PSOMAS

Balancing the Natural and Built Environment

July 31, 2019

Deb Farrar
Director of Community Services
City of Colton
Community Services Department
650 North La Cadena Drive,
Colton, California 92324

VIA EMAIL
DFarrar@coltonca.gov

Subject: Noise and Vibration Analysis for the Proposed Colton Community Soccer Park Project in the City of Colton, California

Dear Ms. Farrar:

This Letter Report presents the results of the noise and vibration analysis for the proposed Colton Community Soccer Park Project located south of East Congress Street, east of the Union Pacific Railroad line, and west of the Santa Ana River in the City of Colton, California (hereinafter referred to as the "Project"). This analysis addresses the potential noise and vibration impacts associated with the Project in accordance with the California Environmental Quality Act (CEQA) (California Public Resources Code §21000 et seq.) and the State CEQA Guidelines (California Code of Regulations, Title 14, §15000 et seq.).

PROJECT SETTING AND DESCRIPTION

The proposed Colton Community Soccer Park Project involves the construction of a community-level soccer park located within the City of Colton on multiple City-owned parcels totaling approximately 58 acres. The proposed Project includes development of 8 lighted, synthetic turf regulation size soccer fields to accommodate soccer leagues and tournaments for "Under Age 5 (U5) and Under Age 18 (U18) on approximately 55 acres of the site, with 3 acres of the site allocated to habitat. The conceptual design of the proposes three tiers of elevation for the site design. The community soccer park portion of the Project would include approximately 300 parking stalls, rest room facilities, a concession building, breezeway with seating, children's' play areas, multipurpose trails, field and parking lot lighting, security fencing, retaining walls and shaded spectator seating.

An approximately four- to six-acre portion of the project site, proposed for the main surface parking lot located at the southern terminus of South Florez Street and South Fernando Street, is located on a former waste disposal site known as Guyaux Landfill. The existing drainage is located in the southwest portion of the site. Detention basins are proposed on the eastern edge of the project site adjacent to the Santa Ana River and the southwest portion of the site located below South Florez Street.

The Project site is predominantly surrounded by residential and industrial uses to the north and west. Please refer to Exhibit 1, Project Area. Access to the project site would include two vehicular driveways and pedestrian access available from East Congress Street and a vehicular and pedestrian access at the south end of South Florez Street. Pedestrian only access

225 South Lake Avenue
Suite 1000
Pasadena, CA 91101

Tel 626.351.2000
Fax 626.351.2030
www.Psomas.com

would be located at the south end of South Fernando Street. The project site is generally bounded by single-family residences to the north, residential and industrial uses to the northwest, the Burlington Northern Santa Fe Railway and industrial uses to the west and vacant land and the Santa Ana River and Santa Ana River Trail to the east and south.

NOISE AND VIBRATION ANALYSES

Relevant elements of the proposed Project related to the analysis of potential noise and vibration impacts include (1) site preparation activities, (2) on-site grading activities, which are expected to import 58,500 cubic yards (cy) of soil; (3) the use of construction equipment during construction of eight soccer fields, surface parking, two restrooms, and two concession buildings; and (4) the vehicle trips generated by the proposed Project.

NOISE AND VIBRATION BASICS AND TERMINOLOGY

Noise

"Sound" is a vibratory disturbance created by a moving or vibrating source and is capable of being detected. "Noise" is defined as sound that is loud, unpleasant, unexpected, or undesired and may therefore be classified as a more specific group of sounds. The effects of noise on people can include general annoyance; interference with speech communication; sleep disturbance; and, in the extreme, hearing impairment (Caltrans 2013).

Sound pressure levels are described in units called the decibel (dB). Decibels are measured on a logarithmic scale. A doubling of the energy of a noise source (such as doubling of traffic volume) would increase the noise level by 3 dB. The human ear is not equally sensitive to all frequencies within the sound spectrum. To accommodate this phenomenon, the A-scale was devised; the A-weighted decibel scale (dBA) approximates the frequency response of the average healthy ear when listening to most ordinary everyday sounds and is used in this analysis.

Human perception of noise has no simple correlation with acoustical energy. Due to subjective thresholds of tolerance, the annoyance of a given noise source is perceived very differently from person to person. The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at 3 feet is approximately 60 dBA, while loud jet engine noises at 1,000 feet equate to 100 dBA, which can cause serious discomfort. Table 1 shows the relationship of various noise levels in dBA to commonly experienced noise events.

Two noise sources do not "sound twice as loud" as one source. As stated above, a doubling of noise sources results in a noise level increase of 3 dBA. It is widely accepted that (1) the average healthy ear can barely perceive changes of a 3 dBA increase or decrease, (2) a change of 5 dBA is readily perceptible, and (3) an increase (decrease) of 10 dBA sounds twice (half) as loud (Caltrans 2013).

From the source to the receiver, noise changes both in the level and frequency spectrum. The most obvious change is the decrease in noise level as the distance from the source increases. Sound from a small localized source (approximating a "point" source) radiates uniformly outward as it travels away from the source in a spherical pattern. For point sources, such as heating, ventilation, and air conditioning (HVAC) units or construction equipment, the sound level attenuates (or drops off) at a rate of 6 dBA for each doubling of distance (i.e., if the noise level is 70 dBA at 25 feet, it is 64 dBA at 50 feet). Vehicle movement on a road makes the source of the sound appear to emanate from a line (line source) rather than a point when viewed over some time interval. The sound level attenuates or drops off at a rate of 3 dBA per doubling of distance for line sources.

TABLE 1
NOISE LEVELS FOR COMMON EVENTS

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock Band
Jet fly-over at 300 m (1,000 ft)	100	
Gas lawn mower at 1 m (3 ft)	90	
Diesel truck at 15 m (50 ft) at 80 km/hr (50 mph)	80	Food blender at 1 m (3 ft); garbage disposal at 1 m (3 ft)
Noisy urban area, daytime gas lawn mower at 30 m (100 ft)	70	Vacuum cleaner at 3 m (10 ft)
Commercial area, heavy traffic at 90 m (300 ft)	60	Normal speech at 1 m (3 ft)
Quiet urban daytime	50	Large business office, dishwasher in next room
Quiet urban nighttime	40	Theater, large conference room (background)
Quiet suburban nighttime	30	Library
Quiet rural nighttime	20	Bedroom at night, concert hall (background)
	10	Broadcast/recording studio
Lowest threshold of human hearing	0	Lowest threshold of human hearing
dBA: A-weighted decibels; m: meter; ft: feet; km/hr: kilometers per hour; mph: miles per hour Source: Caltrans 2013.		

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 or landform features as well as man-made features (e.g., buildings and walls) can significantly alter noise exposure levels. For a noise barrier to work, it must be high enough and long enough to block the view from the receiver to a road or to the noise source. Effective noise barriers can reduce outdoor noise levels at the receptor by up to 15 dBA.

Several rating scales (or noise “metrics”) exist to analyze effects of noise on a community. These scales include the equivalent noise level (L_{eq}), including L_{max} and L_{min}, which are respectively the highest and lowest A-weighted sound levels that occur ding a noise event, and the Community Noise Equivalent Level (CNEL). Average noise levels over a period of minutes or hours are usually expressed as dBA L_{eq}, which is the equivalent noise level for that period of time. The period of time averaging may be specified; for example, $L_{eq(3)}$ would be a three-hour average. Noise of short duration (i.e., substantially less than the averaging period) is averaged into ambient noise during the period of interest. Thus, a loud noise lasting many seconds or a few minutes may have minimal effect on the measured sound level averaged over a one-hour period.

To evaluate community noise impacts, CNEL was developed to account for human sensitivity to nighttime noise. CNEL represents the 24-hour average sound level with a penalty for noise occurring at night. The CNEL computation divides a 24-hour day into three periods: daytime (7:00 AM to 7:00 PM), evening (7:00 PM to 10:00 PM), and nighttime (10:00 PM to 7:00 AM). The evening sound levels are assigned a 5-dBA penalty, and the nighttime sound levels are assigned a 10-dBA penalty prior to averaging with daytime hourly sound levels.

Vibration

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Vibration is normally associated with activities such as railroads or vibration-intensive stationary sources, but can also be associated with construction equipment such as jackhammers, pile drivers, and hydraulic hammers. Vibration displacement is the distance that a point on a surface moves away from its original static position. The instantaneous speed that a point on a surface moves is described as the velocity, and the rate of change of the speed is described as the acceleration. Each of these descriptors can be used to correlate vibration to human response, building damage, and acceptable equipment vibration levels. During construction of a project, the operation of construction equipment can cause groundborne vibration. During the operational phase of a project, receptors may be subject to levels of vibration that can cause annoyance due to noise generated from vibration of a structure or items within a structure. Analysis of this type of vibration is best measured in velocity and acceleration.

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

- Surface or Rayleigh waves travel along the ground surface. They carry most of their energy along an expanding cylindrical wave front, similar to the ripples produced by throwing a rock into a lake. The particle motion is more or less perpendicular to the direction of propagation (known as retrograde elliptical).
- Compression or P-waves are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal, in a push-pull motion. P-waves are analogous to airborne sound waves.
- Shear or S-waves are also body waves, carrying their energy along an expanding spherical wave front. Unlike P-waves, however, the particle motion is transverse, or perpendicular to the direction of propagation.

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

The units for ppv velocity are normally inches per second (in/sec). Often, vibration is presented and discussed in dB units in order to compress the range of numbers required to describe the vibration. In this study, all ppv velocity levels are in in/sec and all vibration levels are in dB relative to one microinch per second. The threshold of perception is approximately 0.3 ppv. Typically, groundborne vibration generated by human activities attenuates rapidly with distance from the source of the vibration. Even the more persistent Rayleigh waves decrease relatively quickly as they move away from the source of the vibration. Manmade vibration problems are, therefore, usually confined to short distances (500 feet or less) from the source.

Construction generally includes a wide range of activities that can generate groundborne vibration. In general, blasting and demolition of structures generate the highest vibrations. Heavy trucks can also generate groundborne vibrations, which vary depending on vehicle type, weight, and pavement conditions. Potholes, pavement joints, discontinuities, differential settlement of pavement, and other anomalies all increase the vibration levels from vehicles passing over a road surface. Construction vibration is normally of greater concern than vibration of normal traffic on streets and freeways with smooth pavement conditions. Trains generate substantial quantities of vibration due to their engines, steel wheels, and heavy loads.

