PARSONS

Technical Memorandum

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Date: July 28, 2022

Re: Los Angeles Department of Transportation Electric Bus Maintenance Facility - Noise and Vibration Analysis

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1.0 PURPOSE OF THIS MEMO

The purpose of this memorandum is to document the results of the noise and vibration analysis of the potential environmental impacts associated with construction and operation of the proposed Electric Bus Maintenance Facility (EBMF or project) in south Los Angeles. This study is conducted in support of the Initial Study to be prepared in compliance with the California Environmental Quality Act (CEQA) and the State CEQA Guidelines and the National Environmental Policy Act (NEPA).

2.0 PROJECT DESCRIPTION

2.1 Project Location and Setting

The City of Los Angeles (the City) is proposing to construct the EBMF on the 5.5 acre land located at 740 and 800 East 111th Place in South Los Angeles (Assessor's Parcel Numbers [APNs] 6071-022-009 and 6071-022-013). The project site is located on the light industrial zoned land and has been recently utilized as a logistics warehouse for solar panels. The site is within Council District 8's jurisdiction in the Southeast Los Angeles Community Planning Area of the City (Figures 1 and 2). The proposed project will be operated by the City Department of Transportation (LADOT).

Figure 2-1. Regional Map

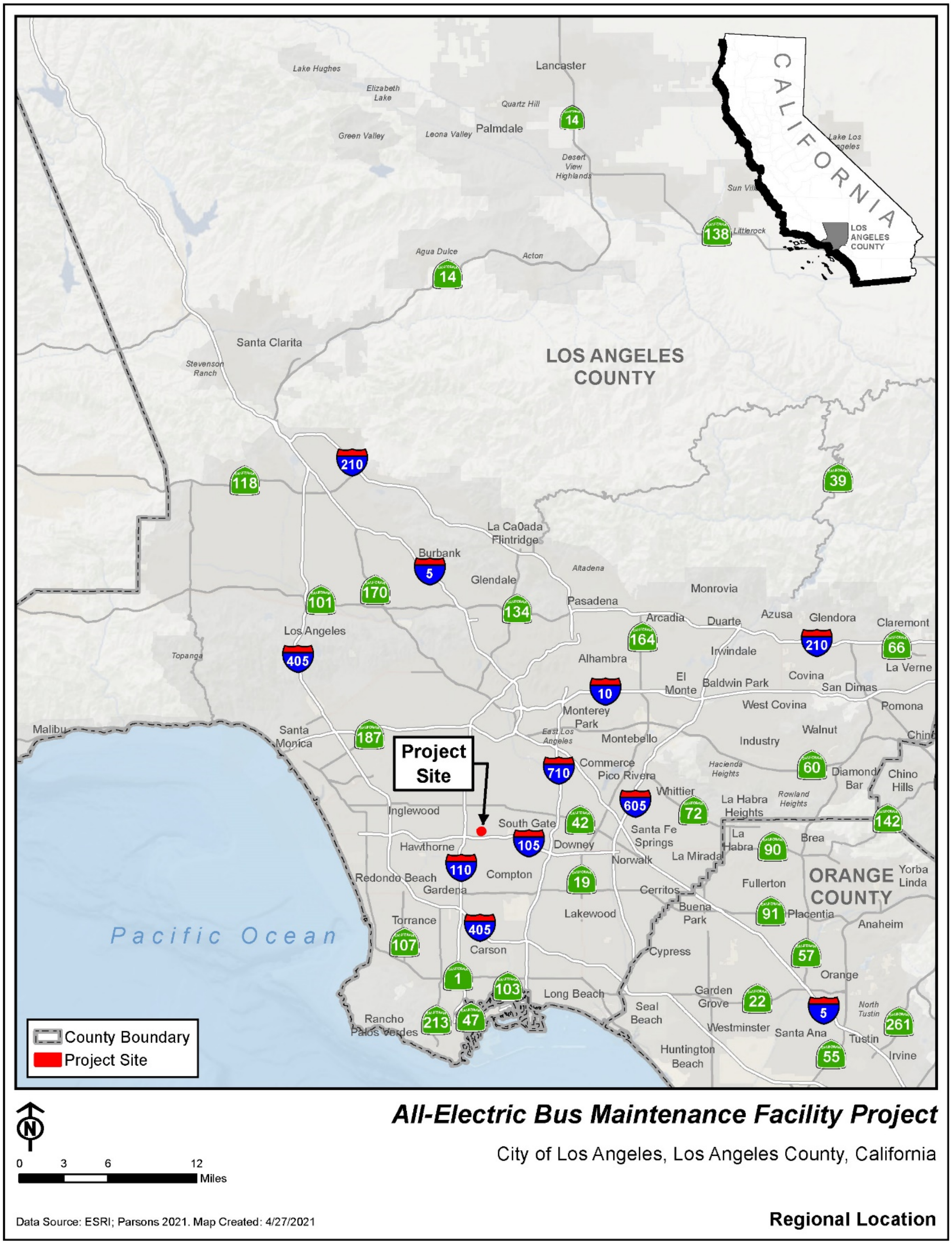
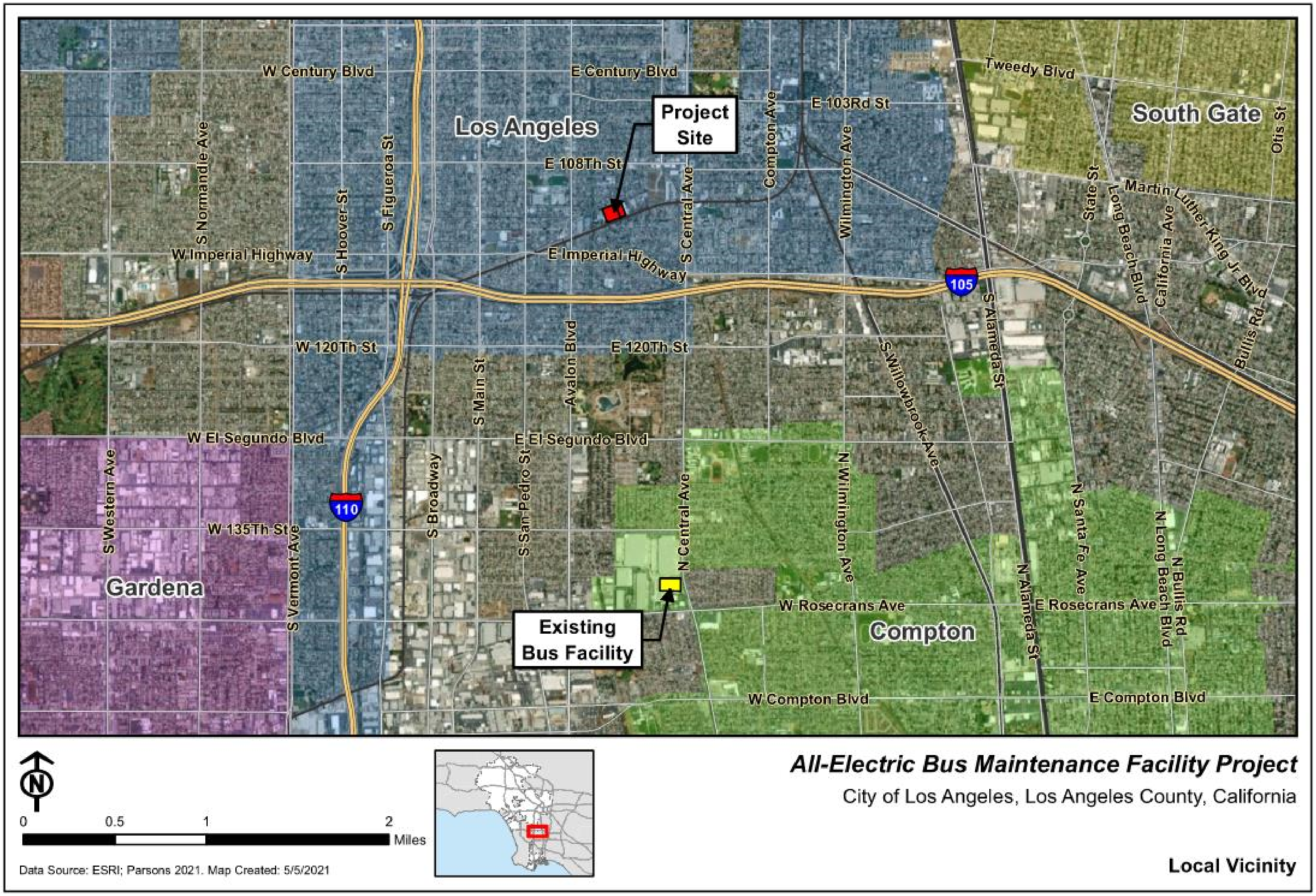


Figure 2-2. Project Location Map



The project site is located between East 111th Place and East Lanzit Avenue, east of South Avalon Boulevard, and has a relatively flat topography. Small clusters of light-industry land uses can be found in the immediate vicinity of the project site, with adjacent land uses surrounding the project site comprised mostly of multi-family and single-family residences but also encompassing lands supporting other activities, including commercial and community-oriented social services, such as education and health facilities. The area is largely urbanized and nearly built-out with little or no remaining vacant land. There are no natural features or major land formations, surface water bodies, or waterways near the project site.

Access to the site is provided by two driveways off East 111th Place, a street that is designated as a local collector with one lane in each direction and allows daytime on-street parking on each side. An existing Union Pacific Railroad (UPRR) rail line runs parallel to East Lanzit Avenue and is located immediately south of the project site. Imperial Highway and Interstate 105 (I-105) are located approximately three and seven blocks south of the project site, respectively.

Figure 2-3 presents an aerial view of the proposed site and its general vicinity.

Figure 2-3. Aerial View of Project Site and its Immediate Vicinity

2.2 Proposed Project Description

LADOT operates and maintains its existing bus fleet from its South Los Angeles Bus Maintenance Facility, located at 14011 South Central Avenue in Compton. This current facility is not owned by the City and is leased through LADOT's operations services contractor. The existing facility does not have sufficient capacity to accommodate the additional maintenance and storage requirements of the proposed transition to electric buses and expanded charging needs of an all-electric bus fleet.

LADOT proposes to build a bus maintenance facility at the project site to serve its future electric bus fleet. The proposed EBMF is planned as a modern maintenance facility to support a larger and cleaner zero-emissions bus fleet, consisting of 130 all-electric battery bus vehicles for the DASH and Commuter Express services provided by LADOT. The EBMF would be used to store and dispatch electric buses for daily service and would provide repair and maintenance services, parking, and inspection functions. The proposed facility would eventually replace the existing LADOT bus maintenance facility located at 14011 South Central Avenue (approximately 2 miles south of the new facility).

After demolition of the existing buildings on the site, the City proposes to construct several buildings and structures, including a two-story operations building to provide dispatch and administrative functions, a maintenance building with 10 bus maintenance bays, a service building, a bus wash building, and a second-story parking deck for up to 360 employee/visitor vehicles, with the canopy above the parking deck topped with a 2,000-kilowatt photovoltaic (PV) system. Electrification equipment, including electrical transformers, switch cabinets, and bus chargers, is also proposed.

