

Berger, Elliott

2010 The Noise Navigator®: A Database of Over 1700 Noise Sources, Version 1.5. July 6. University of Washington, Dept. of Environmental and Occupational Health Sciences, Seattle WA. Available at http://www.e-a-r.com/pdf/hearingcons/Noise_Nav.xls

Brown, Jeff

2010 Email from Jeff Brown, California Department of Parks and Recreation, to Bill Maddux, AECOM, dated 7/12/10.

California, State of

2010 *California Environmental Quality Act (CEQA) Statute and Guidelines*; Public Resources Code 21000–21177 and California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000–15387. Available at http://www.califaep.org/resources/Documents/FINAL%20CEQA%20Handbook%20HighQuality.pdf or http://leginfo.ca.gov.

California Department of Transportation (Caltrans)

2004 *Transportation Related Earthborne Vibrations (Caltrans Experiences)*, Technical Advisory, Vibration TAV-04-01-R0201. January. Available at http://www.dot.ca.gov/hq/env/noise/pub/TRANSPORTATION_RELATED_EARTHBORNE_VIBRATIONS.pdf.

2009 *Technical Noise Supplement.* November. Available at http://www.dot.ca.gov/hq/env/noise/pub/tens_complete.pdf.

California Department of Parks and Recreation (CDPR)

2005 *Los Angeles State Historic Park General Plan and Final Environmental Impact Report*; State Clearinghouse #2003031096. Approved by the State Park and Recreation Commission June 10.

California Governor's Office of Planning and Research (OPR)

2003 *State of California General Plan Guidelines,* Appendix C: Guidelines for the Preparation and Content of the Noise Element of the General Plan. October.

California State Parks (CSP)

2009 Los Angeles State Historic Park [Brochure]. Available at http://www.parks.ca.gov/pages/22272/files/losangeles_shp_web_31709.pdf.

City of Los Angeles (City)

1999 Noise Element of the *Los Angeles City General Plan*. Adopted by the City Council February 3. Available at http://cityplanning.lacity.org/cwd/gnlpln/noiseElt.pdf.

2000 *Central City North Community Plan; A Part of the General Plan - City of Los Angeles*. Adopted Dec. 15. Available at http://cityplanning.lacity.org/complan/pdf/ccncptxt.pdf

2006 *L.A. CEQA Thresholds Guide: Your Resource for Preparing CEQA Analyses in Los Angeles.* Available at http://www.ci.la.ca.us/EAD/programs/Thresholds/3-Introduction.pdf.

2007 *Los Angeles River Revitalization Masterplan*. April. Available at http://www.lariverrmp.org/CommunityOutreach/masterplan_download.htm.

2010a *Draft November 2010 Arroyo Cornfield Specific Plan*. November 1.

2010b *City of Los Angeles Municipal Code*, Sixth Edition. Amended through September 30. Available at http://www.amlegal.com/nxt/gateway.dll?f=templates&fn=default.htm&vid=amlegal:lamc_ca

Crocker, Malcom J. (editor)
2007 *Handbook of Noise and Vibration Control*. John Willey and Sons, Hoboken, New Jersey.

Daum, Miriam C.
2010 *Hearing Loss in Musicians*. Online review October 21. Available at http://www.uic.edu/spha/glakes/harts1/HARTS_library/musnoise.txt.

Federal Highway Administration (FHWA)
1980a *Highway Noise Fundamentals*. September.

1980b *Highway Noise Mitigation*. September.

2004 FHWA Traffic Noise Model Version 2.5 Look-Up Tables Users' Guide (FHWA-HEP-05-008; DOT-VNTSC-FHWA-0406). December. Available at http://www.fhwa.dot.gov/environment/noise/traffic_noise_model/tnm_v25_lookup/.

2006 *Roadway Construction Noise Model User's Guide*. January. Available at http://www.fhwa.dot.gov/environment/noise/construction_noise/rcnm/rcnm.pdf.

2010 *Noise Barrier Design Handbook*. Updated on line May 21, 2010. Available at http://www.fhwa.dot.gov/environment/noise/noise_barriers/design_construction/design/design03.cfm.

Federal Transit Administration (FTA)
2006 *Transit Noise and Vibration Impact Assessment* (FTA-VA-90-1003-06). May. Available at http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf.

Fehr & Peers
2011 Los *Angeles State Historic Park Draft Transportation Impact Analysis*. October.

Hankard Environmental
2009 *Arapahoe County Fairgrounds Noise Measurement Report*. August 17. Available at http://www.co.arapahoe.co.us/Departments/CS/FairandPark/ACFG_Master_Appendix_E_Final.pdf.

Jones & Stokes

2004 *Transportation- and Construction-Induced Vibration Guidance Manual.* June.

Metropolitan Transit Authority- Los Angeles (MTA)

2010 *Metro Gold Line Schedule*. Online Review on October 29, 2010. Available at http://www.metro.net/riding_metro/bus_overview/images/804.pdf.

Niedzielski, Rebecca A.

1990 *Environmental Impulse Noise Study, Final Report*. May. Available at http://www.nonoise.org/library/impulse/impulse.htm#introduction.

Oracle ThinkQuest

2010 *The Physics of Fireworks*. Online review November 13. Available at http://library.thinkquest.org/15384/physics/index.htm.

Pacific Environmental Services, Inc.

1999 *Wind Roses for Selected Areas*. Available at http://home.pes.com/windroses/Default.htm.

Sound Advice

2007 *Concert Halls and Theaters*. Available at http://www.soundadvice.info/index.htm#.

Thalheimer, Erich

2000 "Construction noise control program and mitigation strategy at the Central Artery/Tunnel Project." *Noise Control Engineering Journal*, Boston, MA: September/October 2000. Available at http://www.redmenforever.org/Papers_for_website/CAT%20Noise%20Program,%20NCEJ,%2048(5),%20Sep-Oct%202000.pdf.

APPENDIX A

NOISE MEASUREMENT DATA


RESIDENTIAL
Monitoring Location 6
N. BROADWAY
Monitoring Location 1
Monitoring Location 7
CHURCH
Monitoring Location 5
Monitoring Location 2
Monitoring Location 4
Monitoring Location 3
Park Row Dr
Stadium Way
Arroyo Seco Pkwy
Savoy St
Bishops Rd
Aurora St
Doyle Pl
Cottage Home St
Hill St
N Hill St
110
N Spring St
Sotello St
N Main St
Wilhardt St
E Jetty St
Albion St
S Avenue 16
S Ave 17
Bamboo Ln
Gin Ling Way
W College St
W Elmyra St
W Ann St
Llewellyn St
W Roundout St
Leroy St
© 2010 Google
Gray Buildings © 2010 CyberCity
Imagery Date: Nov 15, 2009
34°04'05.72" N 118°13'49.30" W elev 302 ft
Eye alt 4624 ft
Google

PROJECT: LHSP **PROJECT #:** 1028 0276.02

DATE: 9/30/10 **ENGINEER/ANALYST:** R PELLOS

Receptor ID: 1 SLM Model: 820 (SN: 1665) Calibrator Model: ~~C~~200 (SN: 4214) Data File: ____

