Appendix J

Noise and Vibration Study

AMKO Warehouse Facility Project

Noise and Vibration Study

prepared by

City of Colton
Planning Division, Development Services Department
659 North La Cadena Drive
Colton, California 92324
Contact: Mario Suarez, AICP, CNU-A Planning Manager

prepared with the assistance of

Rincon Consultants, Inc.
11801 Pierce Street, Suite 200
Riverside, California 92505

July 2023

RINCON CONSULTANTS, INC.
Environmental Scientists | Planners | Engineers
rinconconsultants.com

Table of Contents

Tables

Figures

Appendices

1 Project Description and Impact Summary

1.1 Introduction

This study analyzes the potential noise and vibration impacts associated with the construction and operation of the proposed AMKO Warehouse Facility project (hereafter referred to as project or proposed project) located in the City of Colton, California. Rincon Consultants, Inc. (Rincon) prepared this study under contract to the City of Colton in support of the environmental documentation being prepared pursuant to the California Environmental Quality Act (CEQA). Table 1 provides a summary of project impacts.

Table 1 Summary of Impacts

Impact Statements	Proposed Project's Level of Significance
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 or noise ordinance, or applicable standards of other agencies?	Less than significant impact with mitigation incorporated (Construction) Less than significant impact with mitigation incorporated (Operation)
Would the project result in the generation of excessive groundborne vibration or groundborne noise levels?	Less than significant impact with mitigation incorporated (Construction) No impact (Operation)
For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	No impact

1.2 Project Summary

Project Location

The project site is located across six parcels, Assessor Parcel Numbers (APNs) 162-136-06, 162-134-08, 09, 12, 23, and 24 (site) in the City of Colton, in San Bernardino County, California. The approximately 2.73-acre site is generally level and consists of the existing AMKO Recycling facility to the east, an existing warehouse to the northwest, and vacant lots to the south and southwest. **Error! Reference source not found.** shows the regional location of the project site, while **Error! Re ference source not found.** shows the project site boundary.

Figure 1 Regional Location

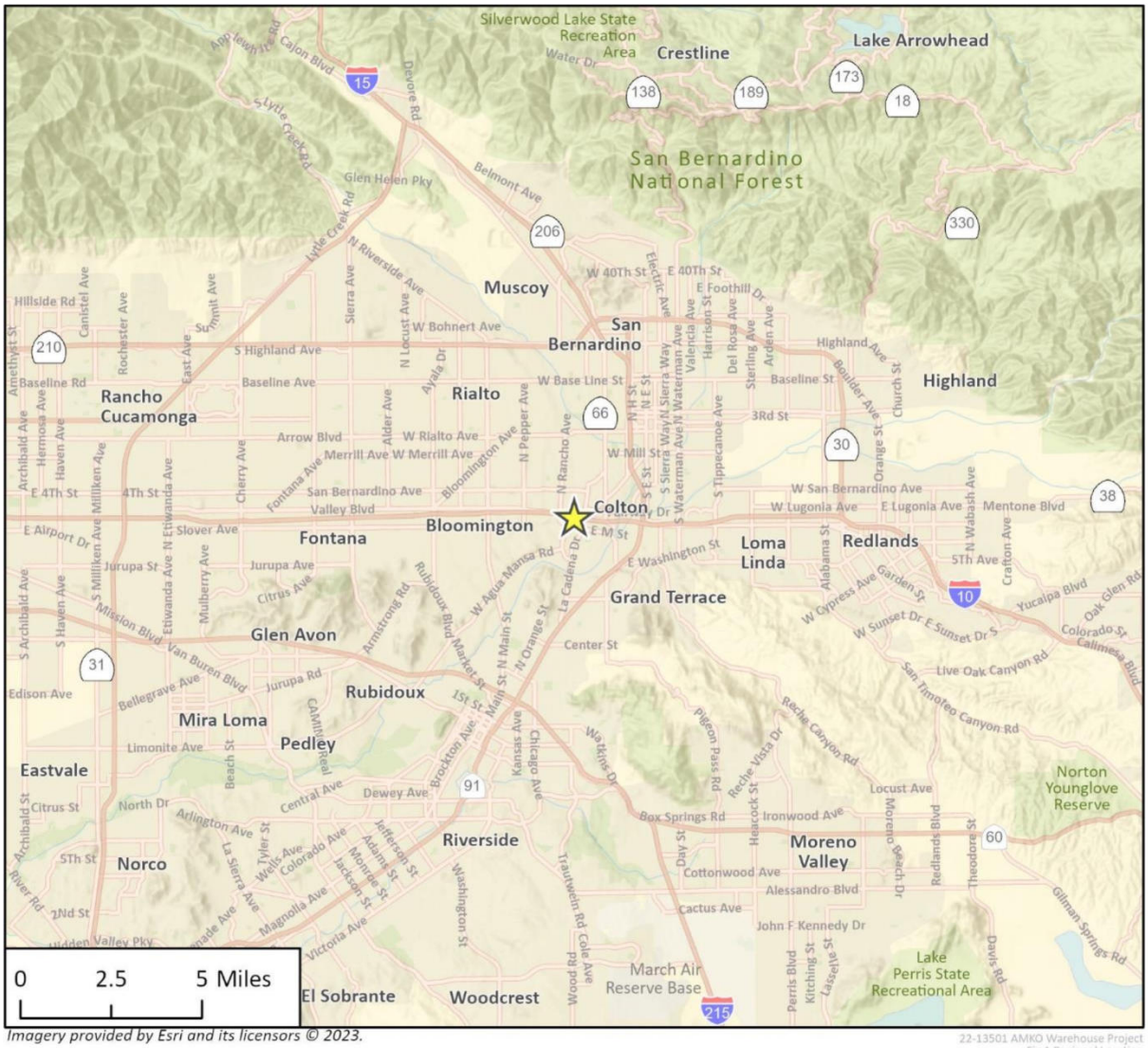
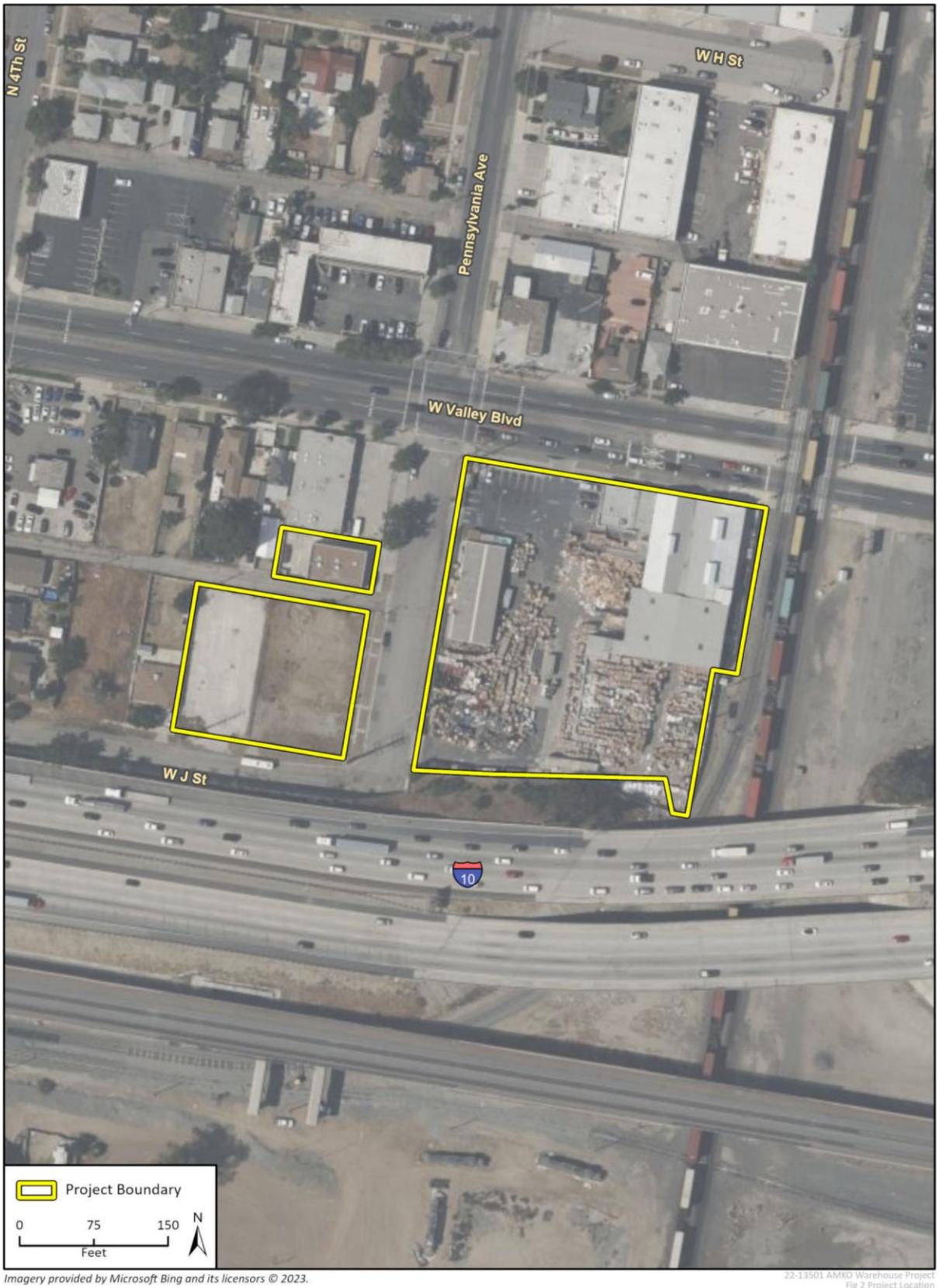