EXISTING CONDITIONS

Noise Sources and Noise Levels. The existing noise environment in the Project area is influenced by traffic noise on nearby roads, distant industrial noise from nearby businesses, aircraft, and residential noise consisting of children playing, yard work, and barking dogs. The northern portion of the site is influenced more by traffic and residential noise than the southern portion, which is primarily influenced by industrial noise. The roadway contributing the most noise to the Project site is Congress Street located along the northern boundary of the Project site. On Wednesday, May 7, 2019, Psomas conducted an ambient noise survey to identify existing noise levels within the Project area. Six short-term noise level measurements of approximately 20 minutes were taken using a Larson Davis Laboratories Model 831 integrating sound level meter (LD 831) equipped with a windscreen. Noise measurements were taken along the Project's north and northwestern boundaries as shown in Exhibit 2. The LD 831 meter was calibrated before and after use with a Larson Davis Model CAL200 acoustical calibrator to ensure that the measurements would be accurate. The sound level meters were programmed to record noise levels in "slow" mode in A-weighted form. Meteorological conditions during all measurement periods were favorable, with light wind and overcast skies.

Traffic on Congress Street remained free-flowing throughout the duration of the noise measurement. Table 2 shows the minimum, average (L_{eq}), and the maximum noise levels measurements. The existing background noise environment (i.e., ambient noise) in the Project area is primarily influenced by vehicle traffic and distant industrial work. Additional noise sources include animals, such as birds and barking dogs, and airplanes.

TABLE 2
AMBIENT NOISE MEASUREMENTS

Noise Measurement Location	Noise Level Minimum (dBA)	Noise Level Average (L_{eq} dBA)	Noise Level Maximum (dBA)
ST 1 - Southwestern Property Line	42.2	49.2	61.3
ST 2 - Southwestern Property Line	39.5	46.5	61.5
ST 3 - Western Property Line	39.0	50.7	66.6
ST 4 - Northwestern Property Line	45.0	54.1	78.6
ST 5 - Northern Property Line	45.0	63.0	87.8
ST 6 - Northern Property Line	46.1	61.9	96.2
Source: See Attachment A for noise measurement data.			

Sensitive Receptors

The State of California defines noise-sensitive receptors as those land uses that require serenity or are otherwise adversely affected by noise events or conditions. Schools, libraries, churches, hospitals, and residential uses make up the majority of these areas. Noise-sensitive receptors closest to the Project site include single-family residences to the north, west, and northwest of the Project site, as shown on Exhibit 1.

Regulatory Setting

Public agencies have established noise guidelines and standards to protect citizens from potential hearing damage and various other adverse physiological and social effects associated with noise.

State of California

Title 24 of the *California Code of Regulations,* also known as the California Building Standards Code, establishes building standards applicable to all occupancies throughout the state. Section 1207.11.2 requires that residential structures other than detached single-family dwellings be designed to prevent the intrusion of exterior noise so that the interior noise attributable to exterior sources shall not exceed 45 dBA CNEL in any habitable room. Section 1207.12 states, "if interior allowable noise levels are met by requiring that windows be unopenable or closed, the design for the structure must also specify a ventilation or air-conditioning system to provide a habitable interior requirement. The ventilation system must not compromise the dwelling unit or guest room noise reduction".

City of Colton

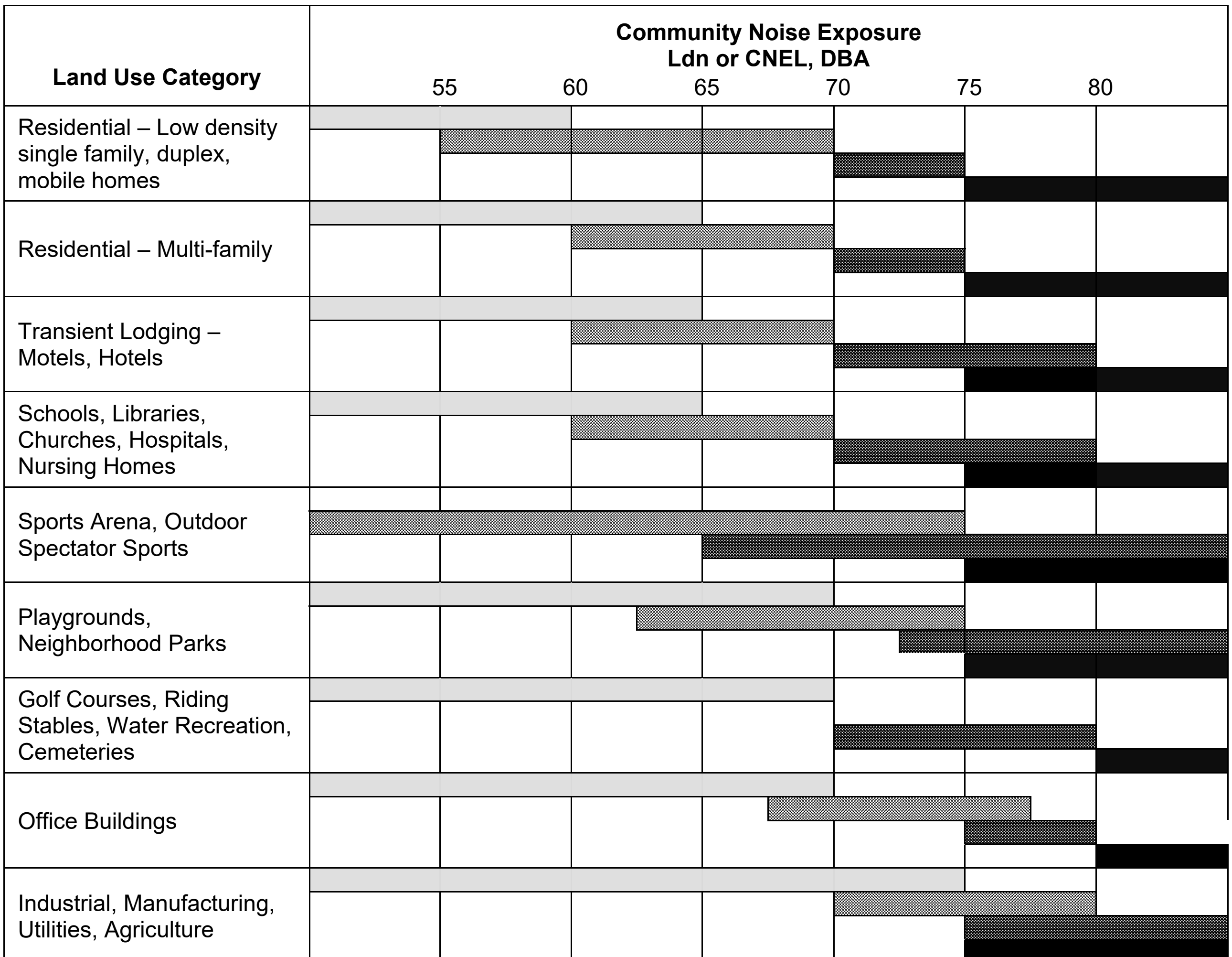
The City of Colton has established guidelines and standards in the General Plan and the Municipal Code.

General Plan Noise Element

The City of Colton is affected by several different sources of noise, including automobile traffic, railroad operations, airport operations, commercial activity, and periodic nuisances such as construction, loud parties, and other events. The Noise Element is intended to identify these sources and provide objectives and policies that ensure that noise from these sources does not create an unacceptable noise environment

(City of Colton 1987). The Noise Element contains guidelines for noise compatible land uses for long-term operations as shown in Table 3.

TABLE 3
CITY OF COLTON LAND USE COMPATIBILITY
FOR COMMUNITY NOISE ENVIRONMENTS



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 requirement.

NORMALLY UNACCEPTALBE

If new construction or development proceeds, an analysis of the noise reduction requirements should be made and needed noise insulation features included in the design.

CONDITIONALLY ACCEPTABLE

New construction or development should be undertaken after an 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.

CLEARLY UNACCEPTALBE

New construction or development should generally not be undertaken, unless it can be demonstrated that an interior level of 45 dBA can be achieved.

Source: Colton 1987.

Municipal Code

The following sections of the Noise Ordinance are applicable to the proposed Project:

9.16.010 - Prohibited—Penalty.

A. Prohibition. Notwithstanding any other provisions of this Code and in addition thereto, it Shall be unlawful and is hereby declared a Public Nuisance for any Person or entity to willfully make, suffer, Permit, continue, or cause to be made or continued, any loud, unnecessary, and unusual Noise or any disturbance, commotion, gathering or event, which disturbs or tends to disturb the peace or quiet of any neighborhood or which causes or tends to cause discomfort or annoyance to any reasonable Person of normal sensitivity within the area.

B. Standards. The standards which May be considered in determining whether Violation of the provisions of this section exists May include, but not be limited to, the Following:

1. Noise:
    a. The level of the Noise;
    b. Whether the nature of the Noise is usual or unusual;
    c. Whether the origin of the Noise is natural or unnatural;
    d. The level and intensity of the background Noise, if any;
    e. The proximity of the Noise to residential sleeping facilities;
    f. The nature and zoning of the area within which the Noise emanates;
    g. The density of the inhabitation of the area within which the Noise emanates;
    h. The time of the Day and Night the Noise occurs;
    i. The duration of the Noise;
    j. Whether the Noise is recurrent, intermittent, or constant; or
    k. Whether the Noise is produced by a commercial or noncommercial activity.
2. Public Safety:
    a. The number of Persons present in relation to the location Used;
    b. The effect on nearby Pedestrian traffic;
    c. The effect on nearby vehicular traffic or parking or both;
    d. The extent of past threats to public safety at the particular location or at gatherings or events held or attended by the same individual or individuals or both; or
    e. The presence of alcohol at the gathering or event.

The City has also developed performance standards related to noise as detailed in Chapter 18.42 of the Municipal Code.