MEASUREMENT INFORMATION

Start Time: 11:02 Stop Time: 11:30 11:32 - 11:34

Principal Source(s): TRAFFIC ON N. BROADWAY

Other Source(s): TRAFFIC ON NEAR SIDE STREET (BAKER ST.) ~~[illegible]~~ HEAVY TRUCKS FROM BUSINES AIRPLANES, HELICOPTERS, TRAIN

Average Observed Noise Level: 54

Maximum L_{eq} Observed: 73 Source(s): TRAIN (11:07)

Minimum L_{eq} Observed: 51

Comments:

TRAIN @ 11:08

TRAIN @ 11:14

TRAIN 11:19

TRAFFIC COUNT DATA

Start Time: 11:10 Stop Time: 11:20

N. BROADWAY

COULD NOT SEE WESTBOUND

Direction: EAST Speed: 15-20

Autos	Med. Trucks	Heavy Trucks
𝍸 X X X X X	////	//

Direction: ____ Speed: ____

Autos	Med. Trucks	Heavy Trucks

PROJECT: LAHSP **PROJECT #:** 10280276.02

DATE: 9/30/10 **ENGINEER/ANALYST:** R. PELLOS

Receptor ID: 1 SLM Model: 820 (SN: 1665) Calibrator Model: 200 (SN: 4214) Data File: ____

LOCATION

Location Description: NE CORNER OF PARK ; NEAR ADMIN BLDG. OF PARK ; NEAR 1762 BAKER ST.

(Sketch meter location below and take at least 2 photographs of meter location)

Distance from edge of roadway: 223 ft Overall Roadway Width: 70 ft Lane Widths: 12 ft

Is Parking Allowed along Street: No Width of Parking Lane: ____

Distance from barriers: 160 ft Barrier Type: EMBANKMENT Barrier Height: 20 ft

Location Comments: ____

METEOROLOGY

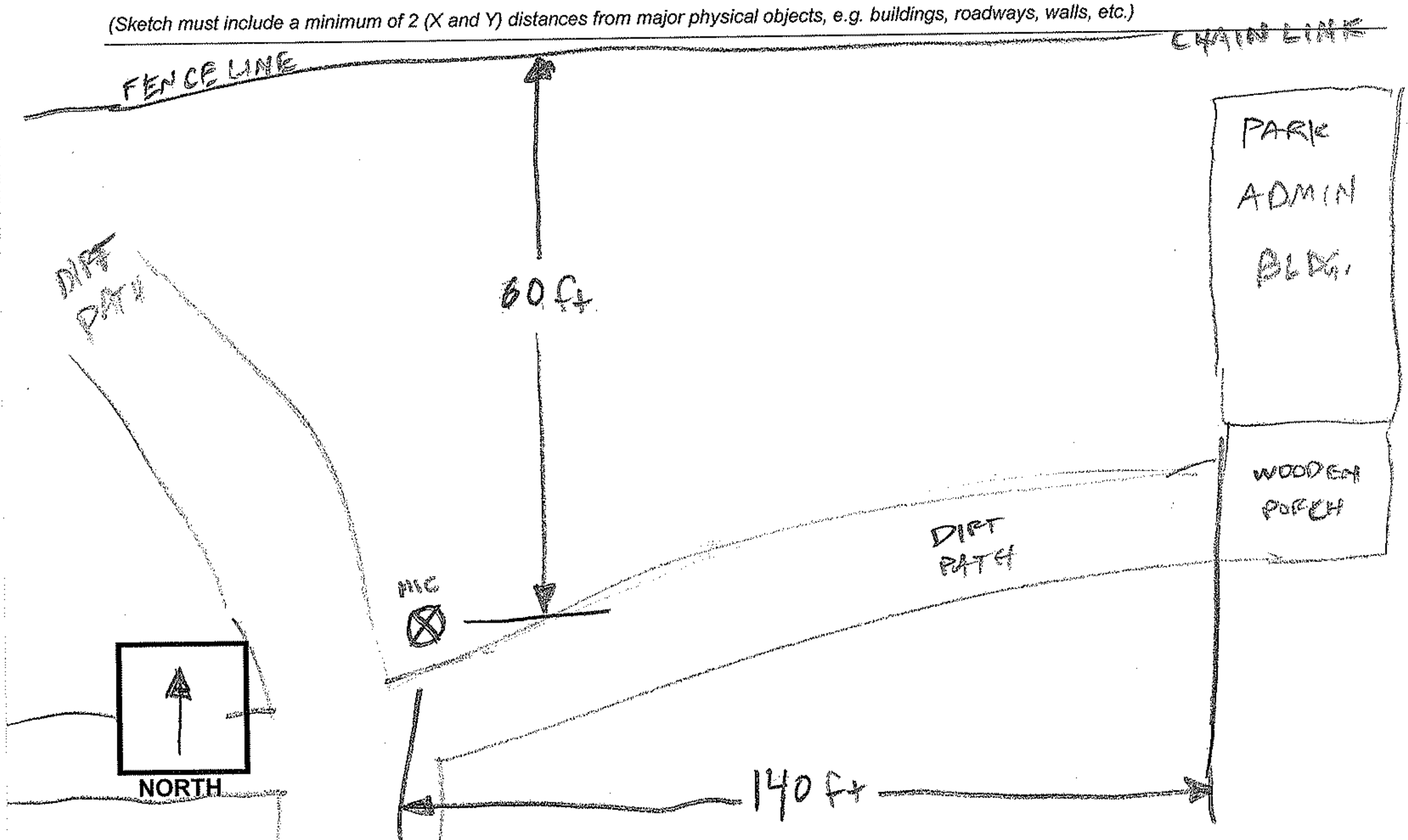
Temperature: 90.2 Wind Speed: 1.1 mph

Wind Direction: NE - BOUND Other (gusts, etc.): ____

Meteorological Comments: MOSTLY SUNNY

Sketch Area

(Sketch must include a minimum of 2 (X and Y) distances from major physical objects, e.g. buildings, roadways, walls, etc.)



PROJECT: LA HSP **PROJECT #:** 6280276.02

DATE: 9/30/10 **ENGINEER/ANALYST:** R PELLOS

Receptor ID: 2 SLM Model: 820 (SN: 1665) Calibrator Model: 200 (SN: ~~[illegible]~~ 4214) Data File: ____

MEASUREMENT INFORMATION

Start Time: 13:23 Stop Time: 13:~~[illegible]~~41

Principal Source(s): TRAFFIC ON N. BROADWAY/N. SPRING

Other Source(s): HELICOPTERS; HEAVY TRUCK IDLING ~~[illegible]~~ IN PARKING LOT ACROSS SPRING ST. TRAINS

Average Observed Noise Level: 5~~[illegible]~~6

Maximum L_{eq} Observed: 76 Source(s): HELICOPTER (13:26)

Minimum L_{eq} Observed: 54

Comments:

TRAIN (13:25)

TRAIN (13:29)