Figure 2 Project Site Boundary



Imagery provided by Microsoft Bing and its licensors © 2023.

22-13501 AMKO Warehouse Project
Fig 2 Project Location

Project Description

The proposed project consists of the expansion and operation of the existing AMKO Recycling Facility. The existing AMKO Facility is a nonconforming large collection facility located at the edge of Colton's Downtown. As a part of the project, the applicant is requesting a General Plan Amendment to change the General Plan land use designation from General Commercial to Heavy Industrial and a zone change of C-D and C-2/D to M-2 to bring the facility into conformance with the City's General Plan and Municipal Code.

Construction

The estimated construction duration for the proposed project is planned to occur in two phases, Phase 1 would occur for approximately six months and consists of the construction of the 10,114 square foot (sf) buyback center. Phase II would occur for approximately six months and entail to the revitalization of the existing AMKO Facility and construction of the 12,545 sf storage area. In total construction is expected to occur over approximately 12 months. Construction operations would occur between the hours of 7am-4pm Monday-Friday and 7am-1pm Saturday.

The project would allow AMKO to relocate the public buy-back center separate from the commercial services at the existing facility. The project aims to isolate the buyback center from the processing facility, ensuring the safety of employees and the general public by minimizing exposure to the operations of the processing facility including routine semi-truck drop off and pick-up. The proposed buyback center would be located on the vacant lots located at 115, 125,133 and 135 North Pennsylvania Avenue with the construction of a 7,670 sf warehouse space, 2,016 sf of retail, 428 sf of office space, and an additional 18 parking spaces.

Improvements to the existing facility located at 340 West Valley Boulevard include incorporating new architectural elements to the building façade to support historic preservation within the downtown Colton area, new landscaping along Pennsylvania Avenue and Valley Boulevard, and construction of a 12,545 sf storage space, which would facilitate enclosing up to 80 precent of the recycling operation containing various materials. The new construction would reflect the original period of the existing building and structure consistent with the historical theme of Downtown Colton. Additionally, expansion of AMKO includes rehabilitation and adaptive reuse of the existing building located at 157 N Pennsylvania Avenue (APN 162-134-08) as a warehouse and storage facility.

2 Background

2.1 Overview of Sound Measurement

Sound is a vibratory disturbance created by a moving or vibrating source, which is capable of being detected by the hearing organs. 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 (California Department of Transportation [Caltrans] 2013).

Noise levels are commonly measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels so that they are consistent with the human hearing response, which is most sensitive to frequencies around 4,000 Hertz and less sensitive to frequencies around and below 100 Hertz. Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used to measure earthquake magnitudes. A doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dBA; dividing the energy in half would result in a 3 dBA decrease (Harris 1991).

Human perception of noise has no simple correlation with sound energy: the perception of sound is not linear in terms of dBA or in terms of sound energy. Two sources do not “sound twice as loud” as one source. It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA, increase or decrease (i.e., twice the sound energy); that a change of 5 dBA is readily perceptible; and that an increase (or decrease) of 10 dBA sounds twice (or half) as loud (Harris 1991).

Sound changes in both level and frequency spectrum as it travels from the source to the receptor. The most obvious change is the decrease in level as the distance from the source increases. The manner by which noise reduces with distance depends on factors such as the type of sources (e.g., point or line, the path the sound will travel, site conditions, and obstructions). Noise levels from a point source typically attenuate, or drop off, at a rate of 6 dBA per doubling of distance (e.g., construction, industrial machinery, ventilation units). Noise from a line source (e.g., roadway, pipeline, railroad) typically attenuates at about 3 dBA per doubling of distance (Caltrans 2013). The propagation of noise is also affected by the intervening ground, known as ground absorption. A hard site, such as a parking lot or smooth body of water, receives no additional ground attenuation and the changes in noise levels with distance (drop-off rate) result from simply the geometric spreading of the source. An additional ground attenuation value of 1.5 dBA per doubling of distance applies to a soft site (e.g., soft dirt, grass, or scattered bushes and trees) (Caltrans 2013). Noise levels may also be reduced by intervening structures; 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, and man-made features such as buildings and walls, can significantly alter noise levels. Generally, any large structure blocking the line of sight will provide at least a 5 dBA reduction in source noise levels at the receptor (Federal Highway Administration [FHWA] 2011). Structures can substantially reduce exposure to interior noise as well. The FHWA’s guidelines indicate that modern building construction generally provides an exterior-to-interior noise level reduction of 20 to 35 dBA with closed windows.

The impact of noise is not a function of loudness alone. The time of day when noise occurs, and the duration of the noise are also important factors of project noise impact. Most noise that lasts for more than a few seconds is variable in its intensity. Consequently, a variety of noise descriptors have been developed. One of the most frequently used noise metrics is the equivalent noise level (L_{eq}); it considers both duration and sound power level. L_{eq} is defined as the single steady A-weighted level equivalent to the same amount of energy as that contained in the actual fluctuating levels over time.

Sound power is the total airborne sound energy radiated by a sound source per unit of time irrespective of the distance from the source. Sound pressure, on the other hand, is the result of sound sources radiating sound energy that is transferred into a specific acoustical environment and measured at a specific location and distance from the source.