The EBMF would provide preventive maintenance inspections, light maintenance and repair, emergency maintenance, interior vehicle cleaning, and exterior vehicle washing. It would also accommodate administrative and operations functions and be used as a report base for bus operators. It would include space for employee parking, conference meeting rooms, operations and maintenance staff offices, dispatcher workstations, employee report and recreation rooms, and areas with lockers, showers, and restrooms for operations and maintenance personnel.

The electric bus fleet's primary entrance to the new EBMF site would be located at the northwest corner of the site along East 111th Place, adjacent to the proposed maintenance building. Buses entering the property would first have to check in with an onsite security guard, with buses looping through the site and park at the central section of the site. A dedicated entrance/exit for nonrevenue bus fleet and employee/visitor vehicles would be located at the north end of the site between the bus entrance and exit driveways, with ramp access to a second-level parking deck.

The construction schedule for the proposed project has not been determined. For environmental analysis purposes, it is assumed construction would be completed in 24 months following the final engineering design and bidding process in 2023. Any required remediation would be completed prior to the start of construction activities. Assuming no or limited remediation is necessary, project construction is tentatively scheduled to begin in mid-2024 and would be completed by mid-2026. Construction activities at the proposed project site would include mobilization and staging; building demolition; site clearing, grading and paving; new structure construction, equipment installation, and minor landscaping and finishing.

The proposed project facility would accommodate as many as 70 of the 30-foot-long DASH buses and 60 of the 45-foot-long Commuter Express buses, comprising a total of 130 Battery-Electric Buses (BEBs) that would be assigned to the new South Los Angeles EBMF. The facility would include surface parking spaces for 130 BEBs in an area located east of the Maintenance Building. The BEBs running easterly from Avalon Boulevard would enter the site through the west entrance driveway on East 111th Place, check in with the onsite security guard, and proceed into the site to the southern section for service and washing. Otherwise, BEBs requiring repairs would park at the bus bays along the western section. Other BEBs may directly run in a counterclockwise direction and park at the central area for charging. The BEBs would leave the site through the east exit driveway and run westerly on East 111th Place to Avalon Boulevard. Vehicles driven by bus operators, proposed project staff, other employees, and visitors would enter and exit through the center driveway that connects to a ramp leading to the second-level parking deck.

Approximately 312 employees would be working onsite and the facility is planned to be open 24 hours per day, 7 days per week. Staff would be onsite on two or three shifts, which would be staggered depending on their work responsibilities.

3.0 NOISE AND VIBRATION CHARACTERISTICS AND EFFECTS

3.1 Noise Characteristics and Effects

Sound is technically described in terms of the loudness (amplitude) and frequency (pitch). The standard unit of measurement for sound is the decibel (dB). The human ear is not equally sensitive to sound at all frequencies. The A-weighted scale, abbreviated dBA, reflects the normal hearing sensitivity range of the human ear. On this scale, the range of human hearing extends from approximately 3 to 140 dBA.

This noise analysis discusses sound levels in terms of equivalent noise level (L_{eq}) and the Day-Night Average Sound Level (L_{dn}). L_{eq} is the average noise level on an energy basis for any specific time period. The L_{eq} for 1 hour is the average energy noise level during the hour. The average noise level is based on the energy content (i.e., acoustic energy) of the sound. L_{eq} can be thought of as the level of a continuous noise that has the same energy content as the fluctuating noise level. The L_{eq} is expressed in units of dBA.

L_{dn} is an average sound level during a 24-hour period. L_{dn} is a noise measurement scale that accounts for noise source, distance, single event duration, single event occurrence, frequency, and time of day. Humans perceive sound differently at certain times of the day. Sounds are perceived at 10 dBA higher from 10:00 p.m. to 7:00 a.m. This perception is the result of changes in background sound and human sensitivity. Because L_{dn} accounts for human sensitivity to sound, the L_{dn} 24-hour figure is always a higher number than the actual 24-hour average.

Noise is generally defined as unwanted sound. The degree to which noise can impact the human environment ranges from levels that interfere with speech and sleep (e.g., annoyance and nuisance) to levels that cause adverse health effects (e.g., hearing loss and psychological effects). Human response to noise is subjective and can vary greatly from person to person. Factors that influence individual response include the intensity, frequency, and pattern of noise, as well as the amount of background noise present before the intruding noise and the nature of work or human activity that is exposed to the noise source.

3.2 Vibration Characteristics and Effects

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 can be a serious concern, causing buildings to shake and rumbling sounds to be heard. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roadways. Some common sources of vibration are trains, buses on rough roads, and construction activities, such as blasting, pile driving, and the use of heavy earth-moving equipment.

The criteria for acceptable ground-borne vibration are expressed in terms of root mean square (RMS) velocity levels in decibels (VdB) and are based on the maximum levels for a single event (L_{max}). The Federal Transit Administration (FTA) has published vibration guidance relevant to the proposed project. To address the human response to ground-borne vibration, FTA has established guidelines for maximum acceptable vibration criteria for different types of land uses for ongoing ground-borne vibration events. These guidelines recommend that maximum vibration levels be established from 72 VdB to 80 VdB for residential uses and buildings where people normally sleep.

High levels of vibration may cause physical personal injury or damage to buildings. However, ground-borne vibration levels rarely affect human health. Instead, most people consider ground-borne vibration to be an annoyance that can affect concentration or disturb sleep. In addition, high levels of ground-borne vibration can damage fragile buildings or interfere with equipment that is highly sensitive to ground-borne vibration (e.g., electron microscopes).

4.0 EXISTING CONDITIONS

The project site is currently developed with two industrial buildings that have been vacant for two years but are currently used as a logistics warehouse for solar panels (see Figure 2-3).

Noise-sensitive land uses (NSLUs) within 500 feet of the project site include single-family residences to the north along East 111th Place and the south along East Lanzit Avenue, a community center to the west, and a school to the east, both along East 111th Place.

Noise monitoring was conducted at the project area by Parsons on June 7 and 8, 2021, to determine the existing ambient exterior noise levels. In addition, photographs were taken to document existing site conditions at the time of the field visits. Noise monitoring sites were selected to capture the ambient noise-level ranges of the area due to dominant noise sources, such as traffic on East 111th Place and East Lanzit Avenue based on distances to noise sources.

Noise monitoring was conducted for a 24-hour period (long-term) and during off-peak traffic conditions (short-term) at several NSLUs to establish the baseline conditions. The long-term measurement was conducted to establish the upper and lower ambient noise-level range of the project area during daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) hours and to adjust the short-term measurements to the lowest daytime and nighttime noise levels to which predicted noise levels from project-related construction activities and operations can be compared.

Based on the measured noise levels, the proposed project area has an exterior (outside) ambient noise level between 59 and 62 dBA during the daytime hour of 7:00 p.m. and between 53 and 56 dBA during the nighttime hour of 5:00 a.m., depending on location. The daytime noise level at 7:00 p.m. and the nighttime noise level at 5:00 a.m. were chosen because it is assumed that the highest electric bus traffic (i.e., operational noise) would occur during these hours based on the existing bus schedule at the existing South Los Angeles facility. Measured and adjusted project site noise levels at the NSLUs are shown in Table 4-1, and the results of the long-term measurements are shown in Attachment A. Attachment B contains the noise monitoring field forms. Noise monitoring locations are shown in Figure 4-1.

Table 4-1. Measured Noise Levels at Noise-Sensitive Land Uses

Noise Measurement Site	Noise Sensitive Location	Measurement Date	Start Time[1]	Measured Ambient Noise Level, Leq, dBA	Adjusted Daytime Ambient Noise Level, Leq, dBA[2]	Adjusted Nighttime Ambient Noise Level, Leq, dBA[3]	Adjusted Ambient Noise Level, Ldn / (Leq), dBA[4]
ST1	710 E 111th Place	06/07/21	11:20	57	59	53	62 / (59)
ST2	810 E 111th Place	06/08/21	8:20	55	59	53	62 / (61)
ST3	745 E 111th Place	06/08/21	9:00	56	62	56	63 / (61)
ST4	750 E Lanzit Avenue	06/07/21	13:00	60	61	55	64 / (63)

Notes:
1 - Duration of measurement was 20 minutes.
2 - Daytime ambient was adjusted from the 7:00 p.m. hour which is the assumed daytime hour with the highest electric bus traffic volumes.
3 - Nighttime ambient was adjusted from the 5:00 a.m. hour which is the assumed nighttime hour with the highest electric bus traffic volumes.
4 - Ldn is provided for Category 2 receptors; Peak-hour Leq is provided for nearby Category 3 receptors per FTA manual.

Figure 4-1. Noise Monitoring Locations

5.0 REGULATORY SETTING

5.1 Federal Regulations

5.1.1 Operational Noise

The noise impact criteria as prescribed in FTA's Transit Noise and Vibration Impact Assessment (FTA, 2018) are used to assess potential noise impacts from the proposed EBMF operations. They are founded on well-documented research on community reaction to noise and are based on change in noise exposure using a sliding scale. The amount that transit projects are allowed to change the overall noise environment is reduced with increasing levels of existing noise.

The FTA Noise Impact Criteria applicable to three categories of land use are summarized in Table 5-1.

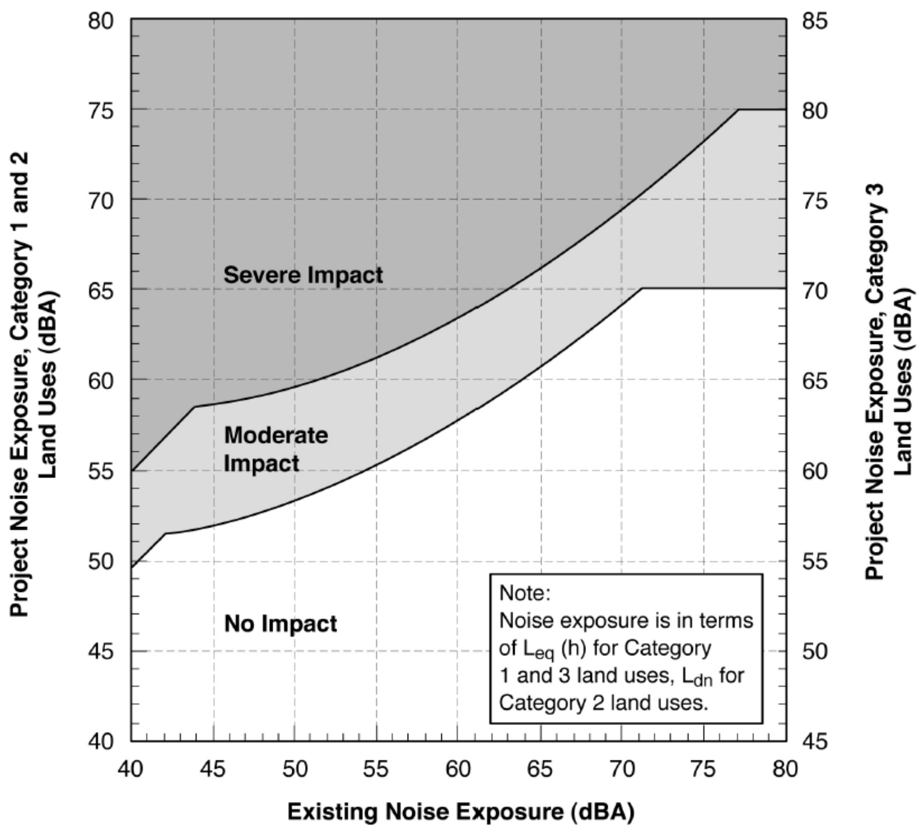
Table 5-1. Land Use Categories and Metrics for Transit Noise Impact Criteria

Land Use Category	Noise Metric, dBA	Description of Land Use Category
1	Outdoor $L_{eq}(h)$*	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use.
2	Outdoor L_{dn}	Residences and buildings where people normally sleep. This category includes homes, hospitals, and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Outdoor $L_{eq}(h)$*	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Buildings with interior spaces where quiet is important, such as medical offices, conference rooms, recording studios, and concert halls fall into this category. Places for meditation or study associated with cemeteries, monuments, and museums. Certain historical sites, parks, and recreational facilities are also included.
Note: * L_{eq} for the noisiest hour of transit-related activity during hours of noise sensitivity.		