72 HELICOPTER (13:34)

TRAFFIC COUNT DATA

Start Time: ____ Stop Time: ____

Direction: ____ Speed: ____

Autos	Med. Trucks	Heavy Trucks

Direction: ____ Speed: ____

Autos	Med. Trucks	Heavy Trucks

PROJECT: LAHSP **PROJECT #:** 10280226.02

DATE: 9/30/10 **ENGINEER/ANALYST:** R. PELLOS

Receptor ID: 2 SLM Model: 820 (SN: 1665) Calibrator Model: 200 (SN: ~~[illegible]~~ 4214) Data File: ____

LOCATION

Location Description: BETWEEN SPRING ST AND N. BROADWAY; MIDDLE OF PARK

(Sketch meter location below and take at least 2 photographs of meter location)

Distance from edge of roadway: 367 ft Overall Roadway Width: 45 ft Lane Widths: 10 ft

Is Parking Allowed along Street: NO Width of Parking Lane: ____

Distance from barriers: — Barrier Type: — Barrier Height: —

Location Comments: ____

METEOROLOGY

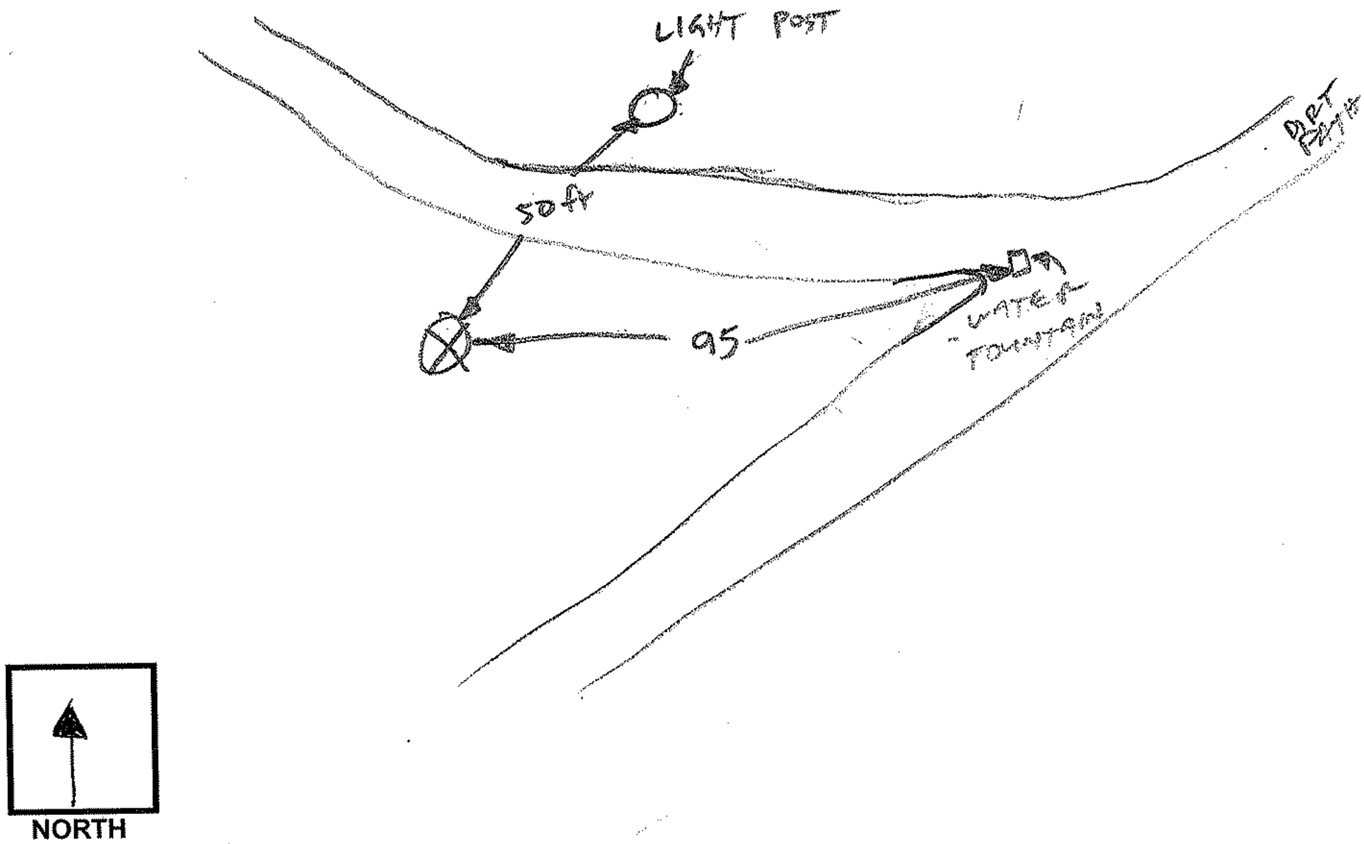
Temperature: 91°F Wind Speed: 3.1 mph

Wind Direction: NE Other (gusts, etc.): VARIABLE ~~[illegible]~~ E BOUND

Meteorological Comments: MOSTLY SUNNY

Sketch Area

(Sketch must include a minimum of 2 (X and Y) distances from major physical objects, e.g. buildings, roadways, walls, etc.)



PROJECT: LAHS PROJECT #: 10280276.02

DATE: 9/30/10 ENGINEER/ANALYST: R PELLOS

Receptor ID: 3 SLM Model: 820 (SN: 1665) Calibrator Model: 200 (SN: ~~1442~~ 4214) Data File: ____

MEASUREMENT INFORMATION

Start Time: 13:56 Stop Time: 14:14

Principal Source(s): TRAFFIC ON N. SPRING ST.

Other Source(s): WIND THROUGH COTTONWOOD TREES

AIRPLANES TRAIN HELICOPTERS; FREEWAY IN THE DISTANCE

Average Observed Noise Level: 57

Maximum L_{eq} Observed: 70 Source(s): TRAIN

Minimum L_{eq} Observed: 55

Comments:

68 TRAIN (13:59)

70 TRAIN (14:01)

TRAFFIC COUNT DATA

Start Time: ____ Stop Time: ____

Direction: ____ Speed: ____

Autos	Med. Trucks	Heavy Trucks

Direction: ____ Speed: ____

Autos	Med. Trucks	Heavy Trucks

PROJECT: LAHSP **PROJECT #:** 10280276.02

DATE: 9/30/10 **ENGINEER/ANALYST:** R. PELLOS

Receptor ID: 3 SLM Model: 820 (SN: 1665) Calibrator Model: 200 (SN: 14214) Data File: ____

LOCATION

Location Description: SW END OF LAHSP. ~~@~~ NORTH OF SPRING ST. NEAR A COFFEE SHOP ON THE PARK GROUNDS

(Sketch meter location below and take at least 2 photographs of meter location)

Distance from edge of roadway: 183 ft Overall Roadway Width: ~~[illegible]~~ 60 Lane Widths: ~~[illegible]~~ 12