Noise that occurs at night tends to be more disturbing than that occurring during the day. Community noise is usually measured using Day-Night Average Level (L_{dn}), which is the 24-hour average noise level with a +10 dBA penalty for noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. It is also measured using CNEL, which is the 24-hour average noise level with a +5 dBA penalty for noise occurring from 7:00 p.m. to 10:00 p.m. and a +10 dBA penalty for noise occurring from 10:00 p.m. to 7:00 a.m. (Caltrans 2013). Noise levels described by L_{dn} and CNEL usually differ by about 1 dBA. The relationship between the peak-hour L_{eq} value and the L_{dn}/CNEL depends on the distribution of traffic during the day, evening, and night.

2.2 Vibration

Groundborne vibration of concern in environmental analysis consists of the oscillatory waves that move from a source through the ground to adjacent structures. The number of cycles per second of oscillation makes up the vibration frequency, described in terms of Hz. The frequency of a vibrating object describes how rapidly it oscillates.

While people have varying sensitivities to vibrations at different frequencies, in general they are most sensitive to low-frequency vibration. Vibration in buildings, such as from nearby construction activities, may cause windows, items on shelves, and pictures on walls to rattle. Vibration of building components can also take the form of an audible low-frequency rumbling noise, 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 vibration source (FTA 2018). Although groundborne vibration is sometimes noticeable in outdoor environments, it is almost never annoying to people who are outdoors. The primary concern from vibration is that it can be intrusive and annoying to building occupants and vibration-sensitive land uses.

Vibration amplitudes are usually expressed in peak particle velocity (PPV), which is normally described in inches per second (in/sec). PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is often used in monitoring of blasting vibration and other construction activities because it is related to the stresses that are experienced by buildings (Caltrans 2020).

2.3 Sensitive Receptors

Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with those uses. Noise sensitive receptors include, but are not limited to, residences, hotels, schools, libraries, churches, hospitals, nursing homes, and community care facilities. Noise sensitive receptors near the site include a single-family residence adjacent to the west of the proposed buyback center and a single-family residence adjacent to the west of the existing building at 157 N. Pennsylvania Avenue; single-family residences approximately 20 feet north of the proposed buyback center; and a single-family residence located approximately 100 feet to the north of the existing recycling center site across W. Valley Boulevard.

Vibration sensitive receptors are similar to noise sensitive receptors, including residences and institutional uses such as schools, churches, and hospitals. However, vibration sensitive receptors also include buildings where vibrations may interfere with vibration-sensitive equipment. Vibration sensitive receptors near the site include the single-family residences west and north of the proposed buyback center and the existing building site.

2.4 Project Noise Setting

The most common source of noise in the project site vicinity is vehicular traffic from Interstate (I)-10. To characterize ambient noise levels in the project vicinity, four short term (15 minute) and two long term (24-hour) noise level measurements were conducted on Thursday, March 2, and Friday, March 3, 2023. Short-term measurement location 1 (ST-1) was taken along North Pennsylvania Avenue approximately 170 feet south of West Valley Boulevard to capture ambient noise levels at the western side of the existing AMKO facility. ST-2 was conducted onsite at the existing AMKO facility to capture noise generated by the facility. ST-3 was conducted in the alley between North Pennsylvania Avenue and North 4th Street to capture ambient noise levels at the residences across from the vacant lot site of the project. ST-4 was conducted approximately 45 feet from the centerline of West Valley Boulevard. Long-term measurement location 1 (LT-1) was conducted along the western boundary for the existing AMKO facility to capture ambient noise levels from the facility and North Pennsylvania Avenue. LT-2 was conducted at the southwest corner of the vacant lot site of the project.

Meteorological conditions during the measurement periods were favorable for outdoor sound measurements and were noted to be representative of the typical conditions for the season. All sound level meters were equipped with a windscreen during measurements. All sound level meters used for noise monitoring satisfy the American National Standards Institute standard for Type 2 instrumentation. The sound level meters were set to “slow” response and “A” weighting (dBA). The meters were calibrated prior to and after the monitoring period. All measurements were at least 5 feet above the ground and away from reflective surfaces. **Error! Reference source not found.** s ummarizes the results of the short-term noise measurements, and Table 3 and Table 4 summarize the results of LT-1 and LT-2, respectively. The approximate noise measurement locations are shown in Figure 3 and Appendix A shows the daily trend in noise levels in the project area.

Table 2 Short-Term Noise Level Measurement Results

Measurement Location	Measurement Location	Sample Times	Approximate Distance to Primary Noise Source or Project Site	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)
ST 1	North Pennsylvania Ave, between West Valley Boulevard and West J Street	9:44 – 9:59 a.m.	Approximately 10 feet from the existing AMKO Recycling facility and approximately 25 feet from the centerline of North Pennsylvania Avenue	67	64	76
ST 2	Existing AMKO Recycling parking lot	10:16 – 10:31 a.m.	Approximately 10 feet from existing AMKO Recycling facility	70	65	88
ST 3	Alley adjacent to vacant parcel	10:55 – 11:10 a.m.	Approximately 170 feet from the centerline of North Pennsylvania Avenue	64	56	75
ST-4	West Valley Boulevard	10:35 – 10:50 a.m.	Approximately 45 feet from the centerline of West Valley Boulevard	70	59	84

dBA = A-weighted decibels; L_{eq} = equivalent noise level; L_{min} = minimum noise level, L_{max} = maximum noise level

Table 3 LT-1 Measurement Results

Sample Time	dBA L_{eq}	Sample Time	dBA L_{eq}
24-hour Measurement – March 2-3, 2023			
10:08 AM	69	10:08 PM	62
11:08 AM	67	11:08 PM	62
12:08 PM	65	12:08 AM	62
1:08 PM	71	1:08 AM	62
2:08 PM	69	2:08 AM	62
3:08 PM	66	3:08 AM	64
4:08 PM	68	4:08 AM	65
5:08 PM	67	5:08 AM	66
6:08 PM	68	6:08 AM	69
7:08 PM	68	7:08 AM	66
8:08 PM	67	8:08 AM	66
9:08 PM	65	9:08 AM	69
24-hour Noise Level (dBA CNEL)			**72**

dBA = A-weighted decibels; L_{eq} = equivalent noise level; CNEL = community equivalent noise level

See Figure 3 for Approximate Noise Measurement Locations; see Appendix A for full measurement details.

Table 4 LT-2 Noise Measurement Results

Sample Time	dBA L_{eq}	Sample Time	dBA L_{eq}
24-hour Measurement – March 2 – 3, 2023			
11:21 AM	67	11:21 PM	64
12:21 PM	65	12:21 AM	63
1:21 PM	66	1:21 AM	64
2:21 PM	64	2:21 AM	63
3:21 PM	64	3:21 AM	66
4:21 PM	64	4:21 AM	67
5:21 PM	64	5:21 AM	68
6:21 PM	66	6:21 AM	68
7:21 PM	66	7:21 AM	66
8:21 PM	66	8:21 AM	67
9:21 PM	65	9:21 AM	67
10:21 PM	65	10:21 AM	66
24-hour Noise Level (dBA CNEL)			**72**

dBA = A-weighted decibels; L_{eq} = equivalent noise level; CNEL = community equivalent noise level

See Figure 3 for Approximate Noise Measurement Locations; see Appendix A for full measurement details.

Figure 3 Approximate Noise Measurement Locations

2.5 Regulatory Setting

Federal

FTA Transit and Noise Vibration Impact Assessment Manual

The FTA provides reasonable criteria for assessing construction noise impacts based on the potential for adverse community reaction in the *Transit and Noise Vibration Impact Assessment Manual* (FTA 2018). For residential uses, the daytime noise threshold is 80 dBA L_{eq}.

State

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

City of Colton Noise Standards

City of Colton General Plan

The main objective of the Noise Element is to achieve and maintain an environment where noise is compatible with human activities interacting with a variety of land uses (City of Colton 1987). The following principle and standards are applicable to the project:

Principle 2: Control noise exposure from future noise generators so the ambient environment will be kept within acceptable limits.