18.42.040 - Noise.

The maximum sound level radiated by any Use of Facility, when measured at the boundary line of the Property on which the sound is generated, Shall not be obnoxious by reason of its intensity, pitch or dynamic characteristics as determined by the City, and Shall not exceed 65 dBA.
(Ord. 0-14-92 § 1 (Exh. A) (part), 1992)

Noise Impact Analysis

The following questions correspond to the questions in the Noise section of the Initial Study Checklist in Appendix G of the State CEQA Guidelines.

Question NOI-1 **Would the Project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan, local noise ordinance, or applicable standards of other agencies?**

Temporary and Permanent Increases in Ambient Noise Levels Due to the Project

The analysis in this section is divided into the following categories: Off-site Noise Generated by Project Traffic, Noise Generated by On-Site Project Sources and Project Construction Noise.

Off-site Noise Generated by Project Traffic

Less than Significant Impact. The Project may result in long-term operational noise increases as a result of increased traffic along local roadways and onsite noise sources such as fields and parking lots.

Traffic. Regarding traffic-related noise, the proposed Project is expected to generate an average daily traffic volume of 571 vehicles/day for weekdays, 3,239 vehicles/day for Saturdays and 2,302 vehicles/day for Sundays. Table 4 shows the increase in street segment traffic volumes associated with the Project.

TABLE 4
STREET SEGMENT VOLUMES

Street Segment	Existing Traffic Volume	Opening Year Without Project Volume	Opening Year With Project Volume
Weekday Volumes			
Congress St between 7th St/West Project Access	700	700	900
Fogg St between Cedar St/M St	800	800	1,200
M St between La Cadena Dr/Fogg St	3,400	4,300	4,500
M St between Fogg St/Mt. Vernon Ave	4,700	5,000	5,200
La Cadena Dr between S of 7th St/7th St	11,800	12,900	12,900
La Cadena Dr between 7th St/M St	13,700	14,700	14,800
La Cadena Dr between M St/I-10	15,700	16,800	17,100
Weekend Volumes			
Congress St between 7th St/West Project Access	500	500	1,500
Fogg St between Cedar St/M St	500	500	2,700
M St between La Cadena Dr/Fogg St	2,000	2,800	3,800
M St between Fogg St/Mt. Vernon Ave	2,600	3,300	4,600
La Cadena Dr between S of 7th St/7th St	4,400	6,700	6,900
La Cadena Dr between 7th St/M St	5,700	8,000	8,800
La Cadena Dr between M St/I-10	7,600	9,800	11,400
Source: Psomas 2019.			

The Federal Highway Administration's (FHWA)'s FHWA-RD-77-108 Highway Traffic Noise Prediction Model was used to calculate anticipated traffic noise increases during the opening year of the Project. Table 5 shows the increase in traffic noise associated with the Project. The Project would not result in a substantial increase in noise levels during the weekdays. A maximum increase in daily noise levels of 2 dBA CNEL is estimated. This increase in noise would not be discernable to human hearing in outdoor environments. A 3 dB change in noise levels is considered to be the minimum change that is needed for humans to detect a change in noise levels in outdoor environments.[1]

Traffic volumes occurring on weekends related to the Project would be higher. There would be a perceptible increase (+3 dB) in noise levels for traffic noise along Congress Street and Fogg Street with other roadways having imperceptible (<3 dB) changes in noise levels. Though noise level increases would be perceptible along these roadways, estimated noise levels of 57 dBA CNEL along Congress Street is below the upper limit for the land use noise compatibility standard of 60 dBA CNEL (shown in Table 3) which is considered by the City to be "Normally Acceptable" for single-family residential uses. Fogg Street is generally zoned as manufacturing with the exception of a portion of the street near Congress Street which is zoned residential. The City has established an upper limit for the land use noise compatibility standard for manufacturing uses of 75 dBA CNEL as "Normally Acceptable". Noise associated with Project related traffic is estimated to be 63 dBA CNEL along Fogg Street which would be well within this Standard. Fogg Street also has a portion of the street that is zoned as residential. There are no existing residential structures along this portion of the Fogg Street. The estimated 63 dBA CNEL noise level associated with Project plus background traffic would result in noise exposure for future residential uses along Fogg Street to fall within the "Conditionally Acceptable" noise standard of 55 – 70 dBA CNEL. This requires "New construction or development should be undertaken after an 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." Though noise level increases would be perceptible, traffic noise levels under Project conditions would be within the City's normally or conditional acceptable categories of the Land Use Compatibility for Community Noise Environments. Therefore, Project-related traffic would not generate a significant noise impact at off-site land uses in the Project area and no mitigation is required.

---

1 Caltrans. Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, Retrofit Barrier Projects. May 2011.

TABLE 5
PROJECT TRAFFIC NOISE

Street Segment	Noise Level Without Project (dBA CNEL)	Noise Level with Project (dBA CNEL)	Noise Increase from Project Traffic (dBA CNEL)[1]	Exceeds 3 dBA Noise Threshold	Exceeds Conditionally Acceptable Noise Compatibility Levels?
Weekday Volumes					
Congress St between 7th St/West Project Access	54	55	1	No	No
Fogg St between Cedar St/M St	57	59	2	No	No
M St between La Cadena Dr/Fogg St	66	66	0	No	No
M St between Fogg St/Mt. Vernon Ave	67	67	0	No	No
La Cadena Dr between S of 7th St/7th St	72	72	0	No	No
La Cadena Dr between 7th St/M St	73	73	0	No	No
La Cadena Dr between M St/I-10	73	73	0	No	No
Weekend Volumes					
Congress St between 7th St/West Project Access	52	57	5	Yes	No
Fogg St between Cedar St/M St	55	63	7	Yes	No
M St between La Cadena Dr/Fogg St	64	65	1	No	No
M St between Fogg St/Mt. Vernon Ave	65	66	1	No	No
La Cadena Dr between S of 7th St/7th St	69	69	0	No	No
La Cadena Dr between 7th St/M St	70	70	0	No	No
La Cadena Dr between M St/I-10	71	71	1	No	No

Note: dBA: A-weighted decibels; CNEL: community noise equivalent level.
[1] Noise level increases are rounded to the nearest integer.
Source: Psomas 2019. Attachment B.

On-Site Project Noise Sources

Less than Significant Impact. Noise associated with facilities at the Project site are regulated by the City's Municipal Code. Section 18.42.040 establishes the following performance standards relative to noise for facilities:

> The maximum sound level radiated by any Use of Facility, when measured at the boundary line of the Property on which the sound is generated, Shall not be obnoxious by reason of its intensity, pitch or dynamic characteristics as determined by the City, and Shall not exceed 65 dBA [18.42.040 – Noise].

Noise impacts associated with the following Project-related activities are evaluated below.

Field and Parking Lot Activities. Parking lots generate noise from vehicle ingress and egress, engine starts, participant and spectator conversations, and door slams. Parking lot activity would occur intermittently throughout the day and night until approximately 10 PM. Noise associated with parking lot activities the Project site were calculated based on the Federal Transit Administration's Noise Impact

Assessment Spreadsheet. Noise from parking lots were found to generate approximately 54 dBA CNEL at 50 feet. Noise exposure further than 50 feet would be exposed to less noise due to noise attenuation with greater distances. The CNEL levels associated with these parking lot activities would not exceed the City's 65 dBA exterior noise limit for off-site noise-sensitive uses and no mitigation is required.

Noise associated with the soccer fields were modeled using the SoundPlan model with all athletic fields operated simultaneously. This model is able to calculate noise exposure for noise sensitive uses located to the north of the Project site as well as the operation of multiple noise sources. The project site and nearby structures were recreated in three dimensions. Noise associated with these athletic fields were found to result in a maximum noise level of 51 dBA at the most affected residences located adjacent to the Project site. Noise levels of 51 dBA is below the 65 dBA exterior noise limit as established under the City's Municipal Code 18.42.040.

If special events are held at the Project site, the City requires a permit to be issued for the event. Municipal Code Section 5.44.010, which regulates special events at City-owned properties, would consider exposure of neighboring residents to excessive noise, including amplified sound, prior to issuance of a special events permit.

As demonstrated in sub-section (a) above, potential long-term noise impacts from Project-related traffic, proposed parking lots, athletic field usage, and other Project activities would have less than significant operational, long-term noise impacts no mitigation is required.

Project Construction Noise

Less than Significant Impact. Two types of short-term noise impacts could occur during construction of the proposed Project. First, sensitive receptors could be affected by noise generated by grading and construction activities on the Project site. Table 6 identifies the estimated noise levels generated by various construction activities.

TABLE 6
CONSTRUCTION NOISE LEVELS AT NOISE SENSITIVE USES

Construction Phase	Noise Levels (L_{eq} dBA)							
	Residential Use to the West of the Project Site		Residential Use to the North of the Project Site		Residential Use to the East of the Project Site		Residential Uses to the South of the Project Site	
	Max (30 ft)	*Avg (175 ft)*	*Max (15 ft)*	*Avg (175 ft)*	*Max (2,190 ft)*	*Avg (2,400)*	*Max (2,230 ft)*	*Avg (3,070 ft)*
Ground Clearing/ Demolition	88	73	94	73	51	50	51	48
Excavation	93	78	99	78	56	55	56	53
Foundation Construction	81	66	87	66	44	43	44	41
Building Construction	88	73	94	73	51	50	51	48
Paving and Site Cleanup	93	78	99	78	56	55	56	53

L_{eq} dBA: Average noise energy level; Max: maximum; avg: average; ft: feet
Note: Noise levels from construction activities do not take into account attenuation provided by intervening structures.
Source: USEPA 1971.

In addition to actual equipment noise onsite, construction crew commuting and the transport of construction equipment and materials to the site would incrementally increase noise levels on roadways in the Project area, mainly Congress Street/Fogg Street and La Cadena Drive. There would be a relatively high single-event noise exposure potential at a maximum level of 87 dBA L_{max} with trucks passing at 50 feet from receptors along roadway segments leading to the Project site (i.e., adjacent to Congress Street). The City would attempt to balance earthwork on the site to the greatest extent practical to minimize the offsite importation of soil. However, the current estimate of 58,500 cy of imported soil would require 3,656 truck-loads to the site from offsite locations assuming 16 cy of soil capacity per truck. These truck trips distributed over a period of three months (Monday through Saturday or 78 days), equals 47 truck-loads per day or 5 trucks per hour assuming 9 hours per work day (7 AM to 4 PM). The addition of 5 trucks per hour distributed over the roadway network would not result in a substantial increase over existing traffic volumes. Therefore, short-term, construction-related truck noise impacts would not be significant.