L_{dn} is used to characterize noise exposure for residential areas, hotels, and hospitals where people normally sleep (Category 2). The maximum 1-hour average hourly L_{eq} during the period that the facility is in use is used for other noise-sensitive land uses such as schools, libraries, churches, and parks (Category 3). The noise impact criteria for human annoyance are based on a comparison of the existing outdoor noise levels and the future outdoor noise levels from a proposed transit project. They incorporate activity interference caused by the transit project alone and annoyance due to the change in the noise environment caused by the project. There are two levels of impact included in the FTA criteria, as shown in Figure 5-1. The interpretations of these two levels of impact are summarized as follows:

- Severe Impact: Project noise above the upper curve is considered to cause Severe Impact because a significant percentage of people would be highly annoyed by the new noise. This curve flattens out at 75 dB for Category 1 and 2 land uses, a level associated with an unacceptable living environment.
- Moderate Impact: The change in the cumulative noise level is noticeable to most people, but it may not be sufficient to cause strong, adverse reactions from the community. In this transitional area, other project-specific factors must be considered to determine the magnitude of the impact and the need for mitigation, such as the existing level, predicted level of increase over existing noise levels, and the types and numbers of noise-sensitive land uses affected.

Figure 5-1. Noise Impact Criteria for Transit Projects



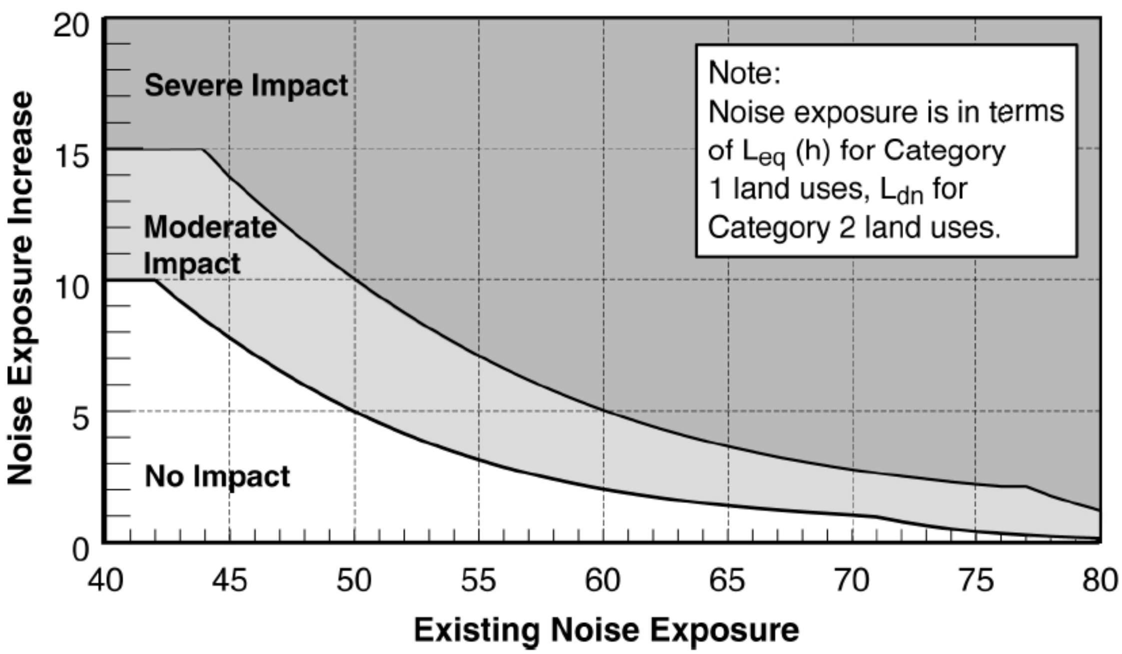
Source: FTA, 2018.

The horizontal axis in Figure 5-1 is the existing L_{dn} or L_{eq} without any project-related noise. The vertical axis on the left side is the L_{dn} at residential land uses and hotels caused by a project, whereas the axis on the right side is the L_{eq} at schools, churches, and parks. Figure 5-1 illustrates that a project noise level of L_{dn} of 61 dBA at a Category 2 receptor would be considered as “moderate impact” if the existing L_{dn} of a selected residence is 65 dBA. If the project noise level reaches an L_{dn} of 67 dBA, the project noise level would be considered as a “severe impact” to the Category 2 receptor.

Although the curves in Figure 5-1 are defined in terms of the project noise exposure and the existing noise exposure, it is important to emphasize that the increase in the cumulative noise (i.e., when the project noise is added to existing noise) is the basis for the criteria.

Figure 5-2 shows the noise impact criteria for Category 1 and 2 land uses in terms of the allowable increase in the cumulative noise exposure. As shown, the criterion for moderate impact allows a noise exposure increase of 10 dB, if the existing noise exposure is 42 dBA or less, but only a 1-dB increase when the existing noise exposure is 70 dBA. As the existing level of ambient noise increases, the allowable level of project noise increases, but the total allowable increase in community noise exposure is reduced. This reduction accounts for the unexpected result – project noise exposure levels that are less than the existing noise exposure can still cause a moderate impact.

Figure 5-2. Increase in Cumulative Noise Levels Allowed by Criteria



Source: FTA, 2018.

For residential land uses, the noise criteria are to be applied outside the building locations at noise-sensitive areas with frequent human use, including outdoor patios. If none is present, the criteria should be applied near building doors and windows. For parks and other significant outdoor uses, the criteria are to be applied at the property lines; however, for locations where land use activities are solely indoors, noise impact may be less significant if the outdoor-to-indoor reduction is greater than for typical buildings (approximately 25 dB with windows closed or 12 dBA with windows open).

5.1.2 Operational Vibration

The criteria in the Transit Noise and Vibration Impact Assessment (FTA, 2018) are used to evaluate vibration impacts from transit operations. The evaluation of vibration impacts can be divided into two categories: (1) human annoyance and (2) building damage.

Generally, human annoyance criteria are used to assess potential impacts associated with operational vibration, whereas building damage criteria are used to estimate vibration impacts due to construction activities.

5.1.2.1 Human Annoyance

The ground-borne vibration impact criteria describe the human response to vibration and potential interference as relates to the operation of vibration-sensitive equipment. Table 5-2 presents the criteria for various land use categories, as well as the frequency of events.

Table 5-2. FTA Ground-Borne Vibration Impact Criteria for Human Annoyance

Land Use Category	Ground-Borne Vibration Impact Levels, VdB*		
	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB[4]	65 VdB[4]	65 VdB[4]
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB

Notes:

1. “Frequent Events” is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.
2. “Occasional Events” is defined as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have these many operations.
3. “Infrequent Events” is defined as more than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.
4. This criterion limit is based on levels that are acceptable for most moderately sensitive equipment, such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.

* Root-mean-square velocity in decibels (VdB) re: 1 micro-inch per second.

Source: FTA, 2018.

Vibration-sensitive receptors include residences, hotels, schools, churches, library, and hospitals. These receptors fall under Category 2, places where people normally sleep including hotels and hospitals, and Category 3, schools, churches, and parks with primarily daytime use. Because the number of proposed bus operations at the site is up to 150 electric buses per weekday, FTA would classify the proposed service as “Frequent Events.” According to Table 5-2, the maximum vibration level cannot exceed 72 VdB for Category 2 land uses and 75 VdB for Category 3 land uses.

5.1.2.2 Building Damage

Vibration resulting from electric bus operations on city streets would not cause building damage because vibration impact from rubber tire-fitted vehicles is extremely rare. This is because rubber tire-fitted vehicles are not very massive. Additionally, they are typically well isolated by the vehicle suspension design and rubber tires, which act as a highly effective barrier to vibration transmission from the vibration-generating carriage and the main propagation medium for vibration excitation – the ground. Potential vibration impact for building damage from rubber tire-fitted vehicles such as those proposed for this project can be reasonably dismissed under general conditions.

Construction activities can result in varying degrees of ground vibration, depending on the equipment used and the method employed. The operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings founded on the soil near the construction site respond to these vibrations with varying results, ranging from no perceptible effects at the lowest levels, perceptible vibrations at moderate levels, and slight damage at the highest levels.

Per the FTA Noise and Vibration Assessment Manual, ground vibrations from construction activities do not often reach the levels that can damage structures, and the vibration associated with typical bus maintenance facility construction is not likely to damage building structures.

Vibrations generated by construction activities are mainly in the form of surface or Raleigh waves. The FTA Noise and Vibration Assessment Manual states that peak particle velocity (PPV) correlates best with building damage and complaints. Table 5-3 summarizes the construction vibration limits shown in FTA guidelines for structures located near the right-of-way of a transit project.

Table 5-3. FTA Construction Vibration Damage Criteria

Building Category	Peak Particle Velocity, in/sec	Approximate Lv*, VdB
I. Reinforced-concrete, steel, or timber (no plaster)	0.50	102
II. Engineered concrete and masonry (no plaster)	0.30	98
III. Non-engineered timber and masonry buildings	0.20	94
IV. Buildings extremely susceptible to vibration damage	0.12	90
Note: * Root-mean-square velocity in decibels (VdB) re: 1 micro-inch per second.		

Source: FTA, 2018.

5.2 State

The California Planning and Zoning Law requires each local government entity to adopt a Noise Element as part of its General Plan. State land use guidelines for evaluating the compatibility of various land uses as a function of community noise exposure are generally incorporated into adopted Noise Elements, as presented below under “Local Regulations and Standards.”

5.3 Local

The proposed project would be located on City-owned land in the City of Los Angeles. The City has established policies and regulations concerning the generation and control of noise that could adversely affect its citizens and noise-sensitive land uses.

5.3.1 City of Los Angeles General Plan Noise Element

The City’s General Plan Noise Element identifies ambient noise levels and major noise sources (e.g., vehicles, rail systems, and airports) in the City and sets goals, objectives, and policies for reducing intrusive noise and the noise impacts of development and changes in land use, and its effects on noise-sensitive land uses.

5.3.2 City of Los Angeles Municipal Code

The City of Los Angeles Municipal Code (LAMC), Chapter IV, Article 1, Section 41.40; and Ordinance No. 161,574 and amended Ordinance No. 156,363 (The City Noise Ordinance) address noise generated at construction sites, including permissible hours of construction. In addition, operational noise from stationary and mobile sources is regulated by the City.