Standard 3: Exterior noise levels should not exceed 65 dBA during the day or 55 dBA at night for commercial land uses, including general business and general merchandising.

Standard 4: Exterior noise levels should not exceed 60 dBA at any time for such areas important to public need, and where the preservation of serenity and quietness is essential if the area is to continue to serve its intended purpose. Such area could include parks, open spaces, amphitheaters, and other areas dedicated for activities requiring special qualities of serenity.

City of Colton Municipal Code

The City implements and enforces noise control through the Colton Municipal Code. Section 18.42.040, *Noise*, states that 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.

3 Methodology

3.1 Construction Noise

Construction noise was estimated using the FHWA Roadway Construction Noise Model (RCNM) (FHWA 2006). RCNM predicts construction noise levels for a variety of construction operations based on empirical data and the application of acoustical propagation formulas. Using RCNM, construction noise levels were estimated at noise sensitive receptors near the project site. RCNM provides reference noise levels for standard construction equipment, with an attenuation rate of 6 dBA per doubling of distance for stationary equipment.

Variation in power imposes additional complexity in characterizing the noise source level from construction equipment. Power variation is accounted for by describing the noise at a reference distance from the equipment operating at full power and adjusting it based on the duty cycle of the activity to determine the L_{eq} of the operation (FHWA 2006). Each phase of construction has a specific equipment mix, depending on the work to be accomplished during that phase. Each phase also has its own noise characteristics; some having higher continuous noise levels than others, and some have high-impact noise levels.

Construction activity would result in temporary noise in the project site vicinity, exposing surrounding nearby receptors to increased noise levels. Construction noise would typically be higher during the heavier periods of initial construction (i.e., site preparation and grading) and would be lower during the later construction phases (i.e., paving). Typical heavy construction equipment during project grading could include backhoes, dozers, graders, and tractors. It is assumed that diesel engines would power all construction equipment. Construction equipment would not all operate at the same time or location. In addition, construction equipment would not be in constant use during the workday.

Construction activities would be located as close as 10 feet to the closest sensitive receptors located adjacent to the project's western boundary but would typically be located at an average distance further away due to the nature of construction. Construction equipment is typically dispersed in various areas of the site, with only a limited amount of equipment operating near a given location at a particular time. The Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment* document recommends an approach where the distance variable in its construction noise calculation "assumes that all equipment operates at the center of the project" (FTA 2018). Therefore, it is common, industry standard practice to analyze average construction noise from the center of the site because this is the approximate center of where noise is being generated, as equipment moves around the site throughout the workday. In accordance with FTA recommendations, construction noise from each construction phase was analyzed from the center of the proposed buyback center site, as construction equipment for these phases would be moving throughout the site. The closest sensitive receptors to the project site are the single-family residences adjacent to the western project boundary located approximately 90 feet from project site's center, single-family residences north of the project site located approximately 105 feet from project site's center, and single-family residences further to the west of the project site located approximately 215 feet from project site's center.

3.2 Groundborne Vibration

The project does not include any substantial vibration sources associated with operation. Thus, construction activities have the greatest potential to generate ground-borne vibration affecting nearby receptors, especially during grading and paving of the project site. The greatest vibratory source during construction in the project vicinity would be a large bulldozer used during site preparation and grading activities. Neither blasting nor pile driving would be required for construction of the project. Construction vibration estimates are based on vibration levels reported by the FTA. Table 5 shows typical vibration levels for various pieces of construction equipment used in the assessment of construction vibration (FTA 2018).

Table 5 Vibration Levels Measured during Construction Activities

Equipment	PPV at 25 feet (in/sec)
Vibratory Roller	0.21
Large Bulldozer	0.089
Loaded Trucks	0.076
Small Bulldozer	0.003

PPV = peak particle velocity; in/sec = inches per second

Source: FTA 2018

3.3 Operational Noise Sources

The primary on-site operational stationary noise source from the proposed project building would HVAC units, truck loading, and forklift operation. A typical HVAC system generates noise levels ranging up to 72 dBA at a distance of 3 feet. Typical HVAC units would be rooftop-mounted units with a 10-foot setback from the edge of the roof. Additionally, taking into account the proposed 4-foot-high mechanical equipment screen and the edge of the roof, there would be an approximate reduction of at least 5 dBA by blocking the line-of-sight.

Truck loading is proposed along the eastern side of the proposed buyback center. Noise from truck loading produces a maximum noise level of up to 75 dBA at a distance of 50 feet (City of Industry 2012). It is assumed that forklifts and yard equipment may access the proposed rollup doors on the western side of the proposed buyback center. Lifts produce a maximum noise level of up to 75 dBA at a distance of 50 feet (FHWA 2006).

3.4 Traffic Noise

Project operation would generate new vehicle trips that would increase noise levels on nearby roadways, such as W. Valley Boulevard. The increase in traffic noise at the residence along W. Valley Boulevard north of the existing recycling facility was estimated by adding the project daily trip generation (Urban Crossroads 2023) to the existing average daily traffic (ADT) volume on W. Valley Boulevard (AimTD 2022) using the following formula: 10xLOG(future traffic volume/existing traffic volume).

3.5 Significance Thresholds

Appendix G of the CEQA Guidelines indicates noise impacts of the project would be significant if the project would:

1) Generate 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 or noise ordinance, or applicable standards of other agencies;
2) Generate excessive groundborne vibration or groundborne noise levels; or
3) For a project located within the vicinity of a private airstrip or an airport or public use airport, expose people residing or working in the project area to excessive noise levels.

Construction Noise

The FTA-recommended criterion of 80 dBA L_{eq} for daytime receptors is used as a significance threshold for residential receptors.

Construction Vibration

Vibration limits used in this analysis to determine a potential impact to local land uses from construction activities, such as, vibratory compaction or excavation, are based on information contained in the FTA *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018). Groundborne vibration levels that could induce potential architectural damage to buildings are identified in Table 6. Based on FTA recommendations, limiting vibration levels to below 0.2 in/sec PPV at non-engineered timber and masonry buildings (which would apply to the nearby residential structures) would prevent architectural damage.

Table 6 Groundborne Vibration Architectural Damage Criteria

Building Category	PPV (in/sec)
I. Reinforced concrete, steel, or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Nonengineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

in/sec = inches per second; PPV = peak particle velocity

Source: FTA 2018

On-site Stationary Operational Noise

The City has adopted exterior noise standards in the General Plan Noise Element regulating operational noise sources in the City. The proposed project would result in a significant impact if noise from project stationary operational noise sources exceeds 65 dBA during the day or 55 dBA at night.

Traffic Noise

A project would normally have a significant effect on the environment related to noise if it would substantially increase the ambient noise levels for adjoining areas. The following thresholds of significance similar to those recommended by the Federal Aviation Administration (FAA), are used

to assess traffic noise impacts at sensitive receptor locations. A significant impact would occur if traffic noise increases the existing noise environment by the following:

- Greater than 1.5 dBA CNEL for ambient noise environments of 65 dBA CNEL and higher.
- Greater than 3 dBA CNEL for ambient noise environments of 60 to 64 CNEL.
- Greater than 5 dBA CNEL for ambient noise environments of less than 60 dBA CNEL.

4 Impact Analysis

Threshold:	Would the project generate a substantial temporary or permanent increase in ambient noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Impact N-1 CONSTRUCTION OF THE PROJECT WOULD TEMPORARILY INCREASE AMBIENT NOISE LEVELS, WHICH COULD EXCEED APPLICABLE STANDARDS. TEMPORARY CONSTRUCTION NOISE WOULD RESULT IN A LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. OPERATIONAL STATIONARY SOURCE NOISE WOULD RESULT IN A LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED.

