# Technical Memorandum

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**Date:** October 6, 2021

**Re:** Sidewalk and Transit Amenities Program
Noise and Vibration Impact Analysis

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## 1.0 PURPOSE AND ORGANIZATION OF THIS MEMORANDUM

The purpose of this memorandum is to document the results of the Noise and Vibration Impact Analysis as it relates to potential environmental impacts associated with construction and operation of the proposed Sidewalk and Transit Amenities Program (STAP) and future projects that may be allowed under the proposed changes to the Los Angeles Municipal Code (LAMC) (collectively, the project). In addition, this memorandum will support the findings of the Initial Study that will be prepared to identify the appropriate environmental document for the project, in compliance with the California Environmental Quality Act (CEQA) and the State CEQA Guidelines.

## 2.0 PROJECT LOCATION AND SETTING

The City of Los Angeles (City) covers approximately 468.7 square miles and is generally located at the southwestern section of Los Angeles County (see Attachment A). Public transit services in the City are provided by the Los Angeles County Metropolitan Transportation Authority (Metro), City of Los Angeles Department of Transportation (LADOT), Southern California Railroad Authority (SCRRA or Metrolink), and bus services from adjacent cities. Current inventory indicated that there are 1,884 existing transit shelters in the City, which are located at scattered bus stop locations that are used by Metro, LADOT DASH and Commuter Express, Culver City, Santa Monica Big Blue Bus, and other regional and municipal bus operators.

Approximately 21 percent (63,888 acres) of all land in the City is developed as streets, storm drainage channels, utility facilities, and reservoirs. The City currently maintains an inventory of 1,884 transit shelters, 197 public amenity kiosks, 6 vending kiosks, and 14 automated public toilets as part of its Coordinated Street Furniture Program (CSFP). Table 1 provides an inventory of these facilities. At the direction of the Los Angeles City Council, the CSFP is entirely funded by revenue from advertising panels at most existing program furniture locations.

**Table 1. CSFP Inventory**

| Structures and Facilities | Number |
|---|---|
| Transit Shelters with advertising | 1,667 |
| Transit Shelters without advertising | 123 |
| Rapid Bus Shelters | 52 |
| Los Angeles Neighborhood Initiative (LANI) Non-Advertising Shelters | 42 |
| Total Transit Shelters | 1,884 |
| Public Amenity Kiosks | 197 |
| Vending Kiosks | 6 |
| Total Advertising Panels (with 13% for public service programs) | 3,679 |
| Automatic Public Toilets (APTs) (owned/operated by a private firm)[1] | 14 |

Source: StreetsLA, 2021.

# 3.0 PROJECT DESCRIPTION

## 3.1 Project Objectives

The STAP would be implemented by the Department of Public Works Bureau of Street Services (StreetsLA) and would provide shelter, shade, safety, and comfort to the City's transit riders, active transportation users, and pedestrians. The program would support public transit and shared use of the sidewalk; improve transit information and public service delivery; be a self-sustaining program through the reinvestment of advertising revenues to improve access and mobility; and create a dynamic program that incorporates flexibility and collaboration with other City goals and programs. These goals would be achieved through the efficient delivery of enhanced program elements and active management by the City.

The primary objectives of the STAP include the following:

- Promote and expand the use of transit, active transportation, and shared mobility by improving the quality and technological capability of associated physical program elements, such as transit shelters, kiosks, and other amenities
- Improve the intrinsic design qualities of street furniture and other public right-of-way infrastructure and streetscapes on a citywide basis
- Provide public benefits to help strengthen neighborhoods while facilitating an economically and physically sustainable project
- Foster a public-private collaborative approach to provide expanded and more equitable public services, regular STAP equipment maintenance, and revenue to the City using commercial advertising opportunities

[1] APTs are currently considered an option for inclusion in the proposed STAP but are not a mandatory component of the incoming program. The City is considering its options to pursue a separate public toilet program. Were the City to create a stand-alone public toilet program, the current APT inventory would be included as part of that program and would not be part of STAP.

## 3.2 Project Implementation Features

Approximately 1,116 new transit shelters would be constructed at designated locations, at existing bus stops without transit shelters, and the existing 1,884 new transit shelters would be replaced. Additionally, approximately 664 of the existing transit shelters would be removed, refurbished and relocated to bus stops that do not currently have shelters during the initial program year(s), with most expected to be eventually replaced with new shelters. However, approximately 20 percent of these 664 relocated shelters (or 133 shelters) may remain at the new locations throughout the STAP rollout process and would not be replaced with new shelters. This would possibly increase new shelters to be constructed at approximately 1,249 locations for a total new transit shelter construction at approximately 3,133 sites. In addition, 450 shade structures may also be placed at bus stops where it is not practical to install a transit shelter. A total of approximately 3,583 transit shelters and shade structures would be installed under STAP.