LAMC Section 112.05 states that construction and industrial machinery shall not exceed a maximum of 75 dBA at a distance of 50 feet in a residential zone or within 500 feet of a residential zone, except where compliance is technically infeasible. In addition, LAMC Section 41.40, as referenced, restricts construction activities during different hours of the day (i.e., no person shall perform any construction or repair work that makes loud noises that disturb persons occupying sleeping quarters in any place of residence between the hours of 9:00 p.m. of one day and 7:00 a.m. of the following day).

LAMC Section 112.02 states that operational noise (e.g., heating, ventilation, and air conditioning [HVAC] equipment) shall not cause the noise level on the premises on any other occupied property to exceed the ambient noise level by more than 5 dBA. LAMC Section 112.04 also restricts mechanical noise between the hours of 10:00 p.m. and 7:00 a.m. of the following day. Excess noise during this period is defined as loud, raucous, or impulsive sound within a residential zone or within 500 feet of a residential zone.

The project design shall comply with a construction management plan that includes project design conditions, as necessary, to protect the health, safety, or convenience of affected sensitive receptors, located in the neighborhood that surrounds the project. General conditions to control construction noise and vibration, as may be listed in the construction management plan specifications, could include:

1) Construction or use of temporary noise barriers, enclosures, or sound blankets
2) Use of low noise, low vibration, low emission-generating construction equipment (e.g., quieter) Tier 4 engines, as needed
3) Maintenance of mufflers and ancillary noise-abatement equipment
4) Scheduling high noise-producing activities during periods that are least sensitive when most people are at work during daytime hours
5) Routing construction-related truck traffic away from noise-sensitive areas
6) Reducing construction vehicle speeds
7) Locating equipment as far as feasible from sensitive receptors

Design methods that shall be considered to further lower operations noise levels may include but are not limited to:

1) Selecting mechanical equipment designed to produce low noise levels. This includes mechanical (i.e., HVAC) equipment for heating and cooling interior spaces.
2) Locating mechanical equipment inside the building or shielding it with screens; walls, including parapet walls for rooftop equipment; acoustical louvers; or other noise-control devices.
3) Designing the building shell to contain noise within the building. This includes proper specifications for windows, doors, and ventilation systems.
4) Limiting the maximum noise levels that may be produced by activities within the project.
5) Orienting doors, windows, and other openings away from NSLUs. Where windows or emergency doors need to be oriented toward homes or other noise-sensitive uses, ensure they remain closed when not in use.
6) Considering all of the above noise control methods in the final architectural and engineering designs and specifications for project construction.

5.3.3 Thresholds

According to the L.A. CEQA Thresholds Guide (2006), a project would normally have a significant effect on construction noise if:

- Construction activities lasting more than 1 day would exceed existing ambient exterior noise levels by 10 dBA or more at a noise-sensitive use;

- Construction activities lasting more than 10 days in a 3-month period would exceed existing ambient exterior noise levels by 5 dBA or more at a noise-sensitive use; or
- Construction activities would exceed the ambient noise level by 5 dBA at a noise-sensitive use between the hours of 9:00 p.m. and 7:00 a.m. Monday through Friday, before 8:00 a.m. or after 6:00 p.m. on Saturday, or at any time on Sunday.

The proposed project would be under construction for 24 months; thus, construction activities would last longer than 10 days in a 3-month period. Therefore, the first and second bulleted threshold above applies to the proposed project. Because construction activities and deliveries would be restricted to 7:00 a.m. to 5 p.m. on weekdays, with no work on weekends and holidays, the third bulleted threshold does not apply.

According to the L.A. CEQA Thresholds Guide (2006), a project would normally have a significant operational noise impact if the project causes:

- The ambient noise level measured at the property line of affected uses to increase by 3 dBA in community noise equivalent level (CNEL) to or within the "normally unacceptable" or "clearly unacceptable" category, or any 5 dBA or greater noise increase.

Additionally, the City Noise Ordinance, Section 112.02 states that operational noise (e.g., bus maintenance and repairs) shall not cause the noise level on the premises of any occupied property other than the site to exceed the ambient noise level by 5 dBA or more. This threshold is more conservative than the CEQA Threshold Guide of 5 dBA at an affected land use in that the noise increase is measured at the nearest occupied property rather than the nearest sensitive land use (i.e., NSLU or affected use). An NSLU may be farther away than the next occupied property. Therefore, LAMC Section 112.02 is being used for an operational threshold in this screening assessment. LAMC Section 112.04 also restricts excess mechanical noise between the hours of 10:00 p.m. and. 7:00 a.m. of the following day in residential zones and within 500 feet of a residential zone. Excess noise during this period is defined as loud, raucous, or impulsive sounds. The qualitative threshold is also being used for nighttime operational noise.

6.0 IMPACT ANALYSIS

6.1 Methodology

6.1.1 Operations – Electric Bus Traffic and Maintenance Facility

Operations noise from the proposed project is expected to be generated by the electric buses entering and leaving the maintenance facility, as well as activities within the maintenance facility itself. This analysis considers the aggregate of the electric bus noise emanating from a line source as well as maintenance facility noise emanating from a single point-source at approximately pedestrian height (i.e., approximately 5 feet). The effects of air and ground acoustical absorption are conservatively excluded from the point-source sound propagation algorithm. Operational noise analysis follows FTA procedures and is calculated from the FTA noise model.

6.1.2 Construction

Construction noise from the proposed project has been predicted with a technique based on the FTA “general assessment” method that focuses on the anticipated equipment and vehicles on site per phase. Consistent with data provided by the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM) (FHWA, 2006), the predictive analysis for this study also applies the “acoustical usage factor” to calculate an equivalent sound level (L_{eq}) for a typical hour during which the construction equipment is expected to generate noise. Other included analysis factors are as follows:

- On average, equipment noise emanates from a single point at the geographic center of the nearest activity, illustrated as construction activity focal points on Figure 4-1, representing the mobility of construction activities and equipment locations across the entire project area as work proceeds;
- Point-source sound propagation and the source emission point is 6 feet above grade;
- First-floor receivers are 5 feet above property grade;
- The effect of acoustical ground and air absorption is conservatively not included.

The proposed project construction activities are expected to involve the use of various equipment, including a backhoe, paver, generators, compressors, rollers, skid loaders, and trucks. Reference maximum noise levels for such conventional construction equipment range between 74 and 81 dBA at a distance of 50 feet from the sound-producing source (FHWA, 2018).

During the construction period, the projected construction activity noise levels have been calculated to be up to 83 dBA at 50 feet, as shown in Table 6-1.

Table 6-1. Estimated Construction Noise Levels

Construction Activity Equipment	Number of Equipment Used	Sound Level at 50 ft (dBA)	Usage Factor[1]	Effective Usage Factor[2]	Leq, dBA[3, 4] @ 50 ft	Leq, dBA[3, 4] @ 100 ft
O&M Facilty Construction						
Demolition of Existing Facility						
Pavement Breaker	2	82	0.3	0.15	74	68
Front-end loader	2	79	0.5	0.30	74	68
Dozer	1	80	0.5	0.15	72	66
Dump Truck	2	88	0.3	0.15	80	74
			Overall Leq =		**82**	**76**
			Noise Impact Distance[5] = 110 ft			
Removal of Pavement						
Pavement Breaker	2	82	0.5	0.30	77	71
Dozer	1	80	0.3	0.08	69	63
Dump Truck	2	88	0.3	0.15	80	74
			Overall Leq =		**82**	**76**
			Noise Impact Distance[5] = 105 ft			
Excavation and Site Grading						
Backhoe	2	80	0.5	0.30	75	69
Compactor	2	82	0.3	0.15	74	68
Grader	1	85	0.5	0.15	77	71
Front-end loader	2	79	0.3	0.15	71	65
			Overall Leq =		**81**	**75**
			Noise Impact Distance[5] = 90 ft			
Foundation						
Utility Truck	2	84	0.3	0.15	76	70
Concrete Mixer	1	85	0.5	0.15	77	71
Saw	2	78	0.3	0.15	70	64
			Overall Leq =		**80**	**74**
			Noise Impact Distance[5] = 85 ft			
Structure Construction						
Crane, Derrick	1	88	0.5	0.15	80	74
Saw	2	78	0.3	0.15	70	64
Utility Truck	2	84	0.5	0.30	79	73
			Overall Leq =		**83**	**77**
			Noise Impact Distance[5] = 115 ft			

Notes:

1 - Usage factor is a percentage of time of the 8-hour construction period through which a hypothetical receptor would be noise impacted by the piece of equipment concerned. This value cannot exceed 0.5 in practical terms.

2 - Assuming that the equipment are operating at, or near, their maximum sound levels 30 percent of the time during operation except for the compressor, roller, and generator. These 3 pieces of equipment were assumed to be operational

3 - Calculated noise levels do not assume any mitigation measures.

4 - Distance is measured from the geometric center of construction activities.

5 - Based on the construction noise limit criteria of 80 dBA for daytime hours at residential land uses. Distances are measured from the center of the noise producing activities associated with the construction phase.

Source: Parsons

6.2 CEQA Analysis

6.2.1 Operations – Electric Bus Traffic and Maintenance Facility

CEQA impact analysis is applied to the project using the measured existing ambient noise levels at the project vicinity. Figure 3-1 shows the locations of nearby noise-sensitive receptors. For this analysis, it is assumed that an average of six buses would be cleaned, washed, and/or possibly provided preventive maintenance and repairs in a given hour for 24 hours per day. Based on the existing bus schedule of the South Yard facility, it is assumed that approximately 57 and 67 buses would arrive and depart the maintenance facility during daytime and nighttime hours, respectively, and it is assumed that 7:00 p.m. and 5:00 a.m. would be the times with the loudest operational noise levels. Electric buses are also assumed to be traveling at 20 miles per hour (mph) near the maintenance facility. Table 6-2 summarizes the BEB operation assumptions.

Table 6-2. Operational Noise Impact Analysis Assumptions

Assumed Daytime/Nighttime Maintenance Facility Operations	Assumed Daytime Electric Bus Operations	Assumed Nighttime Electric Bus Operations
6 buses per hour	57 arriving buses	67 departing buses

Table 6-3 presents the estimated noise levels from the maintenance facility and BEB operations at the NSLUs during the daytime hour of 7:00 p.m., and Table 6-4 presents the estimated noise levels during the nighttime hour of 5:00 a.m.

Table 6-3. Estimated Operations Noise Levels at Noise-Sensitive Land Uses during Daytime Hours

Noise Sensitive Location	Daytime Ambient Noise Level, Leq, dBA[1]	Distance to Property Line, feet[2]	Operational Noise Level at Property Line, Leq, dBA	Compliant with CEQA Threshold (Outdoor Ambient < 5 dBA)
710 E 111th Place	59	30 / 265	55	Yes
810 E 111th Place	59	225 / 285	47	Yes
745 E 111th Place	62	30 / 270	57	Yes
750 E Lazit Avenue	61	550 / 315	45	Yes

1 - Daytime ambient was adjusted from the 7:00 p.m. hour which is the assumed hour with the highest electric bus traffic volumes.