Construction

As described under Section 3, *Methodology*, over the course of a typical construction day, construction would typically be located at an average distance from the approximate center of the proposed buyback center. Table 7 summarizes the estimated noise levels at the closest sensitive receptors from the center of the project site based on the conservatively assumed combined use of all construction equipment during each phase of construction. RCNM modeling outputs are contained in Appendix B.

Table 7 Estimated Noise Levels by Construction Phase

	L_{eq} dBA		
Construction Phase	**Adjacent Residences to the West[1]**	**Residences to the North[2]**	**Residences to the West[3]**
Site Preparation	84	83	77
Grading	84	83	77
Building Construction	86	85	79
Paving	82	80	74

[1] Noise levels estimated at an average distance of 90 feet.

[2] Noise levels estimated at an average distance of 105 feet.

[3] Noise levels estimated at an average distance of 215 feet.

Source: Roadway Construction Noise Model. See Appendix A for modeling outputs.

As shown in Table 7, construction noise could be as high as approximately 86 dBA L_{eq} during building construction at residences adjacent to the west. Therefore, project construction activity could, at times, exceed the significance threshold of 80 dBA L_{eq} and is considered potentially significant. To reduce construction noise below the significance threshold of 80 dBA L_{eq}, Mitigation Measure N-1 is recommended, which includes preparation of a noise control plan containing measures such as installing noise barriers near sensitive receptors and public noticing procedures.

On-Site Operational Stationary Sources

Project operational hours are Monday through Friday from 8:00 a.m. to 2:00 p.m. and Saturday from 8:00 a.m. to 1:00 p.m. The primary on-site operational stationary noise source from the proposed project building would HVAC units, truck loading, and forklift operation. Using the

reference noise levels from Section 3, *Methodology*, project operational HVAC noise levels are estimated at nearby sensitive receptors and shown in Table 8. Therefore, the project would not result in HVAC noise levels of greater than 55 dBA at nearby residences, which is the City's nighttime noise limit assuming that HVAC equipment could run up to 24 hours a day.

Table 8 HVAC Noise

Receptor	Direction from Project Site	Distance from Source (feet)	HVAC Noise Level (dBA)[1]	Threshold (Nighttime)	Exceed Threshold?
425 W J Street	West	25	49	55	No
440 W Valley Boulevard	Northwest	105	36	55	No

Notes: [1] Includes 5 dBA of noise reduction for the proposed mechanical equipment screen and roof edge.

Operational noise from the existing recycling facility would continue as under existing conditions. However, noise from the existing facility would be reduced by the proposed enclosure of up to 80% of the recycling operation.

Truck loading is proposed along the eastern side of the proposed buyback center. Noise from truck loading produces a maximum noise level of up to 75 dBA at a distance of 50 feet (City of Industry 2012). At a distance of approximately 80 feet from the proposed loading docks to the nearest residences to the west and north, truck loading noise would attenuate to approximately 56 dBA accounting for distance and an approximate 15-dBA reduction from the proposed building. This would not exceed the City's daytime noise limit of 65 dBA.

It is assumed that forklifts and yard equipment may access the proposed rollup doors on the western side of the proposed buyback center. Lifts produce a maximum noise level of up to 75 dBA at a distance of 50 feet (FHWA 2006). If unmitigated, this would exceed the City's daytime noise limit of 65 dBA. Implementation of Mitigation Measure N-2 would require the installation of a permanent 8-foot wall to reduce operational forklift noise on the western side of the buyback building.

Off-Site Traffic

Project operation would generate new vehicle trips that would increase noise levels on nearby roadways, such as W. Valley Boulevard. The increase in traffic noise at the residence along W. Valley Boulevard north of the existing recycling facility was estimated by adding the project daily trip generation (Urban Crossroads 2023) to the existing average daily traffic (ADT) volume on W. Valley Boulevard (AimTD 2022) using the following formula: 10xLOG(future traffic volume/existing traffic volume).

Traffic data collected by AimTD for the City indicates that the existing ADT on W. Valley Boulevard is 10,182 (AimTD 2022). The project would add up to 134 net new daily trips (Urban Crossroads 2023). As shown in the Table 9, the traffic noise level increase related to the additional project trips would be less than 0.1 dBA CNEL on W. Valley Boulevard, where there is a residence north of the existing facility. Project traffic would not travel by other nearby residences to the west and north of the proposed buyback center. Therefore, the project would result in a traffic noise increase of less than 1.5 dBA CNEL, and impacts would be less than significant.

Table 9 Existing and Existing Plus Project Roadway Peak Hour Volumes

Roadway	Segment	Existing Peak Hour Volumes	Existing Plus Project Peak Hour Volumes	Noise Level Increase (dBA CNEL)
W. Valley Boulevard	Between Rancho Avenue and Mount Vernon	10,182	10,316	0.06

Source: AimTD 2022, Urban Crossroads 2023

Mitigation Measures

N-1 Construction Noise Reduction Plan

The project applicant and construction contractor shall prepare a Construction Noise Control Plan that includes the following measures. The details of the Construction Noise Control Plan shall be included as part of the permit application drawing set and as part of the construction drawing set.

- At least 21 days prior to the start of construction activities, all off-site businesses and residents within 300 feet of the project site shall be notified of the planned construction activities. The notification shall include a brief description of the project, the activities that would occur, the hours when construction would occur, and the construction period's overall duration. The notification shall include the telephone numbers of the City's and contractor's authorized representatives that are assigned to respond in the event of a noise or vibration complaint.
- At least 10 days prior to the start of construction activities, a sign shall be posted at the entrance(s) to the job site, clearly visible to the public, that includes permitted construction days and hours, as well as the telephone numbers of the City's and contractor's authorized representatives that are assigned to respond in the event of a noise or vibration complaint. If the authorized contractor's representative receives a complaint, the representative shall investigate, take appropriate corrective action, and report the action to the City.
- During the entire active construction period, equipment, tools, and trucks used for project construction shall utilize the best available noise control techniques (e.g., improved mufflers, use of intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds), wherever feasible. During the entire active construction period, stationary noise sources shall be located as far from sensitive receptors as feasible, muffled, and enclosed within temporary sheds or insulation barriers, or other measures for equivalent noise reduction will be incorporated to the extent feasible.
- The contractor shall use impact tools that are hydraulically or electrically powered wherever feasible. Where the use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used along with external noise jackets on the tools.
- Stockpiling of materials shall be located as far as feasible from nearby noise-sensitive receptors.
- Signs shall be posted at the job site entrance(s) to reinforce the prohibition of unnecessary engine idling. All equipment shall be turned off if not in use for more than 5 minutes.
- Stereos and other amplified noise not necessary for the completion of construction work shall be prohibited.
- During the entire active construction period and to the extent feasible, the use of noise producing signals, including horns, whistles, alarms, and bells shall be for safety warning purposes only. The construction manager shall ensure the use of use smart back-up alarms, which automatically adjust the alarm level based on the background noise level or switch off

back-up alarms and replace with human spotters in compliance with safety requirements and laws.

- Erect temporary noise barriers at a height of 12 feet along the western and northern property boundaries to maintain construction noise levels at or below the performance standard of 80 dBA L_{eq}. Barriers shall be constructed with a solid material that has a density of at least 1.5 pounds per square foot with no gaps from the ground to the top of the barrier.