Construction of the transit shelters under STAP would occur over a three- to six-year time span, from 2022–2024 or 2027 depending upon the negotiated terms of the final contract.

At the end of the deployment period, the City would have approximately 3,583 new transit shelters and shade structures. It is also estimated that 200 to 300 urban panels[2], 150 placemaking kiosks, and other optional program elements may also be installed in parallel with the transit shelters during the latter half of the roll-out process and beyond.

Maintenance and operation of all the transit shelters, existing and new, would be the responsibility of the contractor for 10 years with two potential 5-year extensions, in accordance with agreements with the City. In summary, program implementation would include the following activities:

- Dismantling and removal of existing transit shelters and amenities
- Refresh a number of existing shelter and construction of new transit shelters
- Maintaining the revitalized and new transit shelters
- Installation of urban panels and placemaking kiosks at or within the vicinity of the transit shelters
- Installation of other optional program elements at or within the vicinity of the transit shelters

This section provides an overview of various elements to be performed to implement the STAP.

### 3.2.1 Construction Equipment

Construction equipment associated with implementation of the project under all scenarios would typically include power tools (e.g., concrete cutting saws, circular

[2] Urban panels are digital displays that are positioned on the street level to be viewed by pedestrians and vehicular traffic.

saws, drills, impact drivers, etc.); electric, compressed air, or hydraulic jack hammer; a skid steer loader; backhoe; 5- to 10-cubic yard dump truck; flatbed trailer; boom truck; and hand tools. This equipment would be in use from 2 to 8 hours per day.

### 3.2.2 Construction Crew

It is estimated that a crew of three to seven construction workers would be needed for each of the major actions of either physically dismantling an existing transit shelter or installing a refurbished or new shelter.

### 3.2.3 Hours of Construction

Work would generally occur from 7:00 a.m. to 4:00 p.m., Monday through Friday (8 hours per day). On occasion, work may take place on a Saturday between 8:00 a.m. and 5:00 p.m. In select locations, work hours may be reduced to accommodate rush-hour restrictions. It is anticipated that no construction would occur on Sundays or holidays. (See General Conditions 00210 and Los Angeles Municipal Code Section 41.40.)

### 3.2.4 Site Access, Traffic Circulation, and Parking

All STAP elements would be installed to ultimately provide a clear path of travel with a minimum 5-foot width to allow for pedestrian circulation. Placement of new STAP elements would maintain minimum distance requirements from bus stops; rail station entrances; building/property ingress/egress points; fire hydrants; stand pipes; building fire safety equipment; belowground utilities and related structures; power outlets; utility/street light/traffic signal poles; utility cabinets/aboveground facilities; signs/sign posts; street trees and tree wells; landscaped planters and/or parkways; driveways; access ramps; and other permitted street improvements.

Sidewalk, curb, and lane closure is expected to last for approximately 2 hours per transit shelter removal site. For purposes of installing transit shelters, it is expected that intermittent closure of a sidewalk, curb, and/or traffic lane would occur over a 2.5-day period, with 1 day projected to get the shelter site prepared and 1.5 days to physically install and make the shelter operational. No curb-lane closure(s) would generally be allowed during peak traffic periods (i.e., the hours of 6:00 to 9:00 a.m. and 4:00 to 7:00 p.m.); occasional exemptions to peak traffic hour restrictions may be sought on a case by case basis to accommodate installation schedules. Bus stop operations may temporarily be relocated to the opposite side of a typical intersection, next nearest stop, or suspended during activities to either dismantle or install a shelter. No parking is anticipated to be affected by any STAP work.

### 3.2.5 Landscaping and Lighting

Where possible, STAP elements are intended to enhance or take advantage of tree canopies that provide natural shade and shelter. No trees are proposed to be removed with implementation of the STAP elements under most instances. However, there may be situations where tree root pruning that is required to make sidewalk repairs

necessary to achieve Americans with Disabilities Act (ADA) compliance may destabilize an existing street tree beyond a reasonable level of liability and thus, may likely require the removal of such tree to minimize public safety risks and to bring liability levels down to an acceptable level. When the installation of a transit shelter brings with it the possibility that a street tree may have to be removed, the contractor would have to comply with existing City regulations, including the need for a street tree removal permit from the Board of Public Works; public notification of the proposed removal of three or more street trees; a Board of Public Works public hearing for consideration of removal of three or more street trees at a specific address; and provision of replacement trees on a 2:1 basis with 24-inch box size tree stock to be watered for a minimum 3-year period.