Is Parking Allowed along Street: No Width of Parking Lane: —

Distance from barriers: — Barrier Type: — Barrier Height: —

Location Comments: ____

METEOROLOGY

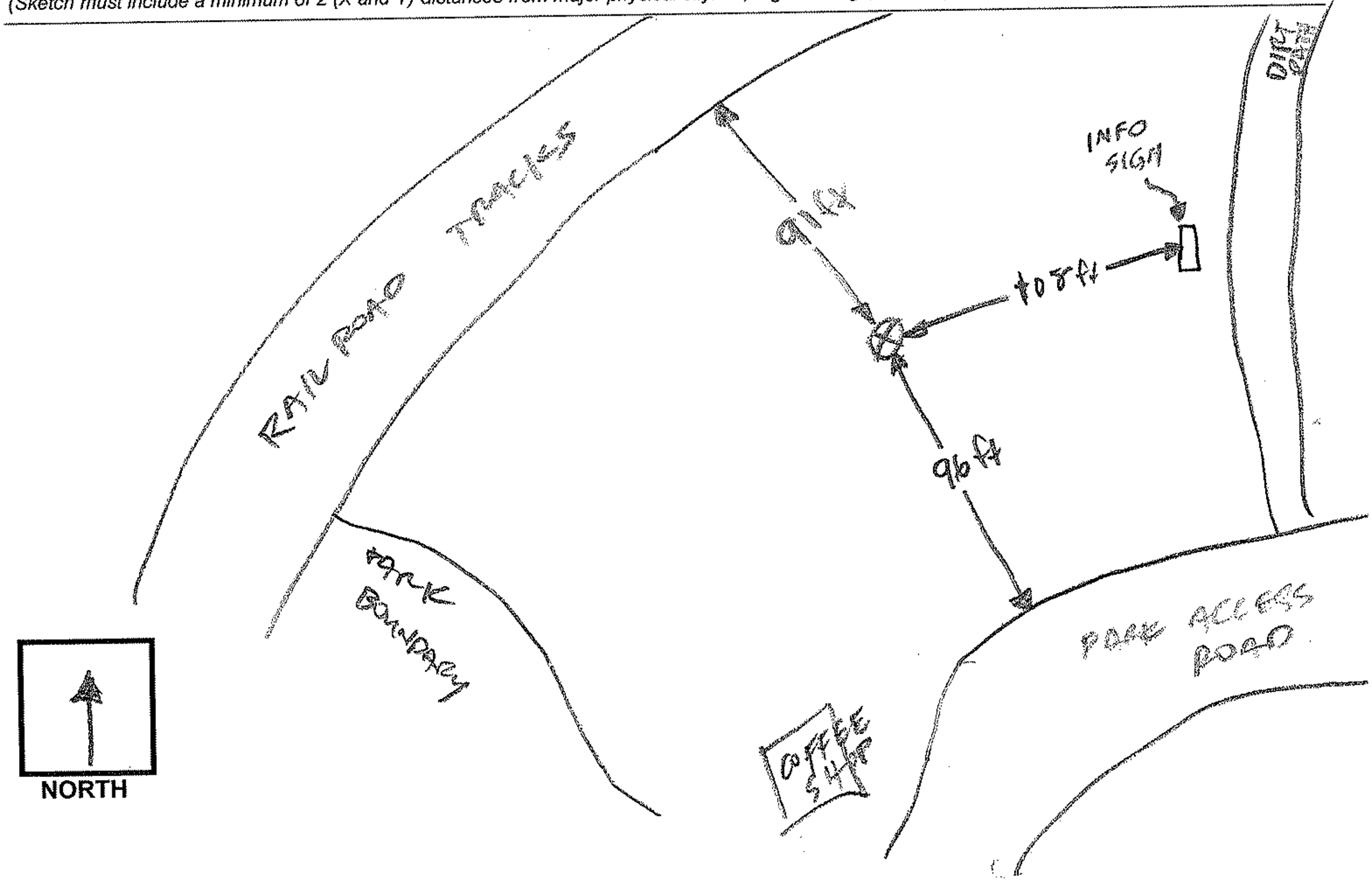
Temperature: ~~[illegible]~~ 87.2° F Wind Speed: 3.2 mph

Wind Direction: NE TO EAST Other (gusts, etc.): ____

Meteorological Comments: MOSTLY SUNNY

Sketch Area

(Sketch must include a minimum of 2 (X and Y) distances from major physical objects, e.g. buildings, roadways, walls, etc.)



PROJECT: LASHP PROJECT #: 10280276.02

DATE: 9/30/10 ENGINEER/ANALYST: R PELLOS

Receptor ID: 4 SLM Model: 820 (SN: 1665, Calibrator Model: 200 (SN: 4214) Data File: ____

MEASUREMENT INFORMATION

Start Time: 14:28 Stop Time: 14:43

Principal Source(s): TRAFFIC ON SPRING ST.

Other Source(s): TRAFFIC ON SOTELLO ST. / ACTIVITY AT ADJACENT BUSINESS McKENNA BOILERWORKS

Average Observed Noise Level: 66

Maximum L_{eq} Observed: 85 Source(s): HEAVY TRUCK

Minimum L_{eq} Observed: ~~60~~ 56

Comments:

TRAFFIC COUNT DATA

Start Time: ____ Stop Time: ____

Direction: ____ Speed: ____

Autos	Med. Trucks	Heavy Trucks

Direction: ____ Speed: ____

Autos	Med. Trucks	Heavy Trucks

PROJECT: LAHSP PROJECT #: 10280276.02

DATE: 9/30/10 ENGINEER/ANALYST: R PELLOS

Receptor ID: 4 SLM Model: 820 (SN: 1665) Calibrator Model: 200 (SN: 4214) Data File: ___

LOCATION

Location Description: CORNER OF N. SPRING ST AND SOTELLO ST.

(Sketch meter location below and take at least 2 photographs of meter location)