N-2 Operational Noise Reduction

Prior to the issuance of a building permit, the project plans shall be updated to show a barrier along the western property line and the portion of the northern property line across the alley from residences. The barrier shall be continuous from grade to top, with no cracks or gaps, and have a minimum surface density of four pounds per square foot. The barrier shall have a height of 8 feet, as measured from the base elevation.

Significance After Mitigation

Implementation of Mitigation Measure N-1 would entail several noise reduction measures, including use of mufflers and temporary noise barriers. The combination of all measures including the use of temporary noise barriers would reduce noise levels by at least 15 dBA (FHWA 2011; Bies et al. 2018; Harris 1991). Therefore, project construction noise levels would be mitigated to 71 dBA L_{eq} or less, which would not exceed the significance threshold of 80 dBA L_{eq}, and construction noise impacts would be less than significant.

Implementation of Mitigation Measure N-2 would require the installation of a permanent 8-foot wall, which would reduce operational forklift noise on the western side of the buyback building to 63 dBA or less, which would not exceed the City's daytime noise limit of 65 dBA. With implementation of Mitigation Measure N-2, project operational noise levels would be less than significant.

Threshold 2:	Would the project result in generation of excessive groundborne vibration or groundborne noise levels?

Impact N-2 PROJECT CONSTRUCTION WOULD TEMPORARILY GENERATE GROUNDBORNE VIBRATION ON SITE DURING CONSTRUCTION, BUT WOULD NOT EXCEED APPLICABLE STANDARDS WITH MITIGATION. OPERATION OF THE PROJECT WOULD NOT GENERATE SUBSTANTIAL VIBRATION.

Construction activities known to generate excessive groundborne vibration, such as pile driving, would not be needed to construct the project. Based on FTA recommendations, limiting vibration levels to below 0.2 in/sec PPV at residential structures would prevent architectural damage regardless of building construction type. The greatest anticipated source of vibration during project construction activities would be from a large bulldozer, which would be used during site preparation and grading activities, and a roller used for paving activities. Based on the project site plan, it is assumed the bulldozer and roller may be used within 10 feet of the nearest off-site residential structure to the west of the project site. A large bulldozer generates up to approximately 0.035 in/sec PPV at a distance of 10 feet and a vibratory roller generates up to approximately 0.83 in/sec PPV at a distance of 10 feet, which would exceed the significance threshold of 0.2 in/sec PPV if unmitigated. Implementation of Mitigation Measure N-3 would reduce this impact to a level of less than significant.

The project does not include substantial vibration sources associated with operation. Therefore, operational vibration impacts would be less than significant.

Mitigation Measures

N-3 Construction Vibration Reduction Plan

Prior to the issuance of grading permits, the following measures shall be included as notes on all construction plans:

- If paving activities occur within 25 feet of off-site buildings or structures, a pneumatic or static roller shall be used in lieu of a vibratory roller.
- Grading and earthwork activities within 15 feet of adjacent residential structures shall be conducted with off-road equipment that is limited to 100 horsepower or less.

Significance After Mitigation

With implementation of Mitigation Measure N-3, alternative equipment near off-site receptors would be used to reduce construction related vibration. Specifically, use of a static roller would generate vibration levels of approximately 0.05 in/sec at a distance of 25 feet (McIver 2012). Grading and earthwork equipment that is limited to 100 horsepower or less would generate 0.006 in/sec PPV within 15 feet of sensitive receptors. Therefore, Mitigation Measure N-3 would reduce vibration levels to below the threshold of significance for potential building damage.

Threshold:	For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

Impact N-3 THE PROJECT WOULD NOT EXPOSE PEOPLE WORKING IN THE PROJECT AREA TO EXCESSIVE NOISE LEVELS RELATED TO AIRSTRIP/AIRPORT OPERATION. NO IMPACT WOULD OCCUR.

The project site is not located within an airport land use plan or within two miles of a public or private airport (San Bernardino International Airport Authority 2010). The closest airport is the San Bernardino International Airport, which is approximately five miles northeast of the project site. Therefore, the project would not expose people working in the project area to excessive noise levels related to airstrip/airport operation. There would be no impact.

Mitigation Measures

No mitigation measures would be required.

5 Conclusion

The project would generate both temporary construction-related noise and long-term noise associated with operation of the project. Construction noise could exceed the 80 dBA L_{eq} significance threshold. However, impacts from construction noise would be less than significant with Mitigation Measure N-1 incorporated.

The project's operational stationary noise sources such as HVAC equipment and truck loading would not exceed City standards at the nearest sensitive receptors. However, forklift activity along the western side of the proposed buyback building could exceed City standards if unmitigated. Implementation of Mitigation Measure N-2 would reduce this impact to a less than significant level.

The traffic noise level increase related to the additional project trips would be less than 0.1 dBA CNEL on W. Valley Boulevard, where there is a residence north of the existing facility. Project traffic would not travel by other nearby residences to the west and north of the proposed buyback center. Therefore, the project would result in a traffic noise increase of less than 1.5 dBA CNEL, and impacts would be less than significant.

The project would generate groundborne vibration during construction. Construction vibration during site preparation, grading, and paving would exceed the 0.2 in/sec PPV vibration threshold at the nearest offsite structures with use of vibratory rollers, dozers, or other heavy-duty earthmoving equipment. However, with implementation of Mitigation Measure N-3 impacts would be less than significant.

The project site is not within two miles of any public airport or public use airport. Therefore, no substantial noise exposure would occur to construction workers, employees, or users of the project from aircraft noise.

Given the aforementioned, the project would result in less than significant noise impacts with mitigation incorporated.

6 References

AimTD. 2022. Average Daily Traffic (ADT) Volumes.

Bies, D., Hansen, C.H., & C. Howard. 2018. *Engineering Noise Control, Fifth Edition*.

California Department of Transportation (Caltrans). 2013. *Technical Noise Supplement to the Traffic Noise Analysis Protocol*. (CT-HWANP-RT-13-069.25.2) September. Available at: http://www.dot.ca.gov/hq/env/noise/pub/TeNS_Sept_2013B.pdf (accessed May 2023).

_____. 2020. *Transportation and Construction Vibration Guidance Manual*. Available at: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf (accessed May 2023).

Colton, City of. 1987. Noise Element. https://www.ci.colton.ca.us/DocumentCenter/View/271/GP-50-Noise-Element?bidId= (accessed May 2023).

Federal Highway Administration (FHWA). 2006. *FHWA Highway Construction Noise Handbook*. (FHWAHEP-06-015; DOT-VNTSC-FHWA-06-02). Available at: https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook00.cfm (accessed May 2023).

_____. 2011. Highway Traffic Noise Analysis and Abatement Policy and Guidance. (FHWA-HEP-10-025). December. (accessed May 2023).

Federal Transit Administration (FTA). 2018. *Transit Noise and Vibration Impact Assessment*. November. Available at: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf (accessed May 2023).

Harris, C. 1991. *Handbook of Acoustical Measurements and Noise Control Third Edition*.

Industry, City of. 2012. Macy's Trucking Yard Noise Survey.