As part of the Green New Deal, StreetsLA began to add cooling features, trees, and more shade at bus stops in October 2019. A coordinated effort between the STAP and other City efforts to achieve the Green New Deal goals would be undertaken.

The proposed project would comply with pertinent City's ordinances related to lighting. All transit shelters would come equipped with evening hour security lighting to illuminate passenger waiting areas beneath canopies. Shelter roofs may be equipped with solar panels or green roofs in limited quantities depending on need and/or appropriateness. Other optional shelter features may include free Wi-Fi, charging ports or stations, and possibly cooling systems.

Motion on digital screens would not be allowed, and limitations would be placed on their brightness. Digital elements would have ENERGY STAR ratings for efficiency with light-emitting diode (LED) screens. These devices must automatically control their brightness in response to the time of day and sunlight. All elements of STAP would also be controlled through a Content Management System, which would automatically adjust the brightness of specific devices by location to match the allowable increase over ambient light levels (not to exceed 4.0 lux).

### 3.2.6 Utilities/Utility Coordination

Subsurface utility work associated with the installation of new STAP elements would primarily be coordinated with the City's Department of Water and Power and the Bureau of Street Lighting to provide electrical power and water services that may be necessary for STAP program elements. STAP installation efforts will also be coordinated with any other utilities or subgrade infrastructure that may be located in the City's rights-of-way. Certain water and power system connections may be necessary within the roadway and sidewalk areas to accommodate new project components, such as shelter lighting, digital displays, and hydration stations.

No new utility boxes or power line relocations are required for the removal of existing transit shelters. It is anticipated that any existing shelters to be replaced with a new shelter would utilize the existing electrical services. New electrical service would be required for the proposed new shelter locations. However, it is anticipated that existing electrical circuits and water service lines will be used; therefore, no utility line upgrades are anticipated.

### 3.2.7 Code Compliance

STAP's elements would comply with all applicable Structural, Seismic, Plumbing, and Electrical Codes, and other specific City-adopted policies and standards applicable to the public right-of-way. This includes compliance with Department of Public Works Standard Specifications, Standard Specifications for Public Works Construction, City amendments to the Standard Specifications for Public Works Construction (Brown Book) and various Standard Plans.

### 3.2.8 Operation and Maintenance

Maintenance of all STAP elements would be performed in accordance with performance based contract maintenance standards that takes into account historical data, including public comments and complaints received by the City's 311 Center, STAP web forms, crowd-sourced information, and data collected by StreetsLA's Asset Management Program.

Maintenance of program elements would include cleaning, removing graffiti and stickers, and removing litter in, on, and around each element. All physical shelter and associated street furniture amenities and digital devices would be maintained and kept in good working order by the removal of dust, grime, dirt, stickers, tags, and etchings. The digital technologies would possess a self-reporting feedback loop to alert the StreetsLA's Asset Management System of the need for repair, refurbishment, reconditioning, or replacement, and periodic onsite visual inspections by City staff would be used in tandem to ensure all STAP elements are properly maintained.

## 3.3 Construction and Implementation Scenarios

The three scenarios described below are developed for illustrative purposes to represent the most frequent STAP activities, including dismantling, removal, and relocation of existing transit shelters (Scenario 1) and the placement of new shelters at new locations/ bus stops that currently do not have transit shelters (Scenarios 2a and 2b). An additional scenario (Scenario 3) was also developed for a programmatic analysis of program elements that relate to operation and maintenance activities of transit shelters and associated furniture in place. These scenarios are representative of various configurations, depending on the conditions of each site. All components described below would not occur at each project location.