The City's Municipal Code does not include hourly restrictions on when construction activities are allowed to occur. Although the City does not include construction hour limitations, project related construction activities would occur during normal daytime business hours which are the least noise-sensitive hours of the day. In addition, construction activities are also of relatively short-duration (approximately 9 months). The Project would also not involve construction equipment which generate extremely high noise levels such as pile drivers. Because construction activities would be relatively short in duration, occur during the least noise sensitive periods of the day and would not involve extremely loud equipment, short-term construction construction-related noise impacts would be less than significant, and no mitigation is required.

Question NOI-2 Would the Project result in generation of excessive groundborne vibration or groundborne noise levels?

Less than Significant Impact. Vibration refers to groundborne noise and perceptible motion. Groundborne vibration is almost exclusively a concern inside buildings and is rarely perceived as a problem outdoors, where the motion may be discernable but without the effect associated with the shaking of a building there is less of a reaction. Typical sources of groundborne vibration are construction activities (e.g., blasting, pile driving, and operating heavy duty earthmoving equipment), steel-wheeled trains, and occasional traffic on rough roads. When roadways are smooth, vibration from traffic, even heavy trucks, is rarely perceptible. Roadways surrounding the Project site are paved and Project traffic is not expected to generate perceptible vibration.

The City has established the following Municipal Code limit for vibration:

> All activities Shall be operated so as not to generate ground vibration by equipment other than motor vehicles, trains or by temporary construction or demolition, which is perceptible without instruments by the average person at or beyond any lot line of the Lot containing the activities. [18.42.050 – Vibration]

The above vibration limit applies to stationary sources of vibration. No specific quantitative threshold has been established for construction activities relative to Municipal Code Section 18.42.050. The following vibration thresholds are used in the assessment of potential vibration-induced building damage and annoyance. The California Department of Transportation (Caltrans) vibration damage potential guideline thresholds are shown in Table 7.

TABLE 7
VIBRATION DAMAGE THRESHOLD CRITERIA

Building Class	Continuous Source PPV (in/sec)	Single-Event Source PPV (in/sec)
Class I: buildings in steel or reinforced concrete, such as factories, retaining walls, bridges, steel towers, open channels, underground chambers and tunnels with and without concrete alignment	0.5	1.2
Class II: buildings with foundation walls and floors in concrete, walls in concrete or masonry, stone masonry retaining walls, underground chambers and tunnels with masonry alignments, conduits in loose material	0.3	0.7
Class III: buildings as mentioned above but with wooden ceilings and walls in masonry	0.2	0.5
Class IV: construction very sensitive to vibrations; objects of historic interest	0.12	0.3
Source: Caltrans 2013.		

The building damage threshold for "Class III Buildings" of 0.2 peak particle velocity (ppv) inch per second (in/sec) is selected for residential buildings for this analysis. These thresholds represent the vibration limits for damage to adjacent residential buildings to the Project site from continuous sources of vibration.

The Caltrans vibration annoyance potential guideline thresholds are shown in Table 8. Based on the guidance in Table 8, the "Distinctly perceptible" vibration level of 0.24 ppv in/sec is considered as a threshold for a potentially significant vibration impact for human annoyance.

TABLE 8
VIBRATION ANNOYANCE CRITERIA

Average Human Response	ppv (in/sec)
Severe	2.0
Strongly perceptible	0.9
Distinctly perceptible	0.24
Barely perceptible	0.035
ppv: peak particle velocity; in/sec: inch(es) per second Source: Caltrans 2013.	

Pile driving and blasting are generally the sources of the most severe vibration during construction. Neither pile driving nor blasting would be used during Project construction. Conventional construction equipment would be used for demolition and grading activities. Table 9 summarizes typical vibration levels measured during construction activities for various vibration-inducing pieces of equipment.

TABLE 9
VIBRATION LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment		ppv at 25 ft (in/sec)
Pile driver (impact)	upper range	1.518
	typical	0.644
Pile driver (sonic)	upper range	0.734
	typical	0.170
Vibratory roller		0.210
Large bulldozer		0.089
Caisson drilling		0.089
Loaded trucks		0.076
Jackhammer		0.035
Small bulldozer		0.003
ppv: peak particle velocity; ft: feet; in/sec: inches per second. Source: Caltrans 2013; FTA 2018.		

Site clearing, grading, and construction would occur proximate to neighboring residential land uses. Table 10, Vibration Annoyance Criteria at Sensitive Uses, shows the estimated vibration levels from Project construction activities relative to the vibration annoyance criteria. There are no vibration sensitive uses to the south and east of the Project site.

TABLE 10
VIBRATION ANNOYANCE CRITERIA AT SENSITIVE USES

	Vibration Levels (ppv)	
	Residential Use to the West of the Project Site	Residential Use to the North of the Project Site
Equipment	*(ppv @ 30 ft)*	*(ppv @ 30 ft)*
Vibratory roller	0.16	0.16
Large bulldozer	0.07	0.07
Small bulldozer	0.00	0.00
Loaded trucks	0.06	0.06
Criteria	**0.24**	**0.24**
Exceeds Criteria?	**No**	**No**
ppv: peak particle velocity; Max: maximum; avg: average; ft: feet Source: FTA 2018 (Calculations can be found in Appendix G).		

As shown in Table 10, ppv would not exceed the criteria threshold when construction activities occur under maximum (i.e., closest to the receptor) exposure conditions. These vibration levels represent conditions when construction activities occur closest to receptor locations. Construction-related vibration would be less under average conditions when construction activities are located further away. Because vibration levels would be below the significance thresholds, vibration generated by the Project's construction equipment would not be expected to generate distinctly perceptible levels of vibration at the nearest uses and would result in less than significant vibration impacts related to vibration annoyance.

Project related vibration levels generated by construction activities were also assessed for the potential cause building damage. Table 11 shows the peak particle velocity levels (ppv) relative to building damage at the nearest buildings from Project related construction activities. As shown in Table 11, all ppv levels would be below the building damage threshold at adjacent off-site structures. As such, vibration impacts related to the potential for cosmetic building damage to the nearest offsite land uses.

TABLE 11
BUILDING DAMAGE AT NEARBY USES

Equipment	Vibration Levels (ppv)	
	Residential Use to the West of the Project Site	Residential Use to the North of the Project Site
	(ppv @ 30 ft)	*(ppv @ 30 ft)*
Vibratory roller	0.16	0.16
Large bulldozer	0.07	0.07
Small bulldozer	0.00	0.00
Loaded trucks	0.06	0.06
Criteria	**0.20**	**0.20**
Exceeds Criteria?	**No**	**No**
ppv: peak particle velocity; Max: maximum; avg: average; ft: feet Source: USEPA 1971. Calculations can be found in Attachment B.		

Question NOI-3 **For a project located within the vicinity of a private airstrip or an airport land use plan or, where such plan has not been adopted, within two miles of a public airport or public use airport, would the Project result in exposure of people residing or working in the Project area to excessive noise levels?**

No Impact. The Project site is not located within the vicinity of a private airstrip or public airport; therefore, the proposed Project would not have an impact related to aircraft noise exposure. Flabob Airport is located approximately 6.1 miles southwest of the Project site, San Bernardino International Airport is located approximately 4.3 miles northeast of the site, Ontario International Airport is located approximately 14.3 miles west of the site, and the Riverside Municipal Airport is 9.6 miles southwest of the site. A review of the respective Airport Land Use Compatibility Plans confirms that the Project site is not within any designated airport influence areas or fly zones under either the proposed site plan or the access option site plan. Therefore, there would be no impacts in this regard and no mitigation is required.

CONCLUSION

The proposed Project was analyzed for potential noise and vibration impacts from both the construction and operational phases. The Project would result in less than significant impacts from groundborne vibration and groundborne noise levels generated during construction. The Project would not result in a substantial permanent or temporary increase in ambient noise levels in the Project vicinity above levels existing without the Project, and impacts would be less than significant. The Project would also not result in the exposure of people residing or working in the Project area to excessive noise levels from private or public airports. In conclusion, the Project would have no significant noise or vibration impacts.

Thank you for the opportunity to assist on this Project. If you have any questions or comments, please contact me at (626) 351-2000.

Sincerely,
PSOMAS

Tin Cheung
Director of Air Quality, Climate Change and Noise Services

Enclosures: Exhibit 1 – Project Area
Exhibit 2 – Noise Monitoring Locations

Attachments: A – Noise Measurement Data
B – Noise Calculations

REFERENCES

California Department of Transportation (Caltrans). 2013 (September). *Technical Noise Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA: Caltrans. http://www.dot.ca.gov/hq/env/noise/pub/TeNS_Sept_2013B.pdf.

Colton, City of. 1987 (accessed July 19, 2019). Noise Element of the City of Colton General Plan. Colton, CA: City of Colton. http://www.ci.colton.ca.us/index.aspx?NID=778

Psomas. 2019 (June). DRAFT Traffic Impact Study Colton Community Soccer Park. Santa Ana, CA: Psomas.

U.S. Department of Transportation, Federal Transit Administration (FTA). 2018 (September). *Transit Noise and Vibration Impact Assessment, FTA Report No. 0123* (prepared by John A. Volpe National Transportation Systems Center) https://www.transit.dot.gov/regulations-and-guidance/environmental-programs/noise-and-vibration

United States Environmental Protection Agency (USEPA). 1971 (December 31). *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances.* Washington, D.C.: USEPA.