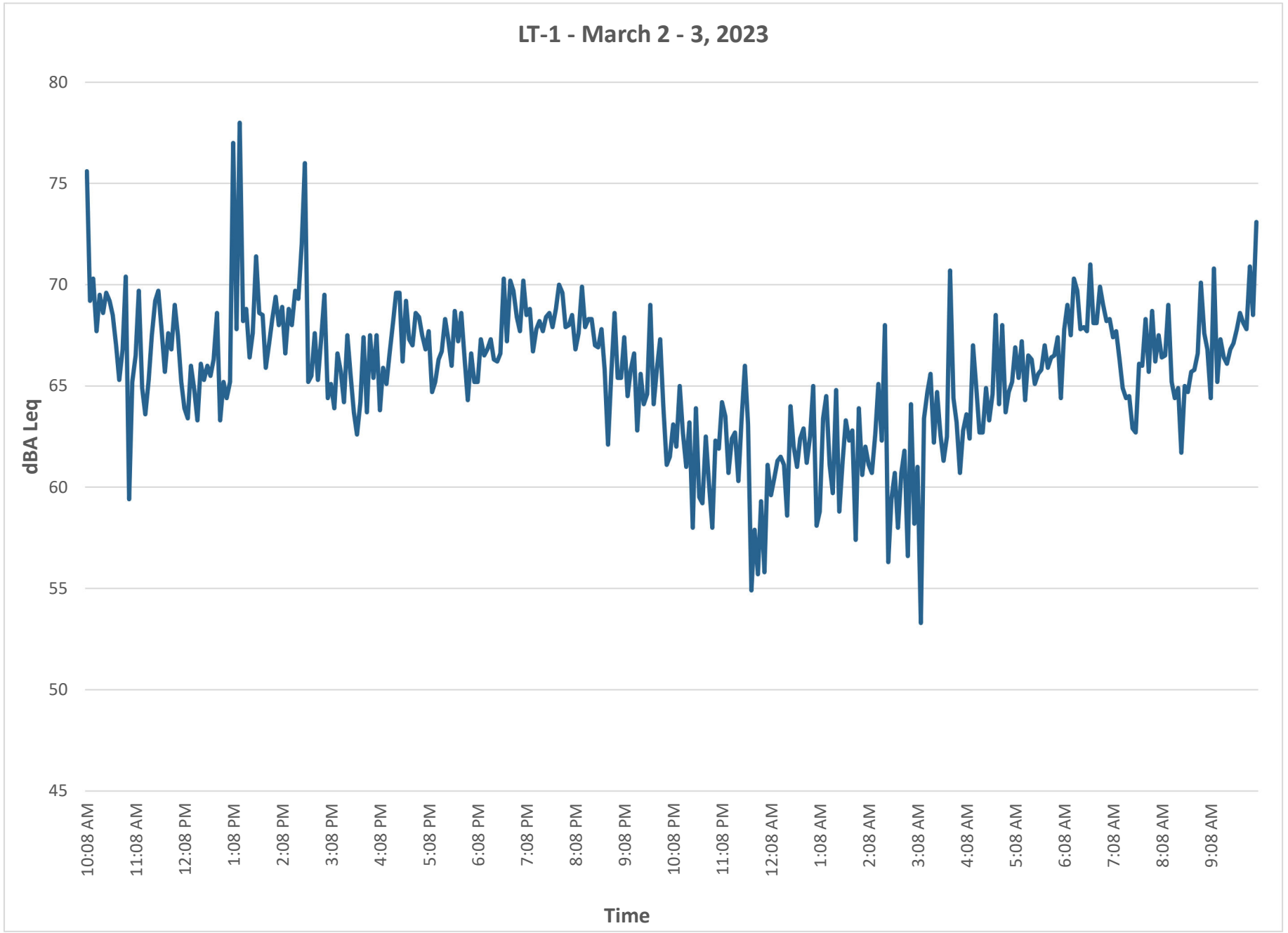
McIver, IR. 2012. Ground Vibration from Road Construction. https://www.epa.govt.nz/assets/FileAPI/proposal/NSP000005/Hearings/f73d4769a3/APSOC-Closing-Subs-Attachment-report.pdf (accessed May 2023).

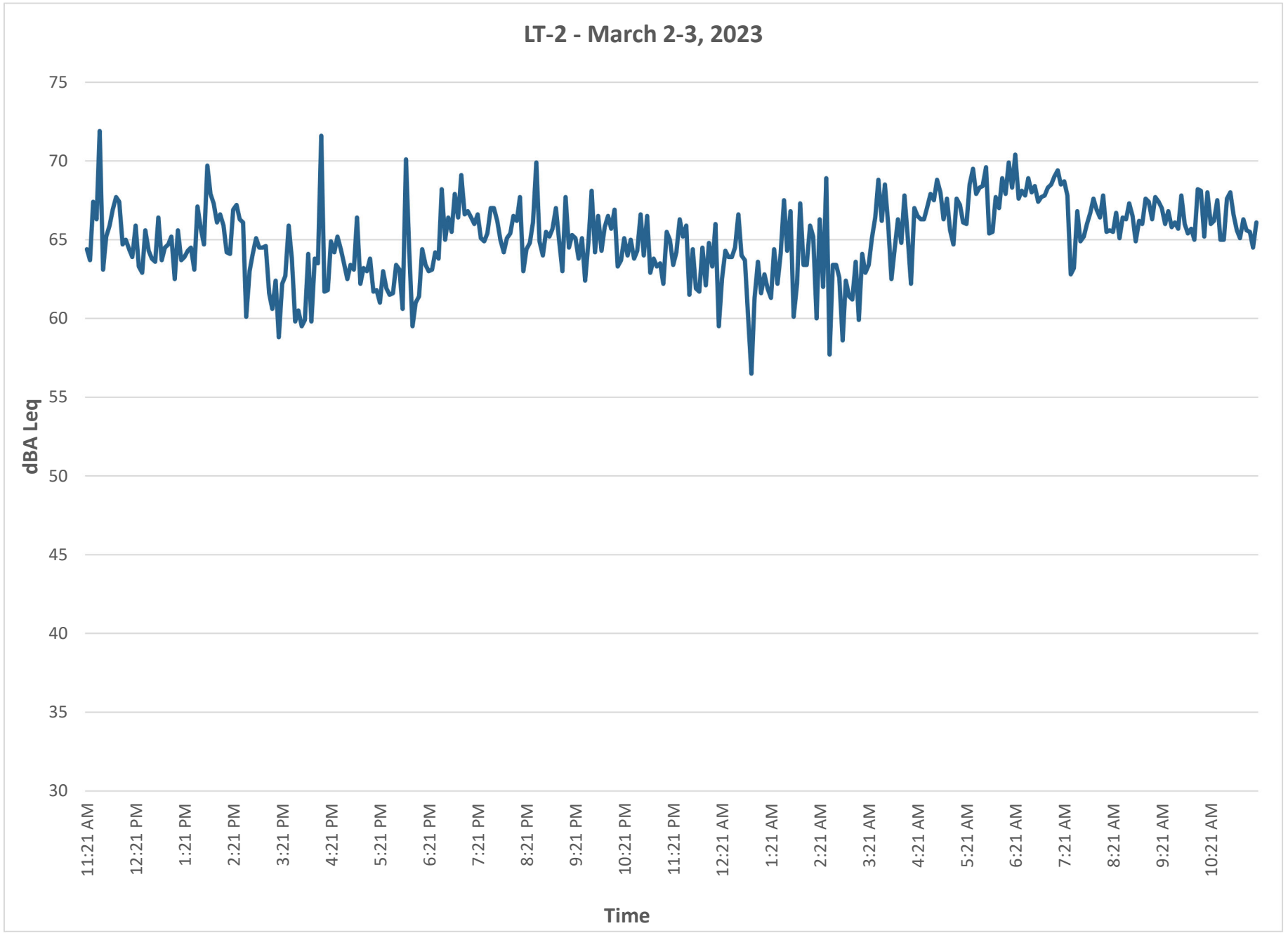
San Bernardino International Airport Authority. 2010. Airport Layout Plan Narrative Report for San Bernardino International Airport. http://www.sbiaa.org/wp-content/uploads/2015/10/ALP-Narrative-Report-Complete.pdf (accessed May 2023).