Distance from edge of roadway: 10 ft Overall Roadway Width: 44 Lane Widths: 12

Is Parking Allowed along Street: YES Width of Parking Lane: 8

Distance from barriers: — Barrier Type: — Barrier Height: —

Location Comments: SOUTH OF LAHSP

METEOROLOGY

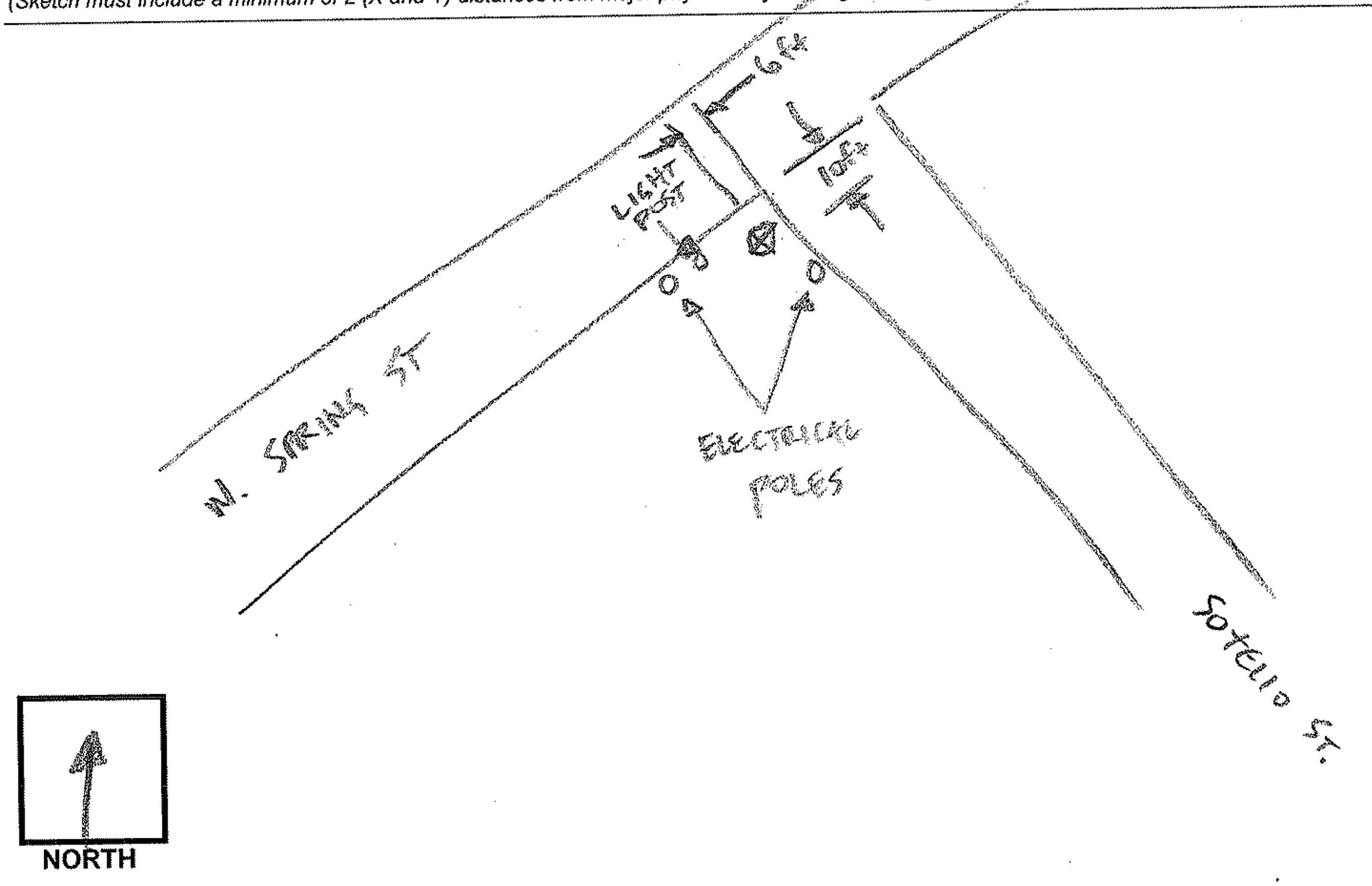
Temperature: 92.3°F Wind Speed: 6.5 mph

Wind Direction: NE Other (gusts, etc.): ___

Meteorological Comments: MOSTLY SUNNY

Sketch Area

(Sketch must include a minimum of 2 (X and Y) distances from major physical objects, e.g. buildings, roadways, walls, etc.)



PROJECT: 10280276.02 LAHSP **PROJECT #:** 10280276.02

DATE: 9/30/10 **ENGINEER/ANALYST:** R. PELLOS

Receptor ID: 5 SLM Model: 820 (SN: 1665) Calibrator Model: 200 (SN: 4214) Data File: ____

MEASUREMENT INFORMATION

12:04 – 12:15 INDUSTRIAL

Start Time: 10:44 Stop Time: 12:03

Principal Source(s): TRAFFIC ON N. SPRING ST. / ACTIVITY AT BUSINESS OPPOSITE SPRING ST.

Other Source(s): AIRPLANES ; TRAFFIC

Average Observed Noise Level: 56

Maximum L_{eq} Observed: 73 Source(s): AMBULANCE (11:56) ON SPRING ST.

Minimum L_{eq} Observed: 52

Comments:

TRAIN 11:52
TRAIN 12:02
TRAIN 12:09
TRAIN 12:13

TRAFFIC COUNT DATA

Start Time: 11:52 Stop Time: 12:02 N. SPRING ST.

Direction: BOTH Speed: 20 – 25

Autos	Med. Trucks	Heavy Trucks
X X X X X X X X X X X	~~IIII~~ III	~~IIII~~
110	8	5

Direction: ____ Speed: ____

Autos	Med. Trucks	Heavy Trucks

PROJECT: LASHP PROJECT #: 10280276.02
DATE: 9/30/10 ENGINEER/ANALYST: R. PELLOS

Receptor ID: 5 SLM Model: 820 (SN: 1668) Calibrator Model: 200 (SN: 4214) Data File: ____

LOCATION

Location Description: BETWEEN N. BROADWAY AND N. SPRING ST. IN CENTER OF PART

(Sketch meter location below and take at least 2 photographs of meter location)

Distance from edge of roadway: 290 ft Overall Roadway Width: 45 ft Lane Widths: 10

Is Parking Allowed along Street: No Width of Parking Lane: ____

Distance from barriers: NONE Barrier Type: ____ Barrier Height: ____

Location Comments: ____

METEOROLOGY

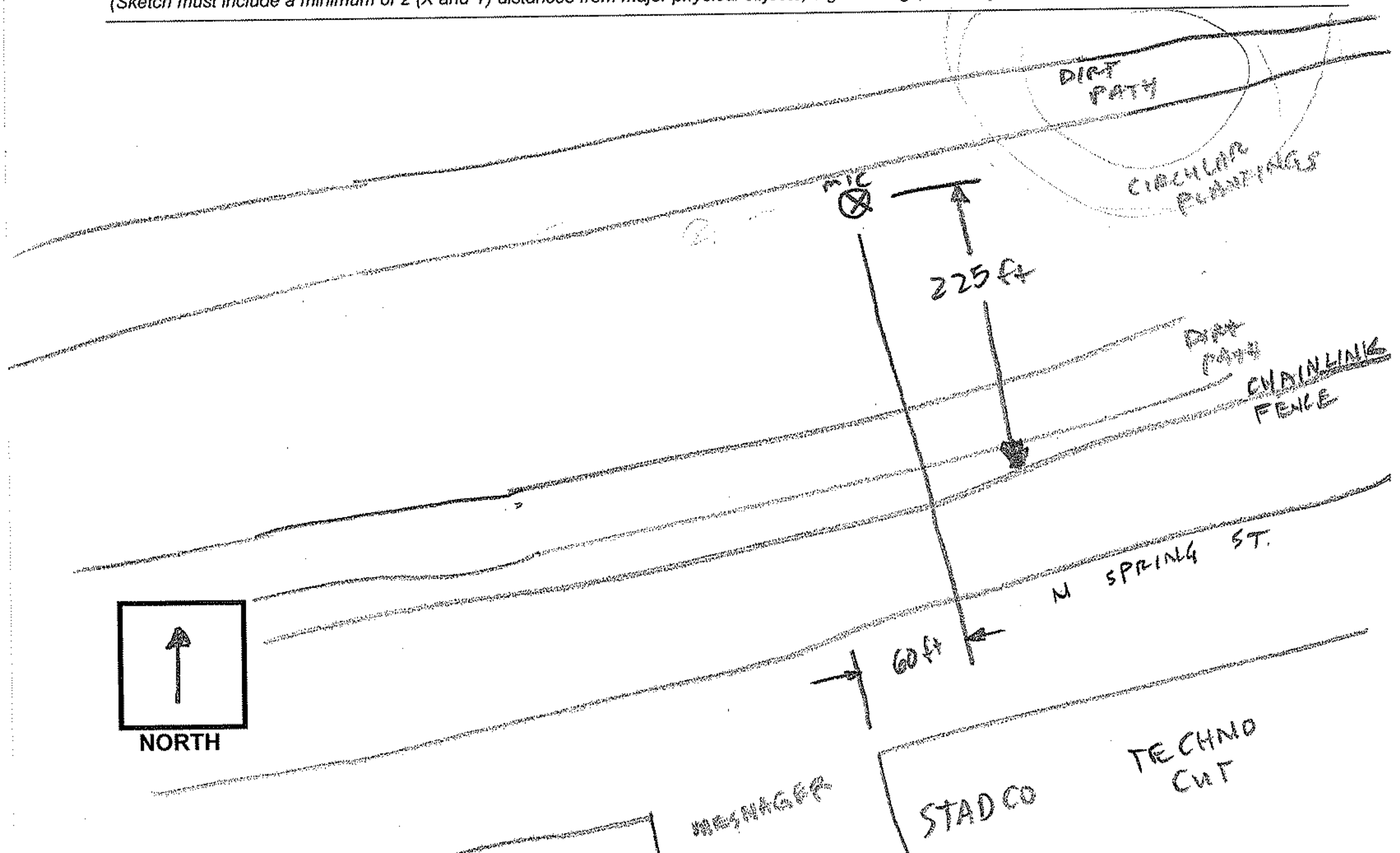
Temperature: ~~MOSTLY SUNNY~~ 93°F Wind Speed: 1.6