2 - Distance to electric bus operations / distance to maintenance facility.

Table 6-4. Estimated Operations Noise Levels at Noise-Sensitive Land Uses during Nighttime Hours

Noise Sensitive Location	Daytime Ambient Noise Level, Leq, dBA[1]	Distance to Property Line, feet[2]	Operational Noise Level at Property Line, Leq, dBA	Compliant with CEQA Threshold (Outdoor Ambient < 5 dBA)
710 E 111th Place	53	30 / 265	55	Yes
810 E 111th Place	53	225 / 285	47	Yes
745 E 111th Place	56	30 / 270	58	Yes
750 E Lazit Avenue	55	550 / 315	45	Yes

1 - Nighttime ambient was adjusted from the 5:00 a.m. hour which is the assumed hour with the highest electric bus traffic volumes.

2 - Distance to electric bus operations / distance to maintenance facility.

Tables 6-5 and 6-6 present the estimated cumulative noise levels of ambient noise and operational noise levels at the NSLUs during daytime and nighttime hours, respectively.

Table 6-5. Estimated Cumulative Noise Levels at Noise-Sensitive Land Uses during Daytime Hours

Noise Sensitive Location	Daytime Ambient Noise Level, Leq, dBA[1]	Operational Noise Level at Property Line, Leq, dBA	Cumulative Daytime Noise Level, Leq, dBA[1]	Compliant with CEQA Threshold (Outdoor Ambient < 5 dBA)
710 E 111th Place	59	55	60	Yes
810 E 111th Place	59	47	59	Yes
745 E 111th Place	62	57	63	Yes
750 E Lazit Avenue	61	45	61	Yes

1 - Daytime ambient was adjusted from the 7:00 p.m. hour which is the assumed hour with the highest electric bus traffic volumes.

Table 6-6. Estimated Cumulative Noise Levels at Noise-Sensitive Land Uses during Nighttime Hours

Noise Sensitive Location	Daytime Ambient Noise Level, Leq, dBA[1]	Operational Noise Level at Property Line, Leq, dBA	Cumulative Nighttime Noise Level, Leq, dBA[1]	Compliant with CEQA Threshold (Outdoor Ambient < 5 dBA)
710 E 111th Place	53	55	57	Yes
810 E 111th Place	53	47	54	Yes
745 E 111th Place	56	58	60	Yes
750 E Lazit Avenue	55	45	55	Yes

1 - Nighttime ambient was adjusted from the 5:00 a.m. hour which is the assumed hour with the highest electric bus traffic volumes.

6.2.2 Construction

The surrounding NSLUs located adjacent to the project site are 265 to 315 feet from the center of construction activity within the site; thus, they may experience temporary exterior noise levels of approximately 67 to 68 dBA L_{eq} from the operation of the loudest expected construction equipment during hours as allowed by the City of Los Angeles. Table 6-7 presents the estimated noise levels for project construction at the noise-sensitive land uses.

Table 6-7. Estimated Construction Noise Levels

Noise Sensitive Location	Lowest Daytime Ambient Noise Level, Leq, dBA	Distance to NSLU, feet	Loudest Construction Phase Noise Level at NSLU, Leq, dBA[1]	Unmitigated Noise Level Increase, Leq, dB	Compliant with CEQA Threshold (Outdoor Ambient < 5 dBA)
710 E 111th Place	53	295	67	14	No
810 E 111th Place	53	285	67	14	No
745 E 111th Place	56	265	68	12	No
750 E Lanzit Avenue	55	315	67	12	No

As shown in Table 6-7, ambient noise levels within the project vicinity range from 53 to 56 dBA, and construction-related noise are estimated to be 67 to 68 dBA. Because the projected construction noise levels are expected to be 12 to 14 dBA above existing ambient noise levels and above CEQA thresholds of less than a 5-dBA increase at noise-sensitive receptors, the project is anticipated to have a significant effect associated with unmitigated construction noise. Construction of a temporary noise barrier, which includes noise barrier fences, moveable noise barriers, and noise control curtains, with an effective height of 12 feet around the perimeter of the construction site should be implemented before the start of construction. Temporary noise barriers may be made, for example, of concrete jersey barriers with 0.75-inch plywood attached to fence posts, and noise control curtain material may be mounted or hung over perimeter chain-link fences. Table 6-8 presents the estimated mitigated noise levels for project construction at the nearby noise-sensitive land uses.

Table 6-8. Estimated Mitigated Construction Noise Levels

Noise Sensitive Location	Lowest Daytime Ambient Noise Level, Leq, dBA	Distance to NSLU, feet	Loudest Construction Phase Noise Level at NSLU, Leq, dBA[1]	Mitigation Measure*	Mitigated Construction Loise Level at NSLU, Leq, dBA	Mitigated Noise Level Increase, Leq, dB	Compliant with CEQA Threshold (Outdoor Ambient < 5 dBA)
710 E 111th Place	53	295	67	12-Foot Barrier	51	-2	Yes
810 E 111th Place	53	285	67	12-Foot Barrier	51	-2	Yes
745 E 111th Place	56	265	68	12-Foot Barrier	59	3	Yes
750 E Lanzit Avenue	55	315	67	12-Foot Barrier	59	4	Yes

* - Mitigation measure would be located along the construction site perimeter.

6.2.3 CEQA Checklist

This section describes the CEQA noise analysis for the proposed project. The CEQA Guidelines include four CEQA issues related to transportation. Using the Initial Study Checklist questions in Appendix G of the CEQA Guidelines and the City's Thresholds, project impacts are analyzed for significance as follows.

	Potentially Significant Impact	Less than Significant With Mitigation	Less than Significant	No Impact
Would the project:				
a) Generation of 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?	☐	☒	☐	☐
b) Generation of excessive ground-borne vibration or ground-borne noise levels?	☐	☐	☒	☐
c) 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?	☐	☐	☐	☒

a) Generation of 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?

Reference: L.A. CEQA Thresholds Guide (2006) (Sections I.1 through I.4); City of Los Angeles General Plan Noise Element; City Noise Ordinance.

Comment: A significant impact would occur if the project exposed persons to or generated noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. The City's Noise Ordinance in LAMC Section 112.05 states that construction machinery shall not exceed a maximum of 75 dBA at a distance of 50 feet in a residential zone. If the estimated construction noise level exceeds the 75-dBA threshold at 50 feet, a noise impact would be assumed to occur.

Less than significant impact with mitigation. Estimated operational noise levels of the electric buses and maintenance facility would be compliant with the CEQA thresholds because the operational noise would not increase noise levels above ambient levels during the daytime hours, as shown in Table 6-3, and may potentially increase noise levels by only 2 dB above ambient levels during the nighttime hours, as shown in Table 6-4, which is not discernible and considered less than significant.

However, estimated construction noise levels as a result of construction equipment usage could increase the ambient noise levels by as much as 14 dB at adjacent noise sensitive land uses, as shown in Table 6-5, which is significantly beyond the 5-dB CEQA threshold. With proper mitigation in the form of temporary noise barriers around the perimeter of the construction activities, construction noise levels would be reduced to be at no more than 3 to 4 dB above ambient at the residential land uses adjacent to the construction site, as shown in Table 6-6, which is compliant with CEQA thresholds. Therefore, with mitigation, the increase in construction noise levels would be less than significant.

b) Generation of excessive ground borne vibration or ground borne noise levels?

Reference: L.A. CEQA Thresholds Guide (2006) (Sections I.1 and I.2); City of Los Angeles General Plan Noise Element; City Noise Ordinance; FHWA RCNM User's Guide, FTA Transit Noise and Vibration Impact Assessment.

Comment: A significant impact would occur if the project exposed persons to or generated excessive ground-borne vibration or ground-borne noise levels.

Less than significant impact. No pile-driving or blasting activities are proposed that may result in ground-borne vibration. Equipment and vehicles to be used for construction are listed in Table 6-1. The anticipated ground vibration due to the operation of the construction equipment and vehicles on the proposed project site has been predicted with a technique based on the FTA "general assessment" method and available data for construction activities. Among the construction equipment and vehicles shown in Table 6-1, during some of the activities, loaded trucks would be expected to produce the largest magnitude of vibration. FTA guidance indicates that such equipment produces a reference vibration velocity level of 86 VdB at a distance of 25 feet. However, it is assumed that the loaded trucks would not be operating closer than an estimated 50 feet to the nearest façade of the closest vibration-sensitive building. Because construction would be short-term and temporary, the vibration velocity level as perceived by nearby building occupants would be approximately 77 VdB, which is less than the 80-VdB threshold/vibration velocity levels for "Infrequent Events" from the most vibratory of onsite construction equipment.

The vibration velocity level would also be considerably less than the 94-VdB threshold/vibration velocity levels that may result in building damage from the most vibratory of onsite construction equipment (see Table 5-3). Therefore, operating equipment associated with the construction of the project is not expected to result in significant annoyance to nearby building occupants nor result in building damage.

In addition, long-term operation at the site (e.g., electric bus parking and charging, and inspection and maintenance activities) would not produce vibration. Thus, it is not anticipated that there would be any excessive ground-borne vibration or ground-borne noise levels due to construction of the maintenance facility or operations of the electric buses and maintenance facility.

c) *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?*

Reference: L.A. CEQA Thresholds Guide (2006) (Sections I.1, I.2, and I.4), City of Los Angeles General Plan Noise Element; Southeast Los Angeles Community Plan; City Noise Ordinance.

Comment: A significant impact may occur if the proposed project site were located within a public airport land use plan area, or within 2 miles of a public airport, and would expose people residing or working in the project area to excessive noise levels.

No impact. No impact is anticipated because the project site is not located within a public airport land use plan area or 2 miles of a public airport, and it is not located within the vicinity of a private airstrip. The nearest public airport is Hawthorne Municipal Airport (also known as Jack Northrop Field) located at 12101 South Crenshaw Boulevard in Hawthorne, California (approximately 3.9 miles to the west/southwest of the EBMF project site). Additionally, the Los Angeles International Airport (LAX), located at 1 World Way in Los Angeles, California, is 8.4 miles west of the project site. The closest private airstrips are Compton/Woodley Airport in Los Angeles, approximately 3.3 miles south of the project site, and the Prairie Gate at the Hawthorne Airport in Hawthorne, approximately 3.9 miles east of the project site. Persons who reside in the area or would be working at the site would not be exposed to excessive noise levels from airport and aircraft operations.

No impact is anticipated.

6.3 NEPA Analysis

6.3.1 No Build Alternative

The No Build Alternative would not implement any changes to the project site. According to FTA's transit operation noise impact criteria, no noise or vibration impact would result if existing conditions are maintained.

6.3.2 Build Alternative

Under the Build Alternative, LADOT proposes to build a bus maintenance facility at the project site to serve its future electric bus fleet.

6.3.2.1 Operations – Electric Bus Traffic and Maintenance Facility

The conventional FTA transit noise impact analysis procedure is applied to the project using the measured existing noise levels in the project area. Figure 3-1 shows the adjacent noise-sensitive receptors. It is assumed for this analysis that the average number of buses that would be cleaned, washed, and/or possibly provided preventive maintenance and repairs conducted in a given hour would be six buses, 24 hours per day. It is further assumed based on the existing bus schedule of the existing South Los Angeles facility adjusted by the fleet size of the proposed facility that 218 and 105 electric buses would arrive and depart the maintenance facility during daytime and nighttime hours, respectively, for Category 2 receptors. It is also assumed based on the existing bus schedule of the South Los Angeles facility that 57 buses would operate during the peak daytime hour for Category 3 receptors. Electric buses are assumed to be traveling at 20 mph near the maintenance facility. Table 6-7 presents the electric bus operation assumptions. The results of this assessment are provided in Table 6-8.