### 3.3.1 Shelter Dismantling and Removal

Under the STAP, approximately 1,884 existing transit shelters are slated to be dismantled and removed from their current locations over a 3- to 6-year time horizon beginning in 2022. Of these, up to 664 shelters are expected to be refurbished and re-distributed during the initial program years to provide a more immediate expansion of shade and shelter at bus stops currently absent such amenities until such time the refreshed transit shelters may be replaced by new transit shelters as a part of the STAP roll-out process. Any combination of the following activities would be required for this construction scenario:

- Dismantling and removal of existing transit shelters, kiosks, and associated amenities
- Temporary or permanent disconnection and proper capping of utility services to existing transit shelters, kiosks, and associated amenities for safety and future access where needed
- Transport of shelter components to a relocation/assembly site, recycling center, and/or appropriate disposal facility
- Refurbishing shelters and other street furniture removed from existing shelter sites
- Site preparation, including removal of existing sidewalks, foundations, and reestablishment of utility connections as needed

The dimensions of most existing transit shelter structures are approximately 5 feet by 13 feet and 9 feet in height, with an attached or detached bench and litter receptacle(s). For impact analysis purposes, it is estimated that approximately 10 square feet of the existing shelter area would be disturbed with a maximum of 0.5-foot excavation depth required. The excavation volume of soil and debris of approximately 5 cubic feet would be removed for disposal at the local landfill. The shelter's electrical components would be disposed of separately. Any steel or aluminum shelter components would be salvaged and recycled.

It is estimated that the average time to take down and transport an existing shelter would range between 2 and 3 hours, with one of these hours reserved per day for traffic lane management. A crew of three to five staff would be needed at each dismantling operation. Intermittent lane closure or curb restrictions would be required. No streets would be completely closed to vehicular traffic during the transit shelter dismantling process, but traffic flag persons and/or devices may need to be in place during the dismantling period to protect vehicles, bicycles, and pedestrians if adequate width for deployment of the equipment is not otherwise available. Bus stops would need to be temporarily relocated or suspended. No parking impacts are anticipated.

### 3.3.2 Shelter Construction and Installation

A total of 1,116 new transit shelters that would be constructed at designated locations, at existing bus stops without transit shelters, and the existing 1,884 transit shelters would be replaced. As stated above, approximately 664 of the existing transit shelters would be removed, refurbished and relocated to bus stops that do not currently have shelters during the initial program year(s), with most expected to be eventually replaced with new shelters. Approximately 20 percent of these 664 relocated shelters (or 133 shelters) may remain at the new location throughout the STAP rollout process and would not be replaced with new shelters. This would possibly increase new shelters to be constructed at approximately 1,249 locations for a total new transit shelter construction at approximately 3,133 sites. In addition, approximately 450 shade structures may also be placed at bus stops where it is not practical to install a transit shelter.

The dimension of each new structure would be approximately 5 feet wide, 14-20 feet long, and 9 feet tall, with placemaking kiosks up to 16 feet tall. It would be equipped

with seating, illumination for security and safety, and provide a separate stand-alone litter/recyclable receptacle.

Construction and installation of each new transit shelter would include any combination of the following activities:

- Installation of refurbished and renewed transit shelter or a new transit shelter at a bus stop that previously had a shelter or amenities
- Installation of refurbished and renewed transit shelter or a new transit shelter at a location that did not previously have a shelter or amenities
- The following program elements may be provided in the area adjacent to the shelter canopy:
    - Installation of litter/recycling receptacles, digital displays, interactive information kiosks, vending kiosks, urban panels, placemaking kiosks, and eLockers
- Any of the following elements may also be incorporated within, or in the vicinity of transit shelters:
    - Shade structures; docks and/or corrals for scooters or bicycles; bollards; pillars; traffic barriers; electric vehicle charging stations[3]; hydration stations; handwashing stations or hand sanitizer dispensers; cooling stations; public Wi-Fi and Broadband 5G; charging ports or stations; public art and features that reflect local and/or architectural history;
- Sidewalk reconstruction related to the installation of new or replacement transit shelters[4], including fixing broken concrete, cracks, and making required accessibility improvements such as cross-slope work for ADA compliance
- Minor utility work, such as underground or overhead utility connections may be required

Each of the new and updated shelters would be equipped with a canopy, a bench, and a litter receptacle with the size of the canopy varied. The City intends to incorporate various amenities as part of STAP to take advantage of expanding innovations in transit and smart technology, including customized automated digitized advertising panels, some of which may be interactive with the capability of providing wayfinding, real-time bus arrival, and other public information. Media panels, approximately 4.5 feet by 2 feet wide and 8 feet tall, will each have two display panels containing a combination of digital graphics and/or static printed commercial advertising; wayfinding, bus arrival, or other public services message content, which may either be incorporated into the transit shelter or installed as separate, stand-alone

[3] Electric vehicle charging stations would be incompatible with bus stop zones where no-parking is allowed; but ***may*** be a program feature provided away from/outside of bus stop zones.