D:\Projects\3COL\020100\MXD\IS\ex_Aerial_20190603.mxd

Project Area

Exhibit 1

Colton Community Soccer Park Project

N W E S

300 150 0 300 Feet

PSOMAS

(Rev: 6-03-2019 MMD) R:\Projects\COL\3COL020100\Graphics\Biotech\ex_Aerial.pdf

Short Term (ST) Noise Measurements Locations

Exhibit 2

Colton Community Soccer Park Project

N W E S

300 150 0 300 Feet

PSOMAS

(Rev: 7-23-2019 RMB) R:\Projects\COL\3COL020100\Graphics\Noise\ex_NoiseMeasurements.pdf

ATTACHMENT A

NOISE MEASUREMENT DATA

FIELD NOISE MEASUREMENT DATA

PROJECT: Colton PROJ. #: 3COL020100

SITE IDENTIFICATION: Location #1 OBSERVER(S): Sugimoto
START DATE/TIME: 5/7/2019 14:25 END DATE/TIME: 5/7/2019 14:44
ADDRESS:

METEOROLOGICAL CONDITIONS:
TEMP: 65.6 °F HUMIDITY: 56.6 %R.H. WIND: ☐ CALM ☒ LIGHT ☐ MODERATE ☐ VARIABLE
WINDSPEED: 2.3 MPH DIR: ☐ N ☐ NE ☐ E ☐ SE ☐ S ☒ W ☐ NW ☐ STEADY ☐ GUSTY
SKY: ☐ SUNNY ☐ CLEAR ☒ OVRCST ☐ PRTLY CLOUDY ☐ FOG ☐ RAIN ☐ OTHER:

ACOUSTIC INSTRUMENTS:
INSTRUMENT: Larson Davis 831 TYPE: ☐ 1 ☐ 2 SERIAL #: 0001742
CALIBRATOR: Larson Davis Cal 200 SERIAL #: 12648
CALIBRATION CHECK: PRE-TEST 114.09 dBA SPL POST-TEST 113.86 dBA SPL WINDSCREEN yes
SETTINGS: ☐ A-WEIGHTED ☐ SLOW ☐ FAST ☐ FRONTAL ☐ RANDOM ☐ ANSI ☐ OTHER:

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)	
	14:24	14:44	49.2	61.3	42.2						

COMMENTS: The machine is behind 1 hour, so data shows start time @ 13:24*

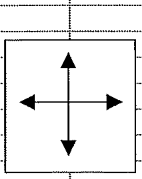
SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: ☐ TRAFFIC ☐ AIRCRAFT ☐ RAIL ☒ INDUSTRIAL ☐ AMBIENT ☐ OTHER:
ROADWAY TYPE: None
TRAFFIC COUNT DURATION: -MIN SPEED #2 COUNT SPEED
☐NB/☐EB ☐SB/☐WB ☐NB/☐EB ☐SB/☐WB ☐NB/☐EB ☐SB/☐WB ☐NB/☐EB ☐SB/☐WB
AUTOS
MED. TRUCKS:
HVY TRUCKS: N/A
BUSES:
MOTORCYCLES:
SPEED ESTIMATED BY: ☐ RADAR ☐ DRIVING ☐ OBSERVER
OTHER SOURCES: ☐ DIST. AIRCRAFT ☐ RUSTLING LEAVES ☐ DIST. BARKING DOGS ☐ BIRDS ☐ DIST. INDUSTRIAL ☐ DIST. CHILDREN PLAYING ☐ DIST. TRAFFIC ☐ DIST. LANDSCAPING ACTIVITIES ☐ OTHER:

DESCRIPTION/SKETCH:
TERRAIN: ☐ HARD ☐ SOFT ☐ MIXED ☐ FLAT ☒ OTHER: Vegetated w/ dry scrub
PHOTOS: 2 photos: ① Pic of meter ② pic of slope; camera pointing south
OTHER COMMENTS/SKETCH:

Terrain sloped up to the west
unpaved, but vegetation has been cut back
Trees to the North & south → birds are chirping constantly

Distant industrial noise from buisness to the west & railway to the south.

No traffic or pedestrians.



* moved meter south of the selected location because the area where Tin designated was gated off. see map.

Noise Monitoring STS
#1
Legend
Fenced off
Fenced off
ST Location #1
Google Earth
© 2018 Google
200 ft
N

FIELD NOISE MEASUREMENT DATA

PROJECT: Colton PROJ. #: 3COL030100

SITE IDENTIFICATION: Colton #2 OBSERVER(S): K Sugimoto
START DATE/TIME: 5/7/19 @ 15:02 END DATE/TIME: 5/7/19 @ 15:23
ADDRESS:

METEOROLOGICAL CONDITIONS:
TEMP: 68.4 °F HUMIDITY: 56.5 %R.H. WIND: ☐ CALM ☑ LIGHT ☐ MODERATE ☐ VARIABLE
WINDSPEED: 1.4 MPH DIR: ☐ N ☐ NE ☐ E ☐ SE ☐ S ☑ W ☐ NW ☐ STEADY ☐ GUSTY
SKY: ☐ SUNNY ☐ CLEAR ☑ OVRCST ☐ PRTLY CLOUDY ☐ FOG ☐ RAIN ☐ OTHER:

ACOUSTIC INSTRUMENTS:
INSTRUMENT: Larson Davis 831 TYPE: ☐ 1 ☐ 2 SERIAL #: 0001742
CALIBRATOR: Larson Davis Cal 200 SERIAL #: 12648
CALIBRATION CHECK: PRE-TEST 114.07 dBA SPL POST-TEST 113.99 dBA SPL WINDSCREEN Yes
SETTINGS: ☐ A-WEIGHTED ☐ SLOW ☐ FAST ☐ FRONTAL ☐ RANDOM ☐ ANSI ☐ OTHER:

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)	
	15:02:32	15:23	46.5	61.5							

COMMENTS: machine is ahead 1 hr, so the time stamp reads 16:02 *

SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: ☐ TRAFFIC ☑ AIRCRAFT ☐ RAIL ☑ INDUSTRIAL ☐ AMBIENT ☐ OTHER:
ROADWAY TYPE:
TRAFFIC COUNT DURATION: ___ -MIN SPEED #2 COUNT SPEED

	☐NB/☐EB	☐SB/☐WB	☐NB/☐EB	☒SB/☐WB	☐NB/☐EB	☐SB/☐WB	☐NB/☐EB	☐SB/☐WB
AUTOS			N/A					
MED. TRUCKS:								
HVY TRUCKS:								
BUSES:								
MOTORCYCLES:								

SPEED ESTIMATED BY: ☐ RADAR ☐ DRIVING ☐ OBSERVER
OTHER SOURCES: ☐ DIST. AIRCRAFT ☐ RUSTLING LEAVES ☐ DIST. BARKING DOGS ☑ BIRDS ☐ DIST. INDUSTRIAL ☐ DIST. CHILDREN PLAYING ☐ DIST. TRAFFIC ☐ DIST. LANDSCAPING ACTIVITIES ☐ OTHER:

DESCRIPTION/SKETCH:
TERRAIN: ☐ HARD ☐ SOFT ☐ MIXED ☒ FLAT ☒ OTHER: Vegetated
PHOTOS: 1. Photo of monitor.
OTHER COMMENTS/SKETCH:

no pedestrians / No traffic
Aircraft & industrial background noise
area flat but vegetation has been cut back
Trees to the west & North of monitor
w/ birds chirping.
could not set meter @ the location Tim picked b/c it was fenced off, but moved it a little south.

See map.*

Noise Monitoring STS
Location 2
Legend
Fence
Fence
New ST Location
200 ft
N
Google Earth
© 2018 Google

FIELD NOISE MEASUREMENT DATA

PROJECT: Colton PROJ. #: 3COL 020100

SITE IDENTIFICATION: Colton #3 OBSERVER(S): K Sugimoto
START DATE/TIME: 5/7/19 @ 15:36 END DATE/TIME: 5/7/19 @ 15:56
ADDRESS: See map.

METEOROLOGICAL CONDITIONS:
TEMP: 65.6 °F HUMIDITY: ~~56.~~ 59.6 %R.H. WIND: ☐ CALM ☑ LIGHT ☐ MODERATE ☐ VARIABLE
WINDSPEED: 2.5 MPH DIR: ☐ N ☐ NE ☐ E ☐ SE ☐ S ☑ W ☐ NW ☐ STEADY ☐ GUSTY
SKY: ☐ SUNNY ☐ CLEAR ☑ OVRCST ☐ PRTLY CLOUDY ☐ FOG ☐ RAIN ☐ OTHER:

ACOUSTIC INSTRUMENTS:
INSTRUMENT: Larson Davis 831 TYPE: ☐ 1 ☐ 2 SERIAL #: 001742
CALIBRATOR: Larson Davis cal 200 SERIAL #: 12648
CALIBRATION CHECK: PRE-TEST 113.99 dBA SPL POST-TEST 114.03 dBA SPL WINDSCREEN
SETTINGS: ☐ A-WEIGHTED ☐ SLOW ☐ FAST ☐ FRONTAL ☐ RANDOM ☐ ANSI ☐ OTHER:

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)	
	15:36	15:56	50.7	66.6							

COMMENTS: * machine is off by 1hour so time stamp reads 16:36 – 16:56

SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: ☐ TRAFFIC ☑ AIRCRAFT ☐ RAIL ☑ INDUSTRIAL ☐ AMBIENT ☑ OTHER: Birds
ROADWAY TYPE:
TRAFFIC COUNT DURATION: -MIN SPEED #2 COUNT SPEED

	☐NB/☐EB	☐SB/☐WB	☐NB/☐EB	☐SB/☐WB	☐NB/☐EB	☐SB/☐WB	☐NB/☐EB	☐SB/☐WB
AUTOS								
MED. TRUCKS:	N/A							
HVY TRUCKS:								
BUSES:								
MOTORCYCLES:								

SPEED ESTIMATED BY: ☐ RADAR ☐ DRIVING ☐ OBSERVER
OTHER SOURCES: ☐ DIST. AIRCRAFT ☐ RUSTLING LEAVES ☐ DIST. BARKING DOGS ☐ BIRDS ☐ DIST. INDUSTRIAL ☐ DIST. CHILDREN PLAYING ☐ DIST. TRAFFIC ☐ DIST. LANDSCAPING ACTIVITIES ☐ OTHER:

DESCRIPTION/SKETCH:
TERRAIN: ☐ HARD ☐ SOFT ☐ MIXED ☒ FLAT ☒ OTHER: unpaved, graded down
PHOTOS: 2: Monitor Location ① pointing NW ② points SW
OTHER COMMENTS/SKETCH:

Trees to the North & West w/ birds chirping
New location situated by the Street ~~ag~~ homes
no traffic or pedestrians
There was a ~~[illegible]~~ small rodent running around
~~[illegible]~~

* could not set meter up @ the spot Tin designated b/c the area was fenced off. moved location a little more south. SEE MAP

Noise Monitoring STS
Location 3
Legend
Fence
Google Earth
© 2018 Google
200 ft
N

FIELD NOISE MEASUREMENT DATA

PROJECT: Colton PROJ. # 360L020100

SITE IDENTIFICATION: Location #4 OBSERVER(S): Sugimoto
START DATE/TIME: 5/7/19 @ 16:20 END DATE/TIME: 5/7/19 @ 16:40
ADDRESS:

METEOROLOGICAL CONDITIONS:
TEMP: 65.2 °F HUMIDITY: 98.8* %R.H. WIND: ☐ CALM ☑ LIGHT ☐ MODERATE ☐ VARIABLE
WINDSPEED: 2.5 MPH DIR: ☐ N ☐ NE ☐ E ☐ SE ☐ S ☐ W ☐ NW ☐ STEADY ☐ GUSTY
SKY: ☐ SUNNY ☐ CLEAR ☑ OVRCST ☐ PRTLY CLOUDY ☐ FOG ☐ RAIN ☐ OTHER:

ACOUSTIC INSTRUMENTS:
INSTRUMENT: Larson Davis 831 TYPE: ☐ 1 ☐ 2 SERIAL #: 000 1142
CALIBRATOR: Larson Davis Cal200 SERIAL #: 12648
CALIBRATION CHECK: PRE-TEST 114.03 dBA SPL POST-TEST 113.98 dBA SPL WINDSCREEN yes
SETTINGS: ☐ A-WEIGHTED ☐ SLOW ☐ FAST ☐ FRONTAL ☐ RANDOM ☐ ANSI ☐ OTHER:

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)	
	16:20	16:40	54.1	78.6							

COMMENTS: Time stamp is off by 1hr in the machine and is recorded as 17:20 - 17:40

SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: ☒ TRAFFIC ☐ AIRCRAFT ☐ RAIL ☐ INDUSTRIAL ☐ AMBIENT ☒ OTHER: Birds
ROADWAY TYPE:
TRAFFIC COUNT DURATION: 20 -MIN 35 SPEED #2 COUNT SPEED

	☐NB/☐EB	☐SB/☐WB	☐NB/☐EB	☐SB/☐WB	☐NB/☐EB	☐SB/☐WB	☐NB/☐EB	☐SB/☐WB
AUTOS	22							
MED. TRUCKS:	1							
HVY TRUCKS:								
BUSES:								
MOTORCYCLES:								

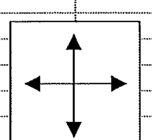
SPEED ESTIMATED BY: ☐ RADAR ☐ DRIVING ☑ OBSERVER
OTHER SOURCES: ☐ DIST. AIRCRAFT ☐ RUSTLING LEAVES ☐ DIST. BARKING DOGS ☐ BIRDS ☐ DIST. INDUSTRIAL ☐ DIST. CHILDREN PLAYING ☐ DIST. TRAFFIC ☒ DIST. LANDSCAPING ACTIVITIES ☐ OTHER:

DESCRIPTION/SKETCH:
TERRAIN: ☐ HARD ☐ SOFT ☐ MIXED ☐ FLAT ☑ OTHER: unpaved & vegetated
PHOTOS: ① Photo of meter (camera pointing West)
OTHER COMMENTS/SKETCH:

Traffic moving West/east * Not sure why I was getting 98% humidity, but I took measurement twice. (all other measurements were around 60%.)

* There are trees along west side of the houses → there are alot of birds chirping in the trees.

* This area is much louder because you can hear more birds, traffic, and planes. You can also hear kids playing



@ 16:24 a lawn mower starts in the very distant
@ 16:25 hear an air plane
16:27 hear an air plane
@ 16:29 hear an air plane

set up monitor just east of the spot tin marked on map b/c of vegetation. SEE MAP


Noise Monitoring STS
Location 4
Legend
5
6
4
Fences
Google Earth
© 2018 Google
N
400 ft

FIELD NOISE MEASUREMENT DATA

PROJECT: Colton PROJ. # 36L020100

SITE IDENTIFICATION: Colton #5 OBSERVER(S): K. Sugimoto
START DATE/TIME: Th 5/7/19 @ 17:53 END DATE/TIME: 5/7/19 @ 17:14
ADDRESS: intersection of congress & Beyrl

METEOROLOGICAL CONDITIONS:
TEMP: 64.9 °F HUMIDITY: 57.5 %R.H. WIND: ☐ CALM ☐ LIGHT ☑ MODERATE ☐ VARIABLE
WINDSPEED: 3.4 MPH DIR: ☐ N ☐ NE ☐ E ☐ SE ☐ S ☑ W ☐ NW ☐ STEADY ☐ GUSTY
SKY: ☐ SUNNY ☐ CLEAR ☑ OVRCST ☐ PRTLY CLOUDY ☐ FOG ☐ RAIN ☐ OTHER:

ACOUSTIC INSTRUMENTS:
INSTRUMENT: Larson Davis 831 TYPE: ☐ 1 ☐ 2 SERIAL #: 000 1742
CALIBRATOR: Larson Davis Cal 200 SERIAL #: 12648
CALIBRATION CHECK: PRE-TEST 113.98 dBA SPL POST-TEST 114.00 dBA SPL WINDSCREEN yes
SETTINGS: ☐ A-WEIGHTED ☐ SLOW ☐ FAST ☐ FRONTAL ☐ RANDOM ☐ ANSI ☐ OTHER:

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)	
	~~16~~:53	17:14	63.0	87.8							

COMMENTS: * machine is ahead by 1 hr.

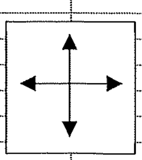
SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: ☑ TRAFFIC ☐ AIRCRAFT ☐ RAIL ☐ INDUSTRIAL ☐ AMBIENT ☑ OTHER: Birds
ROADWAY TYPE: Paved / open field
TRAFFIC COUNT DURATION: 20 -MIN 35 SPEED #2 COUNT SPEED

	☐NB/☐EB	☐SB/☐WB	☐NB/☐EB	☐SB/☐WB	☐NB/☐EB	☐SB/☐WB	☐NB/☐EB	☐SB/☐WB
AUTOS	(20)							
MED. TRUCKS:	III (3)							
HVY TRUCKS:	II (2)							
BUSES:								
MOTORCYCLES:								

SPEED ESTIMATED BY: ☐ RADAR ☐ DRIVING ☑ OBSERVER
OTHER SOURCES: ☐ DIST. AIRCRAFT ☐ RUSTLING LEAVES ☐ DIST. BARKING DOGS ☐ BIRDS ☐ DIST. INDUSTRIAL ☐ DIST. CHILDREN PLAYING ☐ DIST. TRAFFIC ☐ DIST. LANDSCAPING ACTIVITIES ☐ OTHER:

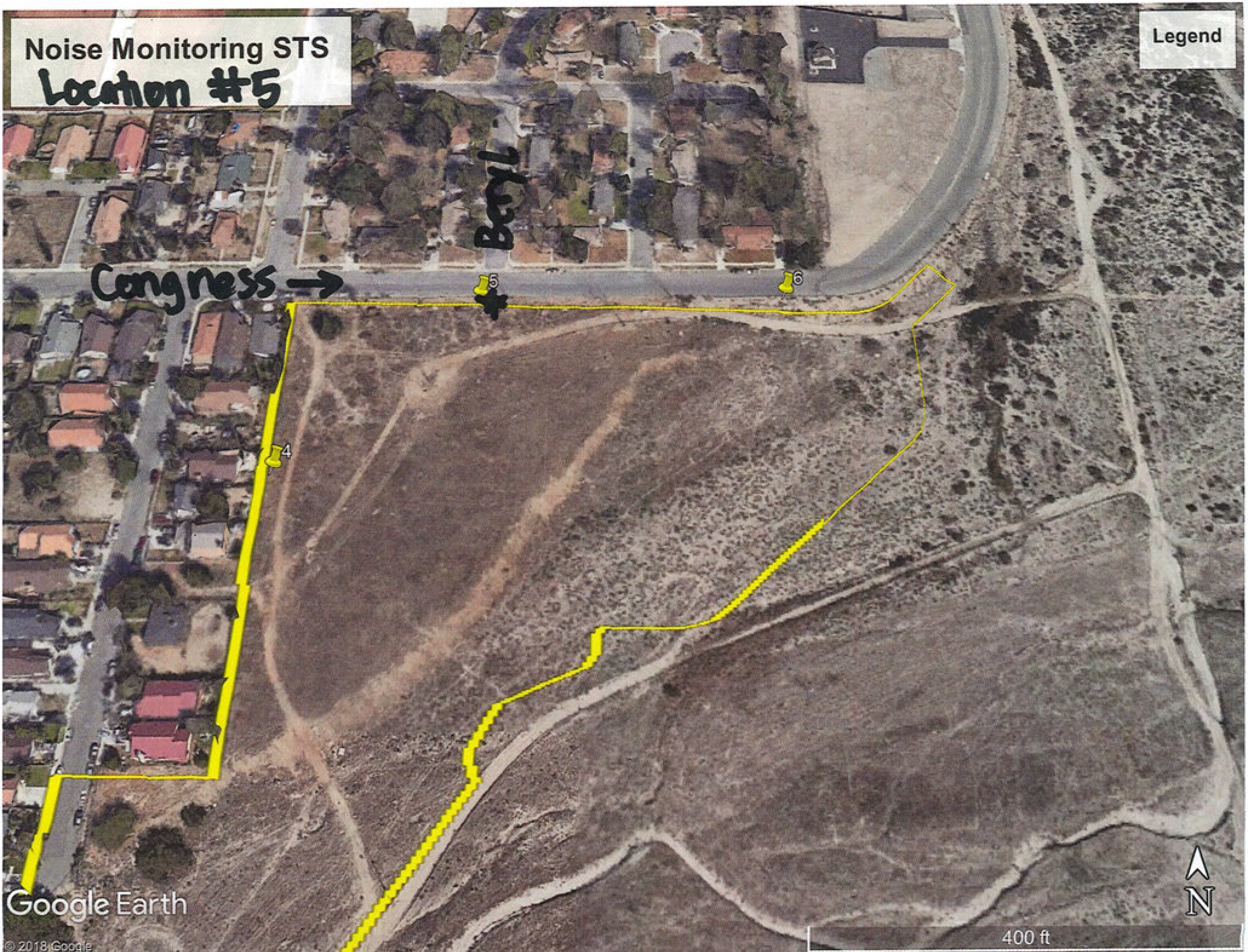
DESCRIPTION/SKETCH:
TERRAIN: ☐ HARD ☐ SOFT ☐ MIXED ☐ FLAT ☑ OTHER: situated on unpaved shoulder of paved road.
PHOTOS: ① photo of meter
OTHER COMMENTS/SKETCH:

17:03 ice cream truck
17:06 horn honking
Dogs barking
birds chirping
Rooster in background
17:11 ice cream truck left



This area is much louder b/c it is on the street. you can hear traffic, pedestrians, & animals.