Wind Direction: NE Other (gusts, etc.): ____

Meteorological Comments: MOSTLY SUNNY

Sketch Area

(Sketch must include a minimum of 2 (X and Y) distances from major physical objects, e.g. buildings, roadways, walls, etc.)



PROJECT: LASHP **PROJECT #:** 10280276.02

DATE: 9/30/10 **ENGINEER/ANALYST:** R. PELLOS

Receptor ID: 6 SLM Model: 820 (SN: 1665) Calibrator Model: 200 (SN: 4214) Data File: ____

MEASUREMENT INFORMATION

Start Time: 15:00 Stop Time: 18:15

Principal Source(s): TRAFFIC ON N. BROADWAY / CASANOVA

Other Source(s):

Average Observed Noise Level: 58

Maximum L_{eq} Observed: ~~8~~ 80 Source(s): GARBAGE TRUCK

Minimum L_{eq} Observed: 49

Comments:

82 VAN ACCELERATING NEXT TO MIC.

TRAFFIC COUNT DATA

Start Time: 15:00 Stop Time: 15:10 N. BROADWAY

Direction: BOTH Speed: 35

Autos	Med. Trucks	Heavy Trucks
XXXXXXXXXXXXXXXX	~~IIII~~	~~IIII~~
XXXXXXX (210)	III (8)	II (7)

Direction: ____ Speed: ____

Autos	Med. Trucks	Heavy Trucks

PROJECT: LAHSP PROJECT #: 10280276.02

DATE: 9/30/10 ENGINEER/ANALYST: R. PELLOS

Receptor ID: 6 SLM Model: 820 (SN: ~~4665~~ Calibrator Model: 200 (SN: 4214 , Data File: ____

LOCATION

Location Description: CORNER OF N. BROADWAY AND CASANOVA ST. NORTH OF LAHSP

(Sketch meter location below and take at least 2 photographs of meter location)

Distance from edge of ~~RAILROAD~~ roadway: ~~3 ft~~ 15 ft Overall Roadway Width: 70 ft Lane Widths: 4 LANES 12

Is Parking Allowed along Street: ONE SIDE ONLY Width of Parking Lane: 8 ft

Distance from barriers: — Barrier Type: ____ Barrier Height: ____

Location Comments: ____

METEOROLOGY

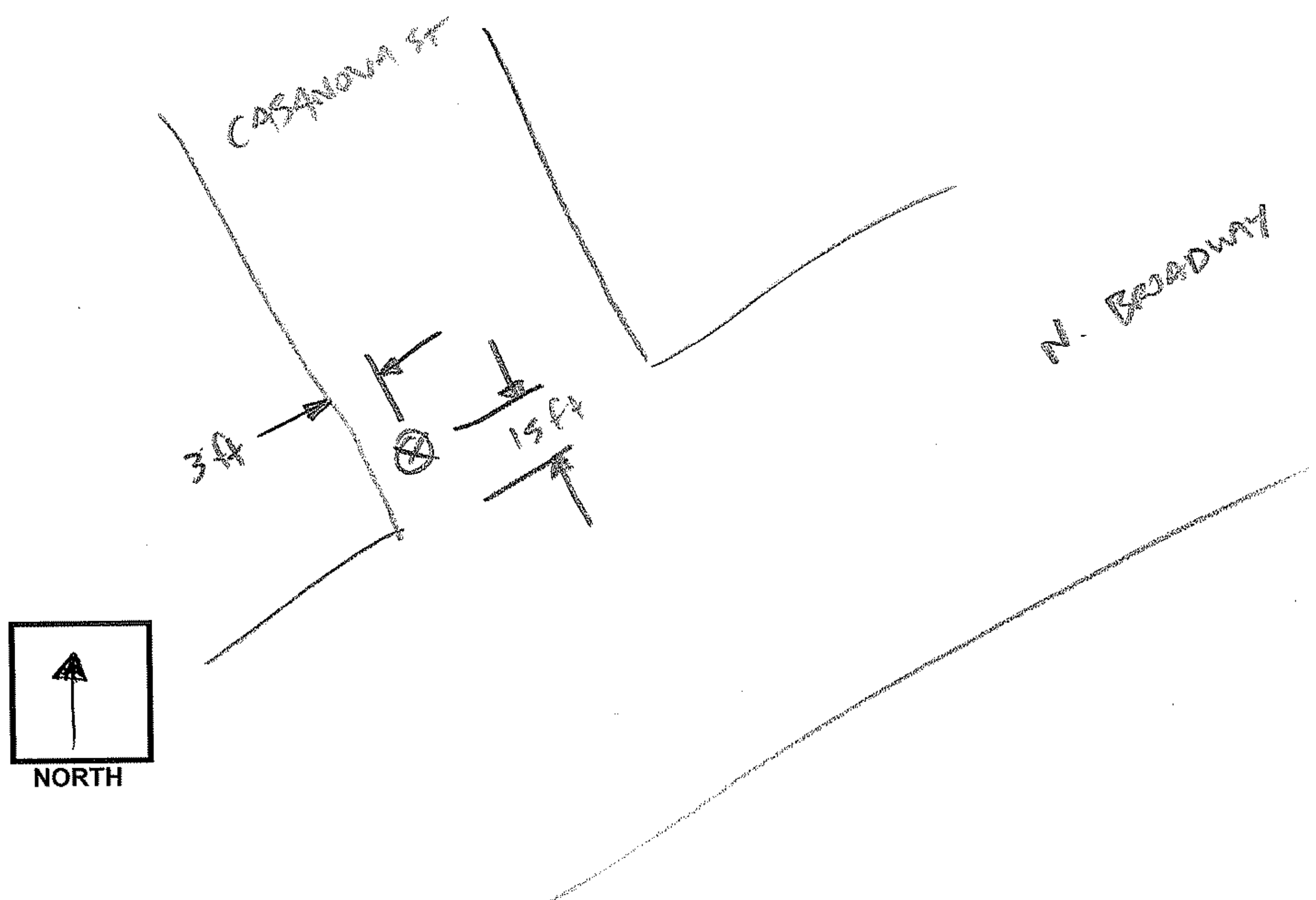
Temperature: ~~80~~ 95 °F Wind Speed: 0.7 mph