[4] The STAP will not be making comprehensive sidewalk repairs throughout a bus stop zone. ADA related sidewalk reconstruction in particular, will be limited to the area immediately beneath the transit shelter, transition areas needed to access the ADA-compliant area beneath a transit shelter, and an ADA-compliant Pedestrian Access Route (PAR) from the waiting area beneath a transit shelter to the ADA-compliant 5-foot by 8-foot boarding/alighting area adjacent to the bus stop sign post. Sidewalk panels disturbed by transit shelter installations will likely be repaired replaced but the scope of additional sidewalk repairs beyond that will be reviewed and determined on a case by case basis depending upon the ability of the City to cover the costs of such work.

structures. Newsstand vending kiosks, public amenity and placemaking kiosks, and urban panels may be included as part of the project. Installation of transit shelters and associated amenities may require sidewalk reconstruction.

For impact analysis purposes, it is estimated that the installation of each transit shelter would disturb an area of approximately 105 to 128 square feet (i.e., 7-8 feet by 15-16 feet); the excavation volume of soil and debris would range from a minimum 25 cubic feet to a maximum of 220 cubic feet, depending on the shelter model and foundation; the maximum depth of excavation would be 3 feet. Construction would require temporary closure of the public sidewalk and temporary use of the public street in front of the bus stop/transit shelter site for up to 8 hours during each of the 2 to 3 days of construction because installation of transit shelters and associated amenities may require sidewalk reconstruction. A crew of 3 to 7 workers would be needed to complete the work at each shelter per day.

Intermittent lane closure or curb restrictions would be required over the approximately 2.5 days required to install shelters. No streets would be completely closed to vehicular traffic during the transit stop/shelter installation process, but traffic flag persons and/or devices may need to be in place during the installation period to protect vehicles, bicycles, and pedestrians if adequate width for deployment of the equipment is not otherwise available. All construction vehicles would be removed daily from the construction site location. Bus stops would need to be temporarily relocated or suspended. No permanent parking impacts are anticipated.

### 3.3.3 Shelter Operations and Maintenance

Maintenance of all of the program transit shelters and other amenities would be performed by the contractor on an ongoing basis over the 10-year period. The activities would include any combination of the following:

- Cleaning of shelter, associated program elements, and sidewalk area on a regularly scheduled (minimally twice per week) and emergency basis, including use of power-washing equipment
- Removal or abatement of graffiti and/or stickers
- Abatement of etching to the highest degree possible
- Litter and recyclable collection and disposal
- Shelter repair work, including fixing broken ad panels, inoperable lights, shelter structures, benches, litter receptacles, and other program elements
- Minor utility repair, such as replacing light elements, fuses, and utility box repairs
- Periodic re-painting or re-coating of transit shelters and their related components

A typical maintenance schedule is presented in Table 2.

**Table 2. Typical Maintenance Schedule**

| Type of Maintenance | Description | Frequency | % of Total Inventory per Frequency |
|---|---|---|---|
| Preventive | Replacement of worn structural elements; original equipment manufacturer (OEM) recommended maintenance of digital displays | Monthly or as needed | 15% |
| Regular | Removal of graffiti, stickers, etchings, and tags; replacement of broken structural elements; cleaning of digital displays; removal of litter and debris | Minimally 2 times per week | 100% |
| Hot Spots | All preventive and regular | Minimum of 3 times per week | Based on need |
| Deep Cleaning | Power washing to pads and program elements; painting or repairs to structural damage; removal and refurbishment of program elements | Rotating schedule: quarterly for power washing; additional power washing at specific locations as needed biannually or as needed for painting and all other repairs | Power washing: 100% Painting & all other repairs: 50% |
| Emergency | Replacement of broken glass, damaged structures, broken digital displays; safely secure and/or restrict access to furniture that cannot be repaired immediately to minimize liability concerns. | Upon notification and no later than 24 hours after notification | 100% |

Source: StreetsLA, 2021.

### 3.3.4 Changes to the Los Angeles Municipal Code

In addition to the transit shelter improvements under STAP, the City is proposing changes o Los Angeles Municipal Code (LAMC) Sections 67.01 and 67.02, which would modify the type of advertising structures allowed in the right-of-way, in order to effectuate portions of the STAP program and potentially authorize the consideration of other projects in the future.