Set up @ the exact location designated by TLn. See Map



Noise Monitoring STS
Location #5
Legend
Beryl
Congress →
5
6
4
Google Earth
© 2018 Google
400 ft
N

FIELD NOISE MEASUREMENT DATA

PROJECT: Colton PROJ. # 360L030100

SITE IDENTIFICATION: Location #6 OBSERVER(S): Sugimoto
START DATE/TIME: 5/7/19 @ 17:19 END DATE/TIME: 5/7/19 @ 17:40
ADDRESS: 689 Congress / open field

METEOROLOGICAL CONDITIONS:
TEMP: 64.2 °F HUMIDITY: 57.6 %R.H. WIND: ☐ CALM ☐ LIGHT ☒ MODERATE ☐ VARIABLE
WINDSPEED: 5.8 MPH DIR: ☐ N ☐ NE ☐ E ☐ SE ☐ S ☒ W ☐ NW ☐ STEADY ☐ GUSTY
SKY: ☐ SUNNY ☐ CLEAR ☒ OVRCST ☐ PRTLY CLOUDY ☐ FOG ☐ RAIN ☐ OTHER:

ACOUSTIC INSTRUMENTS:
INSTRUMENT: Larson Davis 831 TYPE: ☐ 1 ☐ 2 SERIAL #: 0001742
CALIBRATOR: Larson Davis Cal 200 SERIAL #: 12648
CALIBRATION CHECK: PRE-TEST 114.00 dBA SPL POST-TEST 114.05 dBA SPL WINDSCREEN yes
SETTINGS: ☐ A-WEIGHTED ☐ SLOW ☐ FAST ☐ FRONTAL ☐ RANDOM ☐ ANSI ☐ OTHER: ____

REC #	START	END	L_{eq}	L_{max}	L_{min}	L_{90}	L_{50}	L_{10}	OTHER:	(TYPE?)	
	17:19	17:40	61.9	96.2							

COMMENTS: * machine time stamp off by 1 hour. (ahead)

SOURCE INFO AND TRAFFIC COUNTS:
PRIMARY NOISE SOURCE: ☑ TRAFFIC ☐ AIRCRAFT ☐ RAIL ☐ INDUSTRIAL ☐ AMBIENT ☐ OTHER: ____
ROADWAY TYPE: Paved: Congress St.
TRAFFIC COUNT DURATION: 20 -MIN ~35 SPEED #2 COUNT ____ SPEED

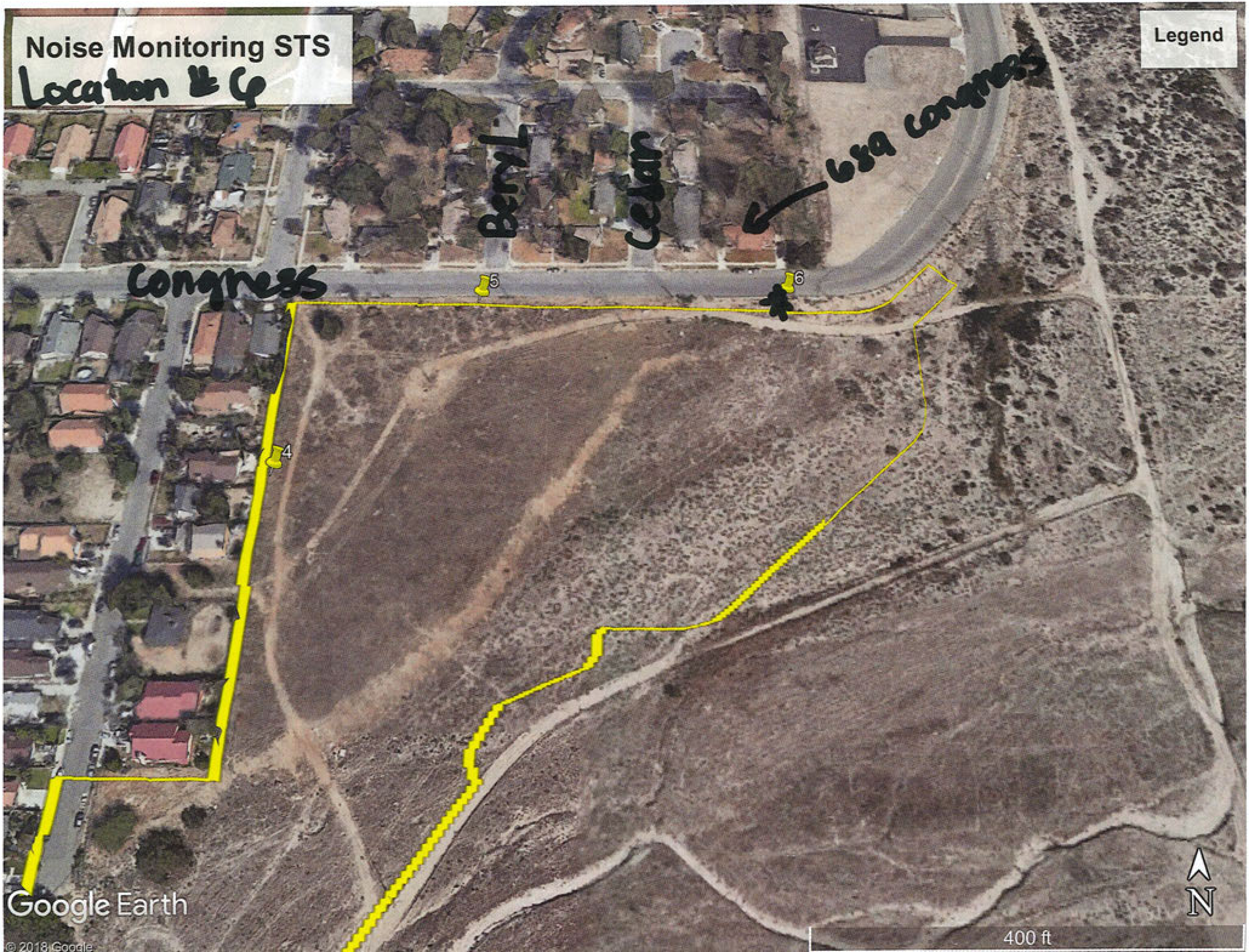
	☐NB/☐EB	☐SB/☐WB	☐NB/☐EB	☐SB/☐WB	☐NB/☐EB	☐SB/☐WB	☐NB/☐EB	☐SB/☐WB
AUTOS	28							
MED. TRUCKS:	2							
HVY TRUCKS:	5							
BUSES:								
MOTORCYCLES:								

SPEED ESTIMATED BY: ☐ RADAR ☑ DRIVING ☐ OBSERVER
OTHER SOURCES: ☐ DIST. AIRCRAFT ☐ RUSTLING LEAVES ☑ DIST. BARKING DOGS ☑ BIRDS ☐ DIST. INDUSTRIAL ☐ DIST. CHILDREN PLAYING ☐ DIST. TRAFFIC ☐ DIST. LANDSCAPING ACTIVITIES ☐ OTHER: ____

DESCRIPTION/SKETCH:
TERRAIN: ☐ HARD ☐ SOFT ☐ MIXED ☐ FLAT ☑ OTHER: on unpaved shoulder, but along a paved road.
PHOTOS: 2 photos of sound meter
OTHER COMMENTS/SKETCH:

area is much louder due to traffic
more large trucks @ end of day
You can hear airplanes more than you can in Locations 1-3
there are a lot of birds chirping.

Set meter @ the spot Tin selected; see MAP



Noise Monitoring STS
Location # 6
Legend
Beryl
Cedar
689 Congress
Congress
5
6
4
Google Earth
© 2018 Google
400 ft
N

ATTACHMENT B

NOISE CALCULATIONS

Construction Generated Noise

Building Type	Industrial, Parking Garage, Religious, Amuser	**Distance (ft)**
Construction Noise at 50 Feet (dBA Leq)		50
Construction Phase	**All Applicable Equipment in Use**[1]	
Ground Clearing/Demolition	84	
Excavation	89	
Finishing and Site Cleanup	89	
Residential Use to the West of the Project Site		
Maximum Construction Noise (dBA Leq)		30
Construction Phase	**All Applicable Equipment in Use**[1]	
Ground Clearing/Demolition	88	
Excavation (Site Preparation)	93	
Foundation Construction	81	
Building Construction	88	
Paving	93	
Average Construction Noise (dBA Leq)		175
Construction Phase	**All Applicable Equipment in Use**[1]	
Ground Clearing/Demolition	73	
Excavation (Site Preparation)	78	
Foundation Construction	66	
Building Construction	73	
Paving	78	
Residential Use to the North of the Project Site		
		15
Construction Phase	**All Applicable Equipment in Use**[1]	
Ground Clearing/Demolition	94	
Excavation (Site Preparation)	99	
Foundation Construction	87	
Building Construction	94	
Paving	99	
Average Construction Noise (dBA Leq)		175
Construction Phase	**All Applicable Equipment in Use**[1]	
Ground Clearing/Demolition	73	
Excavation (Site Preparation)	78	
Foundation Construction	66	
Building Construction	73	
Paving	78	

Source: Bolt, Beranek and Newman, "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances," prepared for the USEPA, December 31, 1971. Based on analysis for Office Building, Hotel, Hospital, School, and Public Works.