Wind Direction: NE Other (gusts, etc.): ____

Meteorological Comments: MOSTLY SUNNY

Sketch Area

(Sketch must include a minimum of 2 (X and Y) distances from major physical objects, e.g. buildings, roadways, walls, etc.)



PROJECT: LAHSP **PROJECT #:** 10280276.02

DATE: 9/30/10 **ENGINEER/ANALYST:** R. Pellos

Receptor ID: 7 SLM Model: 820 (SN: 1665) Calibrator Model: 200 (SN: 4214) Data File: ____

MEASUREMENT INFORMATION

Start Time: 15:24 Stop Time: 15:34

Principal Source(s): TRAFFIC ON N. BROADWAY

Other Source(s):

Average Observed Noise Level: 62

Maximum L_{eq} Observed: 84 Source(s): Bus

Minimum L_{eq} Observed: ~~[illegible]~~ 56

Comments:

87 Bus

TRAFFIC COUNT DATA

Start Time: ____ Stop Time: ____

Direction: ____ Speed: ____

Autos	Med. Trucks	Heavy Trucks

Direction: ____ Speed: ____

Autos	Med. Trucks	Heavy Trucks

PROJECT: LAHSP **PROJECT #:** 10280276.02

DATE: 9/30/10 **ENGINEER/ANALYST:** R PELLOS

Receptor ID: 7 SLM Model: 820 (SN: 1665) Calibrator Model: 200 (SN: 4214) Data File: ____

LOCATION

Location Description: 1349 N. BROADWAY ST. QUAN YUM TEMPLE

(Sketch meter location below and take at least 2 photographs of meter location)

Distance from edge of roadway: 5 ft Overall Roadway Width: 70 Lane Widths: 12

Is Parking Allowed along Street: ONE SIDE ONLY Width of Parking Lane: 8

Distance from barriers: ____ Barrier Type: ____ Barrier Height: ____

Location Comments: ____

METEOROLOGY

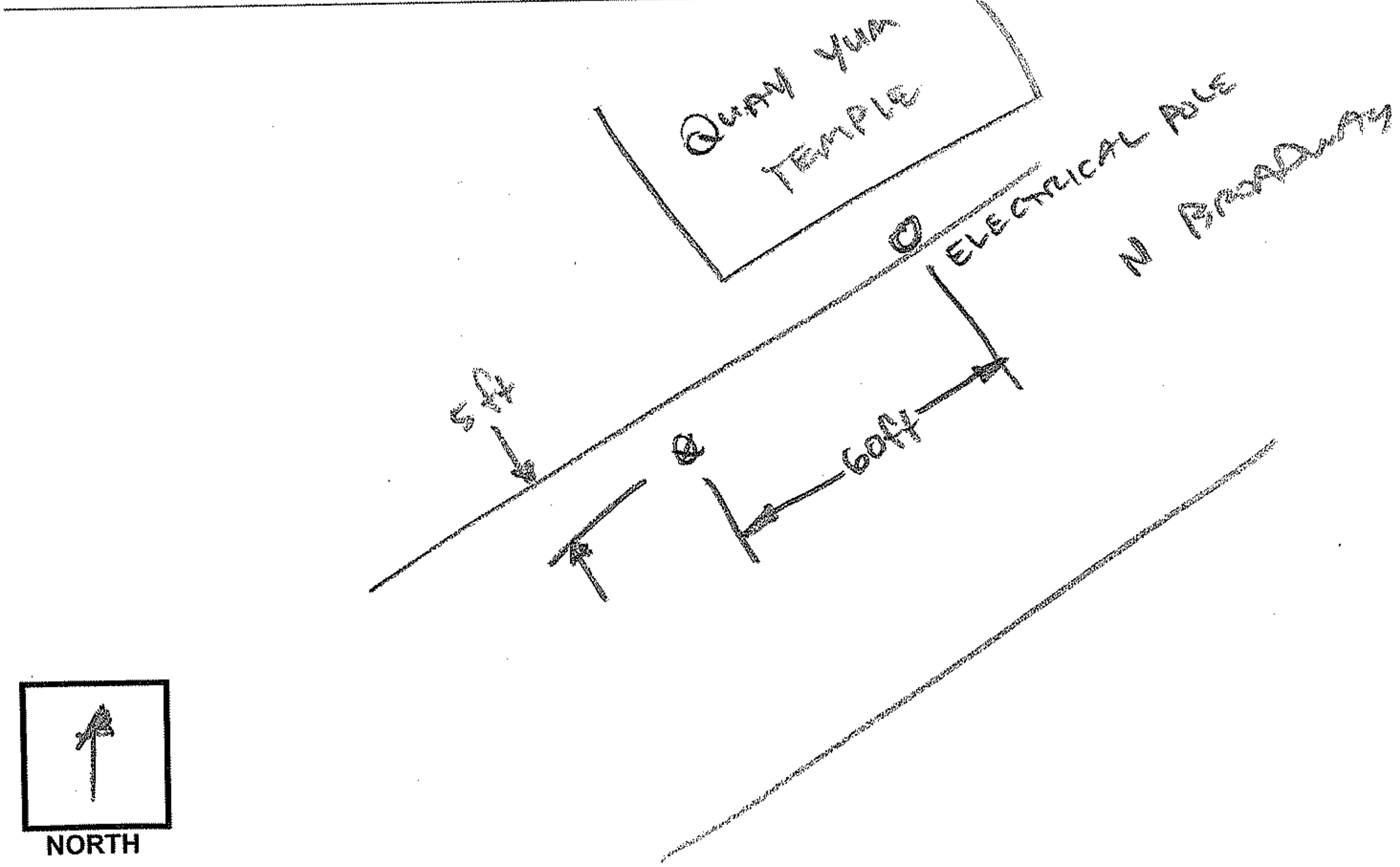
Temperature: 92°F Wind Speed: 3.2 mph

Wind Direction: NE Other (gusts, etc.): ____

Meteorological Comments: MOSTLY SUNNY

Sketch Area

(Sketch must include a minimum of 2 (X and Y) distances from major physical objects, e.g. buildings, roadways, walls, etc.)