Table 6-7. Operational Noise Impact Analysis Assumptions (FTA)

Assumed Daytime/Nighttime Maintenance Facility Operations per Hour	Assumed Total Daytime Operations	Assumed Total Nighttime Operations	Daytime Operations per Hour	Nighttime Operations per Hour	Assumed Peak Hour Operations	Assumed Electric Bus Speed
6 buses	218 buses	105 buses	17 buses	8 buses	57 buses	20 mph

Table 6-8. Operational Noise Impact Analysis (FTA)

Noise Sensitive Location	Land Use Category[1]	Ambient Noise Level, Ldn / (Leq), dBA[2]	Distance to Bus Operations / Maintenance Facility	Criteria, Moderate / Severe, dBA	Operational Noise Level, Ldn / (Leq), dBA[2]	Cumulative Noise Level, Ldn / (Leq), dBA[2]	Increase in Cumulative Noise Level, dB	Impact Criteria (FTA)
710 E 111th Place	3	(59)	300 / 415	63-68 / >68	(39)	(59)	0	No Impact
810 E 111th Place	3	(61)	295 / 265	64-69 / >69	(44)	(61)	0	No Impact
745 E 111th Place	2	63	40 / 265	60-65 / >65	54	63	0	No Impact
750 E Lanzit Avenue	2	64	550 / 315	61-65 / >65	51	64	0	No Impact

1 - Category 2 – Includes residences; Category 3 – Includes schools and recreational facilities.

2 - Noise levels shown within parentheses represent 1-hour Leq. Leq is applied rather than Ldn for Category 3 land uses. The Leq values provided here represent 1 hour periods.

Results of the FTA assessment show that no operational noise impacts are anticipated at any of the receptors near the project site; therefore, no noise impacts resulting from the proposed project operations are anticipated.

6.3.2.2 Vibration

6.3.2.2.1. Human Annoyance

As indicated above, the anticipated ground vibration due to operation of construction equipment and vehicles on and near the proposed project site has been predicted with a technique based on the FTA “general assessment” method and available data for construction activities. Among the construction equipment and vehicles shown in Table 6-1, during some of the activities loaded trucks would be expected to produce the largest magnitude of vibration. FTA guidance indicates that such equipment produces a reference vibration velocity level of 86 VdB at a distance of 25 feet. It is assumed that the loaded trucks would not be operating any closer than an estimated 50 feet to the nearest façade of the closest vibration-sensitive buildings. Therefore, the vibration velocity level as perceived by building occupants would be approximately 77 VdB, which is less than the 80 VdB threshold/vibration velocity levels from the most vibratory of onsite construction equipment.

Therefore, it is anticipated that no substantial annoyance from operating equipment associated with construction of the project would occur to nearby building occupants.

6.3.2.2 Building Damage

The vibration velocity level that could cause building damage is 94 VdB. The vibration velocity level to be perceived by building occupants from the most vibratory of onsite construction equipment would be considerably less than the 94 VdB. Therefore, operating equipment associated with construction of the project is not expected to result in building damage at any adjacent structure, and no vibration reduction measures are necessary to comply with FTA guidance. No impacts from construction vibration are anticipated.

7.0 RECOMMENDED MEASURES

The following mitigation measure shall be implemented before and during construction activities:

MM-NOI-1: To minimize noise impact to area residents during project construction, the Contractor shall install a temporary noise barrier, which includes noise barrier fences, moveable noise barriers, and/or noise control curtains, with an effective height of 12 feet around the perimeter of the construction site. Temporary noise barriers may be made, for example, of concrete jersey barriers with 0.75-inch plywood attached to fence posts, or the noise control curtain material may be mounted or hungover perimeter chain-link fences.

Construction noise impacts would be less than significant after mitigation.

8.0 REFERENCES

City of Los Angeles, 2006. City of Los Angeles CEQA Thresholds Guide.

United States Department of Transportation, Federal Highway Administration (FHWA), 2006. Roadway Construction Noise Model User's Guide. FHWA-HEP-05-054. January.

United States Department of Transportation, Federal Transit Administration (FTA), 2018. Transit Nosie and Vibration Impact Assessment. FTA-VA-90-1003-06. May.

9.0 PREPARERS

Greg Berg, Principal Noise and Vibration Control Specialist, Parsons

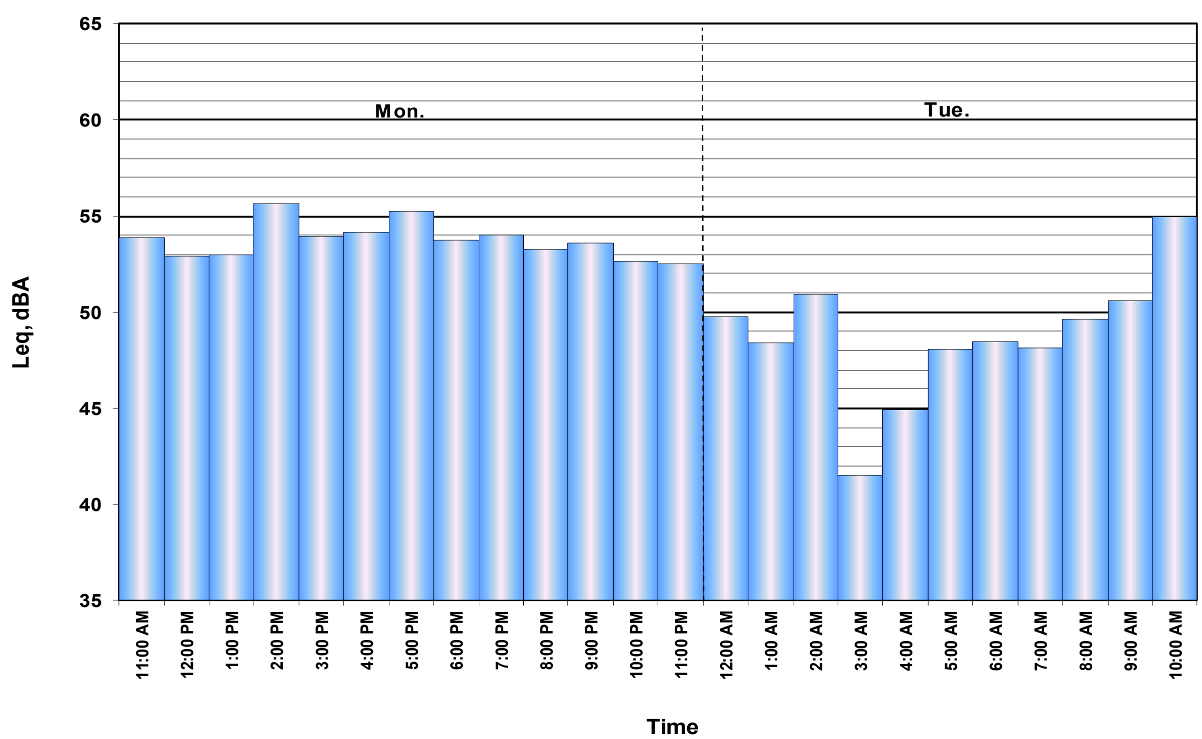
Thanh T. Luc, Technical Director, Noise and Vibration, Parsons

Attachment A – Long-Term Noise Monitoring Results

Site LT1 Hourly Noise Levels, Leq(h)

Location: 740 E. 111th Place **Notes:** See attached Noise Measurement Form.
Position: Side Lot
Sources: Neighborhood Noise Including: Automobiles, Airplanes, Trains
Date: 6/7/21 - 6/8/21

TIME	6/7 - 6/8 Leq(h) dBA
11:00 - 12:00 PM	54
12:00 - 01:00 PM	53
01:00 - 02:00 PM	53
02:00 - 03:00 PM	56
03:00 - 04:00 PM	54
04:00 - 05:00 PM	54
05:00 - 06:00 PM	55
06:00 - 07:00 PM	54
07:00 - 08:00 PM	54
08:00 - 09:00 PM	53
09:00 - 10:00 PM	54
10:00 - 11:00 PM	53
11:00 - 12:00 AM	52
12:00 - 01:00 AM	50
01:00 - 02:00 AM	48
02:00 - 03:00 AM	51
03:00 - 04:00 AM	42
04:00 - 05:00 AM	45
05:00 - 06:00 AM	48
06:00 - 07:00 AM	48
07:00 - 08:00 AM	48
08:00 - 09:00 AM	50
09:00 - 10:00 AM	51
10:00 - 12:00 AM	55
Ldn:	57



Attachment B – Noise Monitoring Field Forms

FIELD SURVEY FORM

PROJECT: LADOT Electric Bus Maintenance Facility		ENGINEER: G. Berg	DATE: 6/7/21
MEASUREMENT ADDRESS: 740 E 111th PL	CITY: LOS ANGELES	☐ Single-Family ☐ Multi-Family ☐ School ☐ Recreational ☒ Commercial ☐ Church	SITE NO.: LT1

SOUND LEVEL METER:	MICROPHONE:	PRE AMP:	NOTES:
☐ LD-870 ☒ LD-820 ☐ LD-LxT ☐ LD-824 ☐ LD-812 ☐ B&K-2250 ☐ LD-2900 ☐ ______	☒ NON-POLAR ☐ POLARIZED ☒ 1/2-INCH ☐ FREEFIELD ☐ 1-INCH ☐ RANDOM ☒ WIND SCREEN	☐ LD-900 ☐ LD-LxT ☒ LD-828 ☐ ZC-0032 ☐ LD-902 ☐ ______	SYSTEM PWR: ☒ BAT ☐ AC
SERIAL #: 1616	SERIAL #: 3378	SERIAL #: 1938	

CALIBRATOR: ☒ LD CA250 ☐ LD CA200 ☐ B&K 4231 ☐ ______ S/N 2127

Freq, Hz.: ☒ 250 ☐ 1000 ☐ 84 ☐ ______

CALIBRATION RECORD: Input, dB / Reading, dB / Offset, dB / Time

Before 114.0 / 114.0 / 7.7 / 10:27am

After 114.0 / 114.0 / — / 10:42am

METER SETTINGS: ☒ A-WTD ☐ LINEAR ☒ SLOW ☐ 1/1 OCT ☒ INTERVALS 20 - MINUTE ☐ C-WTD ☐ IMPULSE ☐ FAST ☐ 1/3 OCT ☐ L_N PERCENTILE VALUES

(observations during measurement)

TEMP: ______ °F R.H.: ______ %

WIND SPEED: ______ MPH

TOWARD (DIR): ______

SKIES: CLOUDY

CAMERA GREG PHONE

☐ VIDEO ☐ RADAR

NOTES:

MEASUREMENT TYPE: ☒ Long Term ☐ Short Term

DATE	START TIME	STOP TIME	L_{MIN}	L_{99}	L_{90}	L_{50}	L_{25}	L_{10}	L_{01}	L_{MAX}	L_{EQ}	NOTES:
6/7	10:28											
6/8		10:40										

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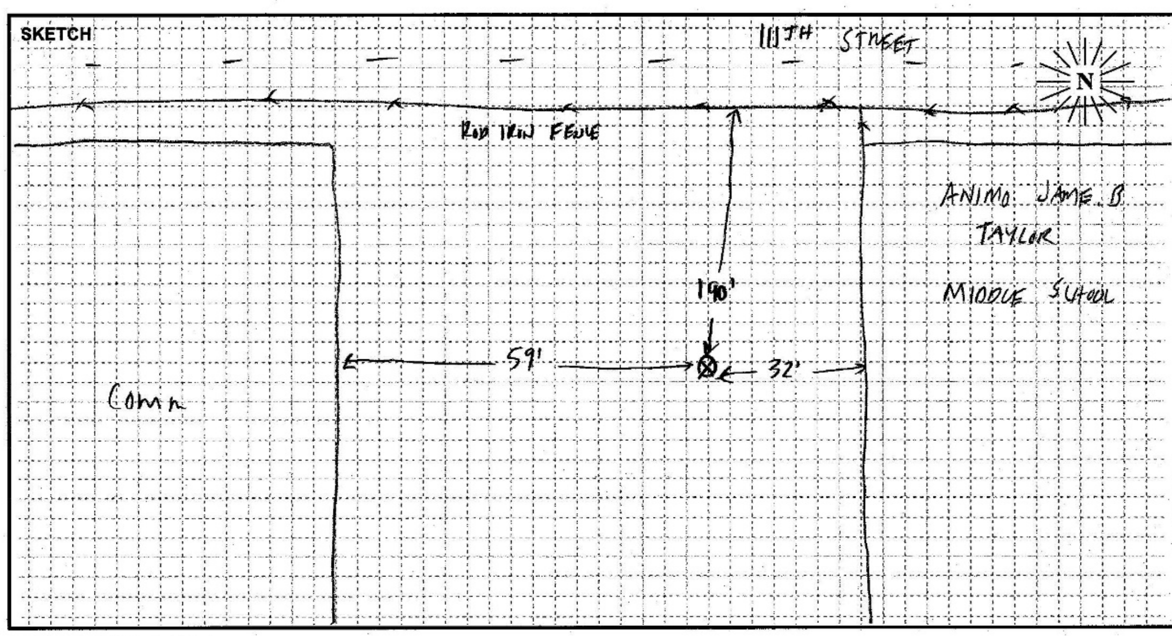


PARSONS

Attachment B – Noise Monitoring Field Forms (Cont'd)

FIELD SURVEY FORM

PROJECT: LADOT Electric Bus Maintenance Facility

ENGINEER: G. Berg

DATE: 6/7/21

MEASUREMENT ADDRESS: 710 E 111th Pl

CITY: Los Angeles

☐ Single-Family ☐ Multi-Family ☐ School ☐ Recreational ☒ Commercial ☐ Church

SITE NO.: ST1

SOUND LEVEL METER: ☐ LD-870 ☐ LD-820 ☐ LD-LxT ☐ LD-824 ☒ LD-812 ☐ B&K-2250 ☐ LD-2900 ☐ ______

SERIAL #: 0639

MICROPHONE: ☒ NON-POLAR ☐ POLARIZED ☒ 1/2-INCH ☐ FREEFIELD ☐ 1-INCH ☐ RANDOM ☒ WIND SCREEN

SERIAL #: 3159

PRE AMP: ☐ LD-900 ☐ LD-LxT ☒ LD-828 ☐ ZC-0032 ☐ LD-902 ☐ ______

SERIAL #: 2330

NOTES:

SYSTEM PWR: ☒ BAT ☐ AC

(observations during measurement)

TEMP: 64.7 °F R.H.: 65.8 %

WIND SPEED: 1.2 MPH

TOWARD (DIR): ______

SKIES: Cloudy

CAMERA Greg Phone

☐ VIDEO ☐ RADAR

CALIBRATOR: ☒ LD CA250 ☐ LD CA200 ☐ B&K 4231 ☐ ______

S/N 2127

Freq, Hz.: ☒ 250 ☐ 1000 ☐ 84 ☐ ______

CALIBRATION RECORD:

Input, dB / Reading, dB / Offset, dB / Time

Before 114.0 / 114.0 / 9.4 / 11:12am

After 114.0 / 114.0 / — / 11:41am

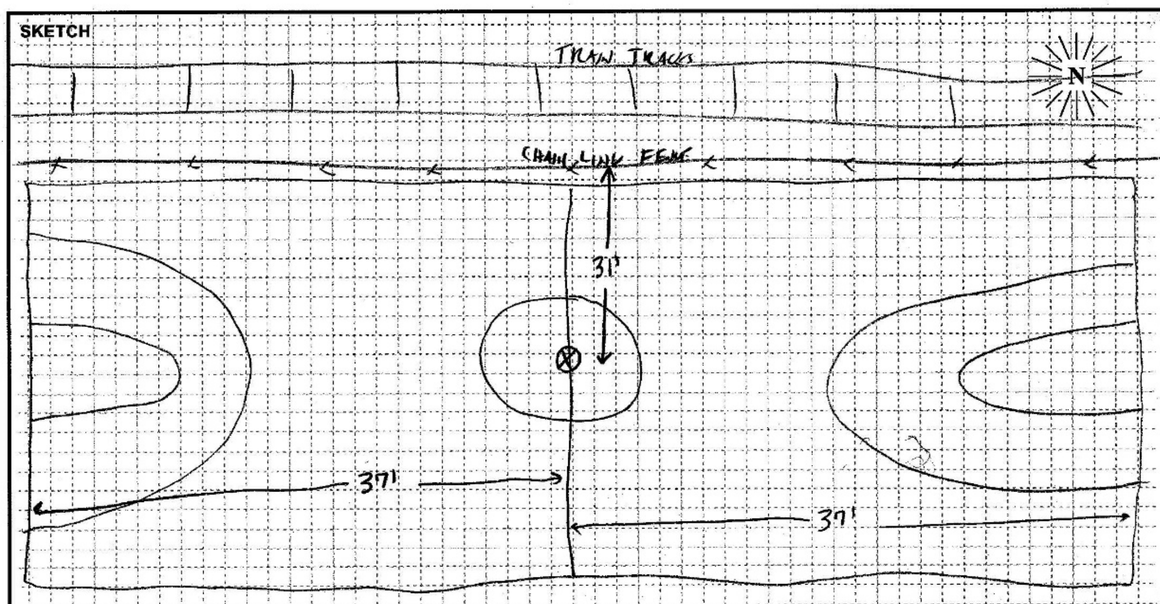
METER SETTINGS: ☒ A-WTD ☐ LINEAR ☒ SLOW ☐ 1/1 OCT ☒ INTERVALS 20 - MINUTE ☐ C-WTD ☐ IMPULSE ☐ FAST ☐ 1/3 OCT ☐ L_N PERCENTILE VALUES

NOTES:

MEASUREMENT TYPE: ☐ Long Term ☒ Short Term

DATE	START TIME	STOP TIME	L_{MIN}	L_{99}	L_{90}	L_{50}	L_{25}	L_{10}	L_{01}	L_{MAX}	L_{EQ}	NOTES:
6/7	11:20	11:40	58.8		54.6	56.2	57.6	59.3		71.5	57.2	

SKETCH



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Attachment B – Noise Monitoring Field Forms (Cont'd)

FIELD SURVEY FORM

PROJECT: LADOT Electric Bus Maintenance Facility
ENGINEER: G. Berg
DATE: 6/8/21

MEASUREMENT ADDRESS: 810 E 111th PL
CITY: LOS ANGELES
☐ Single-Family ☐ Multi-Family ☒ School ☐ Recreational ☐ Commercial ☐ Church
SITE NO.: ST2

SOUND LEVEL METER: ☐ LD-870 ☐ LD-820 ☐ LD-LxT ☐ LD-824 ☒ LD-812 ☐ B&K-2250 ☐ LD-2900 ☐ ______
SERIAL #: 0639

MICROPHONE: ☒ NON-POLAR ☐ POLARIZED ☒ 1/2-INCH ☐ FREEFIELD ☐ 1-INCH ☐ RANDOM ☒ WIND SCREEN
SERIAL #: 3159

PRE AMP: ☐ LD-900 ☐ LD-LxT ☒ LD-828 ☐ ZC-0032 ☐ LD-902 ☐ ______
SERIAL #: 2330

CALIBRATOR: ☒ LD CA250 ☐ LD CA200 ☐ B&K 4231 ☐ ______
S/N 2127
Freq, Hz.: ☒ 250 ☐ 1000 ☐ 84 ☐ ______

CALIBRATION RECORD:
Input, dB / Reading, dB / Offset, dB / Time
Before 114.0 / 114.1 / 9.4 / 7:55am
After 114.0 / 114.0 / — / 8:46am

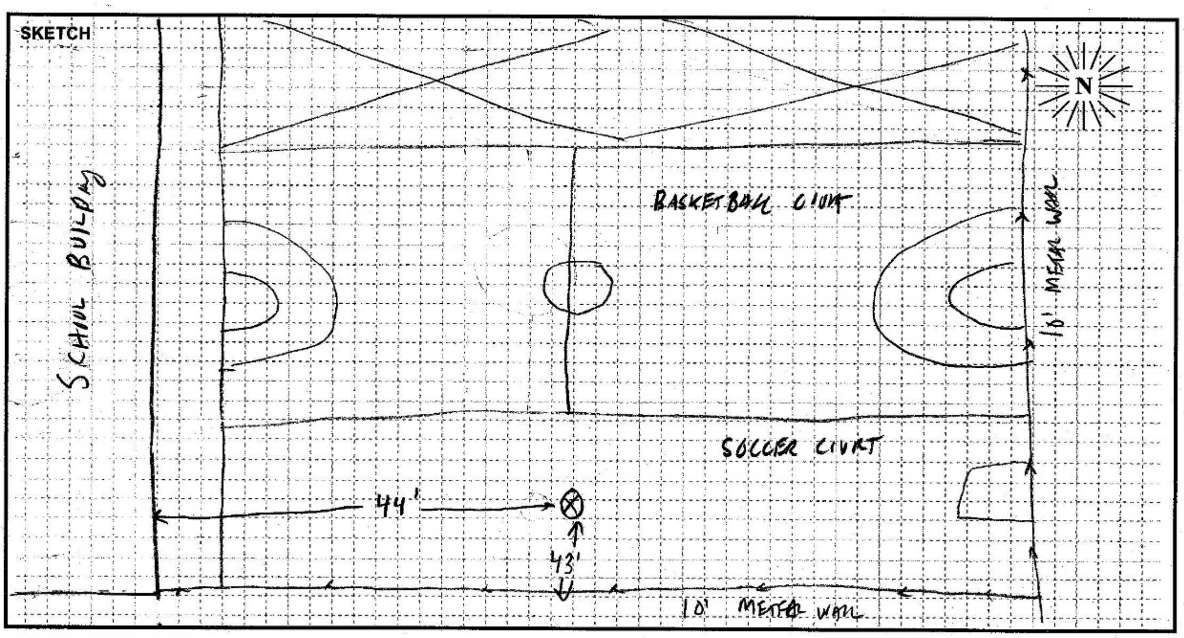
METER SETTINGS: ☒ A-WTD ☐ LINEAR ☒ SLOW ☐ 1/1 OCT ☒ INTERVALS 20 - MINUTE ☐ C-WTD ☐ IMPULSE ☐ FAST ☐ 1/3 OCT ☐ L_N PERCENTILE VALUES