Construction Generated Vibration

Residential Use to the West of the Project Site		Closest Distance (feet):	30
	Approximate RMS a 66	Approximate RMS 73.000	
Equipment	inch/second	inch/second	
Vibratory roller	0.21	0.160	
Large bulldozer	0.089	0.068	
Small bulldozer	0.003	0.002	
Loaded trucks	0.076	0.058	
	Criteria	0.200	
Residential Use to the North of the Project Site		Closest Distance (feet):	30
Equipment	**Approximate RMS a** Velocity at 25 ft, inch/second	Approximate RMS Velocity Level, inch/second	
Vibratory roller	0.21	0.160	
Caisson Drill	0.089	0.068	
Large bulldozer	0.089	0.068	
Small bulldozer	0.003	0.002	
Loaded trucks	0.076	0.058	
	Criteria	0.200	

[1.] Determined based on use of jackhammers or pneumatic hammers that may be used for pavement demolition at a distance of 25 feet

Notes: RMS velocity calculated from vibration level (VdB) using the reference of one microinch/second.

Source: Based on methodology from the United States Department of Transportation Federal Transit Administration, *Transit Noise and Vibration Impact Assessment* (2006).

Colton Soccer Park

Roadway Segment		Speed	24-hour Traffic Volume: Existing	24-hour Traffic Volume: Future Without Project	24-hour Traffic Volume: Future With Project	Distance to CNEL from Roadway Centerline: Existing 35.0 Feet	Existing 60 CNEL	Existing 65 CNEL	Existing 70 CNEL	Future No Project 35.0 Feet	Future No Project 60 CNEL	Future No Project 65 CNEL	Future No Project 70 CNEL	Noise Level (CNEL or Ldn) at Distance from Roadway Centerline: Future With Project 35.0 Feet	Future With Project 60 CNEL	Future With Project 65 CNEL	Future With Project 70 CNEL	Change From Existing	Change due to Project
Weekday																			
Congress St	7th St/West Project Access	25	700	700	900	54	14	6	3	54	14	6	3	55	16	7	3	1	1
Fogg St	Cedar St/M St	35	800	800	1,200	57	23	11	5	57	23	11	5	59	30	14	6	2	2
M St	La Cadena Dr/Fogg St	40	3,400	4,300	4,500	65	75	35	16	66	88	41	19	66	90	42	19	1	0
M St	Fogg St/Mt. Vernon Ave	40	4,700	5,000	5,200	66	93	43	20	67	97	45	21	67	99	46	21	0	0
La Cadena Dr	S of 7th St/7th St	45	11,800	12,900	12,900	72	209	97	45	72	222	103	48	72	222	103	48	0	0
La Cadena Dr	7th St/M St	45	13,700	14,700	14,800	72	231	107	50	73	242	112	52	73	243	113	52	0	0
La Cadena Dr	M St/I-10	45	15,700	16,800	17,100	73	253	117	54	73	264	123	57	73	268	124	58	0	0
Weekend																			
Congress St	7th St/West Project Access	25	500	500	1,500	52	11	5	2	52	11	5	2	57	22	10	5	5	5
Fogg St	Cedar St/M St	35	500	500	2,700	55	17	8	4	55	17	8	4	63	52	24	11	7	7
M St	La Cadena Dr/Fogg St	40	2,000	2,800	3,800	63	53	24	11	64	66	31	14	65	81	37	17	3	1
M St	Fogg St/Mt. Vernon Ave	40	2,600	3,300	4,600	64	63	29	13	65	73	34	16	66	92	43	20	2	1
La Cadena Dr	S of 7th St/7th St	45	4,400	6,700	6,900	67	108	50	23	69	143	67	31	69	146	68	31	2	0
La Cadena Dr	7th St/M St	45	5,700	8,000	8,800	68	129	60	28	70	161	75	35	70	172	80	37	2	0
La Cadena Dr	M St/I-10	45	7,600	9,800	11,400	70	156	72	34	71	185	86	40	71	204	95	44	2	1

Assumptions:

Simplified to 2 lanes	6.1	meters=	20.0
future	6.1	meters=	20.0

Noise path decay parameter for hard site

Calculations using methods of Federal Highway Administration *Highway Traffic Noise Prediction Model* , December, 1978. Baseline California vehicle noise levels from Caltrans, TAN 95-03, 1995

Project: Colton Soccer Park
Receiver: Receiver 1

	Source	Distance	Project Ldn	Existing Ldn	Noise Criteria Mod. Impact	 Sev. Impact	Impact?
1	Park & Ride Lot	50 ft	54.0 dBA	63 dBA	60 dBA	65 dBA	None
2	--	50 ft		63 dBA	60 dBA	65 dBA	
3	--	50 ft		63 dBA	60 dBA	65 dBA	
4	--	70 ft		63 dBA	60 dBA	65 dBA	
5	--	ft		63 dBA	60 dBA	65 dBA	
6	--	ft		63 dBA	60 dBA	65 dBA	
	Combined Sources		**54 dBA**	**63 dBA**	**60 dBA**	**65 dBA**	**None**

Receiver list

No.	Receiver name	Building side	Floor	Limit Day	Limit Evening	Limit Night	Limit Lden	Level Day	Level Evening	Level Night	Level Lden	Conflict Day	Conflict Evening	Conflict Night	Conflict Lden
				dB(A)				dB(A)				dB			
1	2	-	1.Fl	-	-	-	-	50.6	50.6	0.0	50.5	-	-	-	-
			2.Fl	-	-	-	-	50.6	50.6	0.0	50.5	-	-	-	-
			3.Fl	-	-	-	-	50.5	50.5	0.0	50.5	-	-	-	-
2		-	1.Fl	-	-	-	-	49.2	49.2	0.0	49.1	-	-	-	-
			2.Fl	-	-	-	-	49.2	49.2	0.0	49.1	-	-	-	-
			3.Fl	-	-	-	-	49.2	49.2	0.0	49.1	-	-	-	-
3	3	-	1.Fl	-	-	-	-	51.0	51.0	0.0	51.0	-	-	-	-
			2.Fl	-	-	-	-	51.0	51.0	0.0	50.9	-	-	-	-
			3.Fl	-	-	-	-	51.0	51.0	0.0	50.9	-	-	-	-
4	4	-	1.Fl	-	-	-	-	51.2	51.2	0.0	51.2	-	-	-	-
			2.Fl	-	-	-	-	51.2	51.2	0.0	51.1	-	-	-	-
			3.Fl	-	-	-	-	51.2	51.2	0.0	51.1	-	-	-	-
5	5	-	1.Fl	-	-	-	-	51.0	51.0	0.0	50.9	-	-	-	-
			2.Fl	-	-	-	-	50.9	50.9	0.0	50.9	-	-	-	-
			3.Fl	-	-	-	-	50.9	50.9	0.0	50.8	-	-	-	-
6	6	-	1.Fl	-	-	-	-	50.3	50.3	0.0	50.3	-	-	-	-
			2.Fl	-	-	-	-	50.3	50.3	0.0	50.2	-	-	-	-
			3.Fl	-	-	-	-	50.3	50.3	0.0	50.2	-	-	-	-
7	7	-	1.Fl	-	-	-	-	49.4	49.4	0.0	49.3	-	-	-	-
			2.Fl	-	-	-	-	49.3	49.3	0.0	49.3	-	-	-	-
			3.Fl	-	-	-	-	49.3	49.3	0.0	49.2	-	-	-	-
8	8	-	1.Fl	-	-	-	-	48.2	48.2	0.0	48.1	-	-	-	-
			2.Fl	-	-	-	-	48.1	48.1	0.0	48.1	-	-	-	-
			3.Fl	-	-	-	-	48.2	48.2	0.0	48.1	-	-	-	-
9	9	-	1.Fl	-	-	-	-	47.2	47.2	0.0	47.1	-	-	-	-
			2.Fl	-	-	-	-	47.1	47.1	0.0	47.0	-	-	-	-
			3.Fl	-	-	-	-	47.1	47.1	0.0	47.0	-	-	-	-
10	10	-	1.Fl	-	-	-	-	46.4	46.4	0.0	46.4	-	-	-	-
			2.Fl	-	-	-	-	46.2	46.2	0.0	46.2	-	-	-	-
			3.Fl	-	-	-	-	46.2	46.2	0.0	46.2	-	-	-	-
11	11	-	1.Fl	-	-	-	-	45.7	45.7	0.0	45.6	-	-	-	-
			2.Fl	-	-	-	-	45.4	45.4	0.0	45.4	-	-	-	-
			3.Fl	-	-	-	-	45.4	45.4	0.0	45.3	-	-	-	-
12	12	-	1.Fl	-	-	-	-	42.8	42.8	0.0	42.7	-	-	-	-
			2.Fl	-	-	-	-	42.6	42.6	0.0	42.5	-	-	-	-
			3.Fl	-	-	-	-	42.5	42.5	0.0	42.4	-	-	-	-
13	13	-	1.Fl	-	-	-	-	43.6	43.6	0.0	43.5	-	-	-	-
			2.Fl	-	-	-	-	43.3	43.3	0.0	43.2	-	-	-	-
			3.Fl	-	-	-	-	43.3	43.3	0.0	43.2	-	-	-	-
14	14	-	1.Fl	-	-	-	-	45.6	45.6	0.0	45.6	-	-	-	-
			2.Fl	-	-	-	-	45.7	45.7	0.0	45.6	-	-	-	-
			3.Fl	-	-	-	-	45.7	45.7	0.0	45.6	-	-	-	-