APPENDIX B

CONSTRUCTION NOISE CALCULATIONS

Composite Noise Levels (Leq)
at
Nearest Sensitive Receptor
During Grading Operations

Predicted Daily Construction Noise Levels (Leq)				
Location	Equipment	At Receiver	Usage Factor	Composite Leq
LASHP Grading Operations	Truck, Dump	48	40%	56
LASHP Grading Operations	Backhoe	44	40%	
LASHP Grading Operations	Scraper	49	40%	
LASHP Grading Operations	Dozer	49	40%	
LASHP Grading Operations	Excavator	49	40%	
LASHP Grading Operations	Grader	49	40%	
None Identified	Nothing	0	0%	
None Identified	Nothing	0	0%	
None Identified	Nothing	0	0%	
None Identified	Nothing	0	0%	

Note: The composite Leq is based on the simultaneous operation of all pieces of equipment at the same distance from the receiver. It assumes that each piece of equipment would operate only 40 percent of each work day (FTA 2006).

APPENDIX C

MOBILE SOURCE NOISE MODELING

Appendix

Traffic Noise Prediction Model, (FHWA RD-77-108)

Model Input Sheet

Project Name : LA HSP
Project Number :
Modeling Condition : Existing
Ground Type : Hard
Metric (L_{eq}, L_{dn}, CNEL) : Leq

K Factor :
Traffic Desc. (Peak or ADT) : Peak

Segment	Roadway	Segment From	To	Traffic Vol.	Speed (Mph)	Distance to CL	% Autos	%MT	% HT	Day %	Eve %	Night %	Offset (dB)
1	Spring St.	West of	College St.	2061	45	100	95.00%	2.5%	2.5%				
2		College St.	Sotello St.	1694	45	100	95.00%	2.50%	2.50%				
3		Sotello St.	Masnagers St.	1688	45	100	95.00%	2.50%	2.50%				
4		Masnagers St.	N. Ave. 18	1392	45	100	95.00%	2.50%	2.50%				
5		East of	N. Ave. 18	1892	45	100	95.00%	2.50%	2.50%				

Appendix

Traffic Noise Prediction Model, (FHWA RD-77-108)

Predicted Noise Levels

Project Name : LA HSP
Project Number :
Modeling Condition : Existing
Metric (Leq, Ldn, CNEL) : Leq

Segment	Roadway	Segment From	To	Noise Levels, dB Leq Auto	MT	HT	Total	Distance to Traffic Noise Contours, Feet 70 dB	65 dB	60 dB	55 dB	50 dB
1	Spring St.	West of	College St.	67.3	59.8	64.3	69.6	91	287	906	2,865	9,061
2		College St.	Sotello St.	66.5	58.9	63.4	68.7	74	236	745	2,355	7,448
3		Sotello St.	Masnagers St.	66.5	58.9	63.4	68.7	74	235	742	2,347	7,421
4		Masnagers St.	N. Ave. 18	65.6	58.1	62.6	67.9	61	194	612	1,935	6,120
5		East of	N. Ave. 18	67.0	59.4	63.9	69.2	83	263	832	2,630	8,318

Appendix

Traffic Noise Prediction Model, (FHWA RD-77-108)

Model Input Sheet

AECOM

Project Name : LA HSP
Project Number :
Modeling Condition : 2035 No Project
Ground Type : Hard
Metric (L_{eq}, L_{dn}, CNEL) : Leq
K Factor :
Traffic Desc. (Peak or ADT) : Peak

Segment	Roadway	Segment From	To	Traffic Vol.	Speed (Mph)	Distance to CL	% Autos	%MT	% HT	Day %	Eve %	Night %	Offset (dB)
1	Spring St.	West of	College St.	1570	45	100	95.00%	2.5%	2.5%				
2		College St.	Sotello St.	1685	45	100	95.00%	2.50%	2.50%				
3		Sotello St.	Masnagers St.	1948	45	100	95.00%	2.50%	2.50%				
4		Masnagers St.	N. Ave. 18	2168	45	100	95.00%	2.50%	2.50%				
5		East of	N. Ave. 18	2698	45	100	95.00%	2.50%	2.50%				

Appendix

Traffic Noise Prediction Model, (FHWA RD-77-108)

Predicted Noise Levels

AECOM

Project Name : LA HSP
Project Number :
Modeling Condition : 2035 No Project
Metric (Leq, Ldn, CNEL) : Leq

		Segment		Noise Levels, dB Leq				Distance to Traffic Noise Contours, Feet				
Segment	Roadway	From	To	Auto	MT	HT	Total	70 dB	65 dB	60 dB	55 dB	50 dB
1	Spring St.	West of	College St.	66.2	58.6	63.1	68.4	69	218	690	2,183	6,903
2		College St.	Sotello St.	66.5	58.9	63.4	68.7	74	234	741	2,343	7,408
3		Sotello St.	Masnagers St.	67.1	59.5	64.0	69.3	86	271	856	2,708	8,564
4		Masnagers St.	N. Ave. 18	67.6	60.0	64.5	69.8	95	301	953	3,014	9,532
5		East of	N. Ave. 18	68.5	61.0	65.5	70.7	119	375	1,186	3,751	11,862

Appendix

Traffic Noise Prediction Model, (FHWA RD-77-108)

Model Input Sheet

Project Name : LA HSP
Project Number :
Modeling Condition : 2035 With Project
Ground Type : Hard
Metric (L_{eq}, L_{dn}, CNEL) : Leq

K Factor :
Traffic Desc. (Peak or ADT) : Peak

Segment	Roadway	Segment From	Segment To	Traffic Vol.	Speed (Mph)	Distance to CL	% Autos	%MT	% HT	Day %	Eve %	Night %	Offset (dB)
1	Spring St.	West of	College St.	1570	45	100	95.00%	2.5%	2.5%				
2		College St.	Sotello St.	1724	45	100	95.00%	2.50%	2.50%				
3		Sotello St.	Masnagers St.	1934	45	100	95.00%	2.50%	2.50%				
4		Masnagers St.	N. Ave. 18	2190	45	100	95.00%	2.50%	2.50%				
5		East of	N. Ave. 18	2720	45	100	95.00%	2.50%	2.50%				

Appendix

Traffic Noise Prediction Model, (FHWA RD-77-108)

Predicted Noise Levels

Project Name : LA HSP
Project Number :
Modeling Condition : 2035 With Project
Metric (Leq, Ldn, CNEL) : Leq

Segment	Roadway	Segment		Noise Levels, dB Leq				Distance to Traffic Noise Contours, Feet				
		From	To	Auto	MT	HT	Total	70 dB	65 dB	60 dB	55 dB	50 dB
1	Spring St.	West of	College St.	66.2	58.6	63.1	68.4	69	218	690	2,183	6,903
2		College St.	Sotello St.	66.6	59.0	63.5	68.8	76	240	758	2,397	7,580
3		Sotello St.	Masnagers St.	67.1	59.5	64.0	69.3	85	269	850	2,689	8,503
4		Masnagers St.	N. Ave. 18	67.6	60.1	64.6	69.8	96	304	963	3,045	9,628
5		East of	N. Ave. 18	68.5	61.0	65.5	70.8	120	378	1,196	3,782	11,959