NOTES:
SYSTEM PWR: ☒ BAT ☐ AC
(observations during measurement)
TEMP: 64 °F R.H.: 49 %
WIND SPEED: 0.9 MPH
TOWARD (DIR): ______
SKIES: SUNNY
CAMERA GREG PHONE
☐ VIDEO ☐ RADAR

NOTES:

MEASUREMENT TYPE: ☐ Long Term ☒ Short Term

DATE	START TIME	STOP TIME	L_{MIN}	L_{99}	L_{90}	L_{50}	L_{25}	L_{10}	L_{01}	L_{MAX}	L_{EQ}	NOTES:
6/8	8:20	8:40	43.5		46.3	49.0	54.0	57.7		72.1	55.0	



PARSONS

Attachment B – Noise Monitoring Field Forms (Cont'd)

FIELD SURVEY FORM

PROJECT: LADOT Electric Bus Maintenance Facility
ENGINEER: G. Berg
DATE: 6/8/21

MEASUREMENT ADDRESS: 745 E 111th PL
CITY: Los Angeles
☒ Single-Family ☐ Multi-Family ☐ School ☐ Recreational ☐ Commercial ☐ Church
SITE NO.: ST3

SOUND LEVEL METER: ☐ LD-870 ☐ LD-820 ☐ LD-LxT ☐ LD-824 ☒ LD-812 ☐ B&K-2250 ☐ LD-2900 ☐ ______
SERIAL #: 0639

MICROPHONE: ☒ NON-POLAR ☐ POLARIZED ☒ 1/2-INCH ☐ FREEFIELD ☐ 1-INCH ☐ RANDOM ☒ WIND SCREEN
SERIAL #: 3159

PRE AMP: ☐ LD-900 ☐ LD-LxT ☒ LD-828 ☐ ZC-0032 ☐ LD-902 ☐ ______
SERIAL #: 2330

CALIBRATOR: ☒ LD CA250 ☐ LD CA200 ☐ B&K 4231 ☐ ______
S/N 2127
Freq, Hz.: ☒ 250 ☐ 1000 ☐ 84 ☐ ______

CALIBRATION RECORD: Input, dB / Reading, dB / Offset, dB / Time
Before 114.0 / 114.0 / 9.4 / 8:46am
After ______ / ______ / ______ / ______

METER SETTINGS: ☒ A-WTD ☐ C-WTD ☐ LINEAR ☐ IMPULSE ☒ SLOW ☐ FAST ☐ 1/1 OCT ☐ 1/3 OCT ☒ INTERVALS 20 - MINUTE ☐ L_N PERCENTILE VALUES

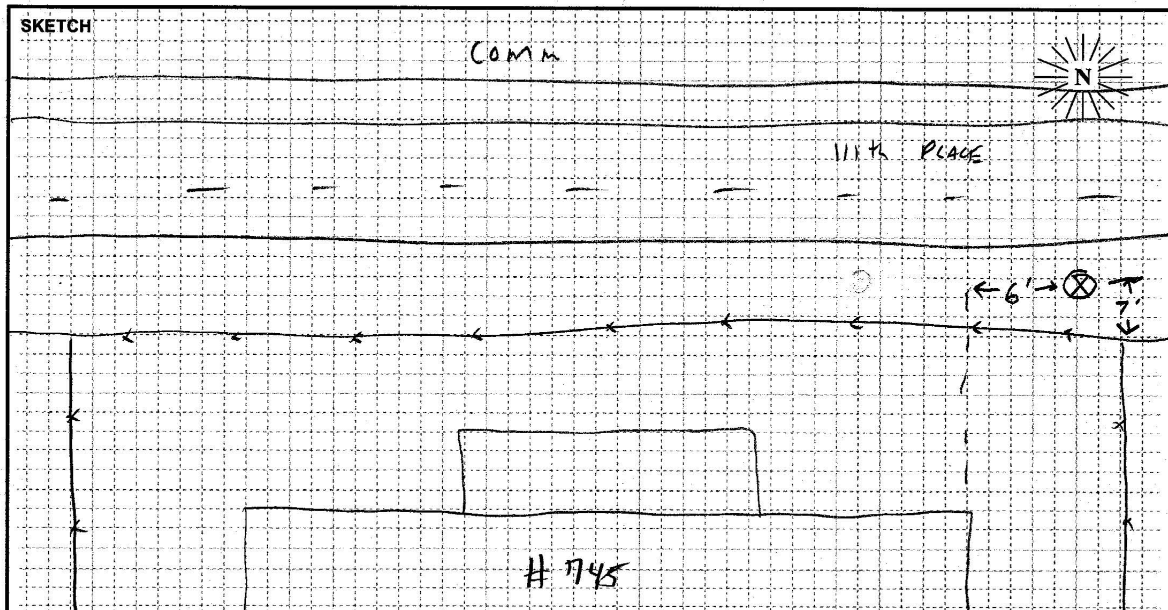
NOTES:
SYSTEM PWR: ☒ BAT ☐ AC
(observations during measurement)
TEMP: 64 °F R.H.: 51 %
WIND SPEED: Ø MPH
TOWARD (DIR): ______
SKIES: SUNNY
CAMERA GREG PHONE
☐ VIDEO ☐ RADAR

NOTES:

MEASUREMENT TYPE: ☐ Long Term ☒ Short Term

DATE	START TIME	STOP TIME	L_{MIN}	L_{99}	L_{90}	L_{50}	L_{25}	L_{10}	L_{01}	L_{MAX}	L_{EQ}	NOTES:
6/8	9:00	9:20	43.1		44.9	51.6	57.8	67.1		86.2	56.2	

SKETCH



PARSONS

Attachment B – Noise Monitoring Field Forms (Cont'd)

FIELD SURVEY FORM

PROJECT: LADOT Electric Bus Maintenance Facility
ENGINEER: G. Berg
DATE: 6/7/21

MEASUREMENT ADDRESS: 750 E LAZIT AVE
CITY: LOS ANGELES
☒ Single-Family ☐ Multi-Family ☐ School ☐ Recreational ☐ Commercial ☐ Church
SITE NO.: ST4

SOUND LEVEL METER: ☐ LD-870 ☐ LD-820 ☐ LD-LxT ☐ LD-824 ☒ LD-812 ☐ B&K-2250 ☐ LD-2900 ☐ ______
SERIAL #: 0639

MICROPHONE: ☒ NON-POLAR ☐ POLARIZED ☒ 1/2-INCH ☐ FREEFIELD ☐ 1-INCH ☐ RANDOM ☒ WIND SCREEN
SERIAL #: 3159

PRE AMP: ☐ LD-900 ☐ LD-LxT ☒ LD-828 ☐ ZC-0032 ☐ LD-902 ☐ ______
SERIAL #: 2330

CALIBRATOR: ☒ LD CA250 ☐ LD CA200 ☐ B&K 4231 ☐ ______
S/N 2127
Freq, Hz.: ☒ 250 ☐ 1000 ☐ 84 ☐ ______

CALIBRATION RECORD:
Input, dB / Reading, dB / Offset, dB / Time
Before 114.0 / 114.0 / 9.4 / 11:41 am
After 114.0 / 114.0 / – / 14:01 pm

METER SETTINGS: ☒ A-WTD ☐ LINEAR ☒ SLOW ☐ 1/1 OCT ☒ INTERVALS 20 - MINUTE ☐ C-WTD ☐ IMPULSE ☐ FAST ☐ 1/3 OCT ☐ L_N PERCENTILE VALUES

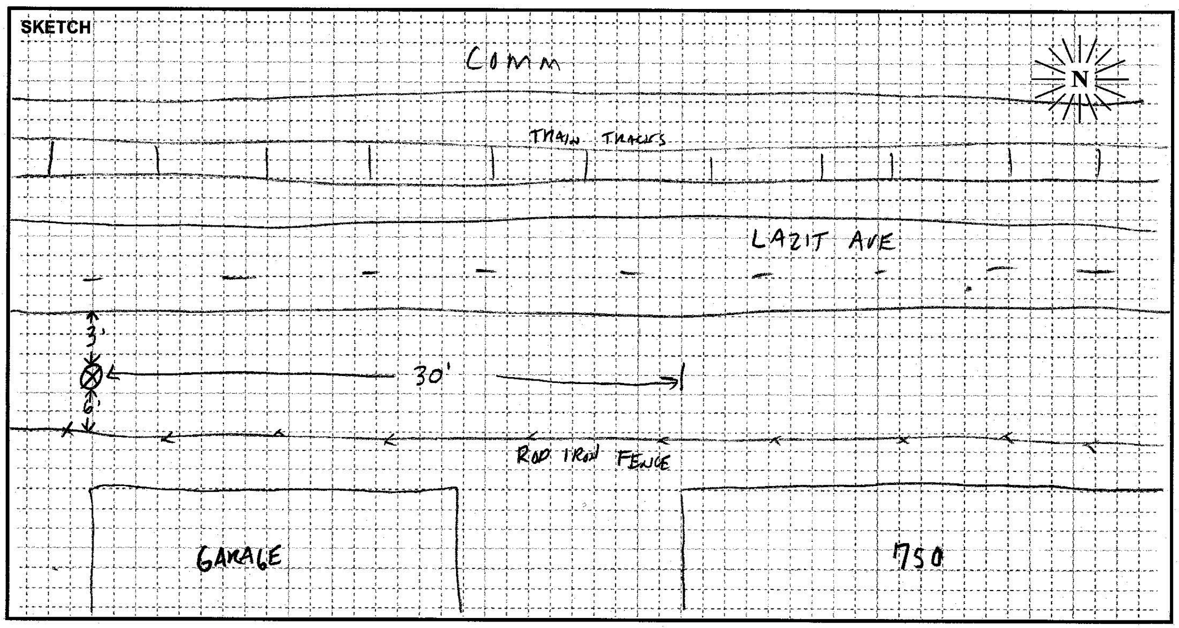
NOTES:
SYSTEM PWR: ☒ BAT ☐ AC
(observations during measurement)
TEMP: 73.4 °F R.H.: 61.2 %
WIND SPEED: 0.9 MPH
TOWARD (DIR): ______
SKIES: CLOUDY
CAMERA GREG PHONE
☐ VIDEO ☐ RADAR

NOTES:

MEASUREMENT TYPE: ☐ Long Term ☒ Short Term

DATE	START TIME	STOP TIME	L_{MIN}	L_{99}	L_{90}	L_{50}	L_{25}	L_{10}	L_{01}	L_{MAX}	L_{EQ}	NOTES:
6/7	13:00	13:20	49.7		51.8	54.8	57.3	63.1		76.6	59.8	
	13:40	14:00	50.7		52.2	54.4	56.8	63.2		74.7	60.0	

SKETCH



PARSONS