Urban Crossroads. 2023. AMKO Recycling Center Facility Trip Generation Assessment.

Appendix A

Noise Monitoring Data


LT-1 - March 2 - 3, 2023
80
75
70
65
60
55
50
45
dBA Leq
10:08 AM
11:08 AM
12:08 PM
1:08 PM
2:08 PM
3:08 PM
4:08 PM
5:08 PM
6:08 PM
7:08 PM
8:08 PM
9:08 PM
10:08 PM
11:08 PM
12:08 AM
1:08 AM
2:08 AM
3:08 AM
4:08 AM
5:08 AM
6:08 AM
7:08 AM
8:08 AM
9:08 AM
Time


LT-2 - March 2-3, 2023
75
70
65
60
55
50
45
40
35
30
dBA Leq
11:21 AM
12:21 PM
1:21 PM
2:21 PM
3:21 PM
4:21 PM
5:21 PM
6:21 PM
7:21 PM
8:21 PM
9:21 PM
10:21 PM
11:21 PM
12:21 AM
1:21 AM
2:21 AM
3:21 AM
4:21 AM
5:21 AM
6:21 AM
7:21 AM
8:21 AM
9:21 AM
10:21 AM
Time

Appendix B

Roadway Construction Noise Modeling (RCNM) Outputs

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 05/03/2023
Case Description: Building Construction

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Building Construction	Residential	65.0	55.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Man Lift	No	20	85.0		50.0	0.0
Backhoe	No	40	80.0		50.0	0.0
Concrete Mixer Truck	No	40	85.0		50.0	0.0
Concrete Saw	No	20	90.0		50.0	0.0
Compactor (ground)	No	20	80.0		50.0	0.0
Compressor (air)	No	40	80.0		50.0	0.0
Crane	No	16	85.0		50.0	0.0
Dump Truck	No	40	84.0		50.0	0.0
Man Lift	No	20	85.0		50.0	0.0
Generator	No	50	82.0		50.0	0.0
Grader	No	40	85.0		50.0	0.0
Paver	No	50	85.0		50.0	0.0
Vacuum Street Sweeper	No	10	80.0		50.0	0.0
Tractor	No	40	84.0		50.0	0.0
Welder / Torch	No	40	73.0		50.0	0.0
Gradall	No	40	85.0		50.0	0.0

Results

Equipment	Calculated (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Night Lmax	Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Day Leq	Evening Lmax	Night Lmax	Night Leq

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 05/03/2023
Case Description: Grading

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Grading	Commercial	65.0	55.0	55.0

Description	Impact Device	Usage (%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40	85.0		50.0	0.0
Excavator	No	40	85.0		50.0	0.0
Grader	No	40	85.0		50.0	0.0
Paver	No	50	85.0		50.0	0.0
Roller	No	20	85.0		50.0	0.0
Scraper	No	40	85.0		50.0	0.0
Front End Loader	No	40	80.0		50.0	0.0
Tractor	No	40	84.0		50.0	0.0

Results

Noise Limits (dBA)

Noise Limit Exceedance (dBA)

Equipment	Calculated (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Dozer	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Grader	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	85.0	82.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Roller			85.0	78.0	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Scraper			85.0	81.0	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Front End Loader			80.0	76.0	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Tractor			84.0	80.0	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A				
		Total	85.0	89.4	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A				

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 05/03/2023
Case Description: Paving

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Paving	Residential	65.0	55.0	55.0

Description	Impact Device	Usage (%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85.0		50.0	0.0
Paver	No	50	85.0		50.0	0.0
Compressor (air)	No	40	80.0		50.0	0.0
Pumps	No	50	77.0		50.0	0.0
Scraper	No	40	85.0		50.0	0.0

Results

Noise Limits (dBA)

Noise Limit Exceedance (dBA)

Equipment	Calculated (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Grader	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Paver	85.0	82.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Compressor (air)	80.0	76.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	77.0	74.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Total	85.0	86.8	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Man Lift			85.0	78.0		N/A		N/A		N/A		N/A		N/A
N/A		N/A		N/A		N/A		N/A						
Backhoe			80.0	76.0		N/A		N/A		N/A		N/A		N/A
N/A		N/A		N/A		N/A		N/A						
Concrete Mixer Truck			85.0	81.0		N/A		N/A		N/A		N/A		N/A
N/A		N/A		N/A		N/A		N/A						
Concrete Saw			90.0	83.0		N/A		N/A		N/A		N/A		N/A
N/A		N/A		N/A		N/A		N/A						
Compactor (ground)			80.0	73.0		N/A		N/A		N/A		N/A		N/A
N/A		N/A		N/A		N/A		N/A						
Compressor (air)			80.0	76.0		N/A		N/A		N/A		N/A		N/A
N/A		N/A		N/A		N/A		N/A						
Crane			85.0	77.0		N/A		N/A		N/A		N/A		N/A
N/A		N/A		N/A		N/A		N/A						
Dump Truck			84.0	80.0		N/A		N/A		N/A		N/A		N/A
N/A		N/A		N/A		N/A		N/A						
Man Lift			85.0	78.0		N/A		N/A		N/A		N/A		N/A
N/A		N/A		N/A		N/A		N/A						
Generator			82.0	79.0		N/A		N/A		N/A		N/A		N/A
N/A		N/A		N/A		N/A		N/A						
Grader			85.0	81.0		N/A		N/A		N/A		N/A		N/A
N/A		N/A		N/A		N/A		N/A						
Paver			85.0	82.0		N/A		N/A		N/A		N/A		N/A
N/A		N/A		N/A		N/A		N/A						
Vacuum Street Sweeper			80.0	70.0		N/A		N/A		N/A		N/A		N/A
N/A		N/A		N/A		N/A		N/A						
Tractor			84.0	80.0		N/A		N/A		N/A		N/A		N/A
N/A		N/A		N/A		N/A		N/A						
Welder / Torch			73.0	69.0		N/A		N/A		N/A		N/A		N/A
N/A		N/A		N/A		N/A		N/A						
Gradall			85.0	81.0		N/A		N/A		N/A		N/A		N/A
N/A		N/A		N/A		N/A		N/A						
	Total		90.0	91.2		N/A		N/A		N/A		N/A		N/A
N/A		N/A		N/A		N/A		N/A						

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 05/03/2023
Case Description: Site Prep

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Site Prep	Residential	65.0	55.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compactor (ground)	No	20	80.0		50.0	0.0
Dozer	No	40	85.0		50.0	0.0
Excavator	No	40	85.0		50.0	0.0
Generator	No	50	82.0		50.0	0.0
Grader	No	40	85.0		50.0	0.0
Paver	No	50	85.0		50.0	0.0
Scraper	No	40	85.0		50.0	0.0
Tractor	No	40	84.0		50.0	0.0

Results

Noise Limits (dBA)

Noise Limit Exceedance (dBA)

Equipment	Calculated (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Compactor (ground)	80.0	73.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Generator	82.0	79.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Grader			85.0	81.0	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Paver			85.0	82.0	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Scraper			85.0	81.0	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A				
Tractor			84.0	80.0	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A				
		Total	85.0	89.4	N/A	N/A	N/A	N/A	N/A	
N/A	N/A	N/A	N/A	N/A	N/A	N/A				

Vacant Lot Construction	Noise Level @ 50 ft	Adjacent Residences to W	Residences to the N	Residences to W
Distance		90	105	215
Site Prep	**89.4**	**84.3**	**83.0**	**76.7**
Grading	**89.4**	**84.3**	**83.0**	**76.7**
Building Construction	**91.2**	**86.1**	**84.8**	**78.5**
Paving	**86.8**	**81.7**	**80.4**	**74.1**