While CEQA does not require the lead agency to speculate on the potential impact of a project, it does generally require a lead agency to evaluate the potential impacts of future development under a new regulatory regime if there is substantial evidence in the record that such future development is reasonably foreseeable. Based on the available knowledge and reasonable investigation, the City conservatively estimates that the potential projects listed below may occur in the future; however, any such approval in the future, if approved at all, will be subject to all applicable laws, including future CEQA analysis and all other City code and permitting requirements.

- Los Angeles Tourism and Convention Board (LATCB) Information Kiosks
- LADOT Mobility Hubs
- Metro Bikeshare
- LADOT Blue LA Electric Vehicle Charging Stations
- Bureau of Street Lighting Advertising on Street Lighting Assets

Based on these potentially foreseeable projects, it is estimated that future advertising displays would be installed at approximately 500 sidewalk locations between 2022 and 2024, or as many as 167 sites per year (concurrent with the STAP rollout period). For impact analysis purposes, these foreseeable advertising displays are being considered in the impact analysis of the proposed project using the same construction assumption as is being used for the transit shelter installation.

# 4.0 EXISTING CONDITIONS

There are approximately 1,884 existing transit shelters and several other transit stops without shelters located within the City. Land uses along sidewalks and near the transit stops include a wide range of categories, including residential, school, recreational, medical, commercial, public, institutional, open space/undeveloped, and industrial. The primary source of ambient noise within the transit stops and along sidewalks are vehicle traffic on adjacent streets, with varying vehicle capacity and number of travel lanes.

## 4.1 Ambient Noise Levels

The ambient noise levels in the City are largely defined by noise from vehicles on City streets and freeways, which is dependent on traffic volume, speed, and vehicle mix. Intermittent vehicle noise is also generated by sirens, vehicle alarms, equipment use, and horns. Other mobile sources of noise in the City include passing trains and aircraft fly-overs. Common stationary sources of noise include, but are not limited to, construction activities, use of mechanical equipment such as heating, ventilation, and air conditioning units, and outdoor activities.

Due to the varying noise sources and resulting noise levels throughout the City, it is not possible nor practical to determine existing noise levels at the approximately 3,583 existing and future transit shelter/shade structure locations and the 500 potential sites for future advertising displays. However, a general representative existing ambient noise environment within the City was documented by long-term (i.e., from 42 to 51 hours) noise measurements conducted at 10 different locations, as part of the environmental review process for the City's Sidewalk Repair Program (SRP). The measurement locations were chosen to represent areas with varying noise sources and land uses, with at least one measurement in each of the seven Area Planning Commissions (APCs) of the City. The noise measurements were conducted from January to February 2018 and are documented in the Noise and Vibration Technical Report (March 2019), as provided in Appendix J of the Draft EIR for the SRP. Table 3 provides the noise measurement locations and the average noise levels from 7:00 a.m. to 3:00 p.m., when construction activities under the project would occur.

## 4.2 Vibration

Vibration is generally caused by the use of heavy equipment and heavy trucks, with vibration levels depending on equipment/vehicle type, weight, power, and site conditions. Heavy trucks on major streets is likely to cause perceptible levels of vibration.

## 4.3 Sensitive Uses

Noise-sensitive land uses generally include residences, transient lodgings, schools, libraries, churches, hospitals, nursing homes, auditoriums, concert halls, amphitheaters, playgrounds, parks, and other uses that generally require a quiet noise environment for various functions and activities.

**Table 3. Sampled Noise Measurement Locations and Noise Levels**

| Location | Description | Address | Average Hourly and (Range of Hourly) Noise Level from 7:00 am to 3:00 pm (dBA) |
|---|---|---|---|
| LT1 | Residence within 500 feet of a regional transit hub | 10127 Remmet Avenue, Chatsworth | 64 (58–67) |
| LT2 | In heavy industrial area | 11202 Tuxford Street, Sun Valley | 73 (72–74) |
| LT3 | Opposite Civic Center | 14401 Sylvan Street, Van Nuys | 71 (64–79) |
| LT4 | Senior living (multi-family) | 10475 Wilshire Boulevard, Los Angeles | 73 (71–78) |
| LT5 | Residence close to LAX | 7601 Earldom Avenue, Playa Del Rey | 68 (66–69) |
| LT6 | In commercial area | 6614 Melrose Avenue, Los Angeles | 75 (73–77) |
| LT7 | LAC+USC Medical Center Hospital Tower | 2051 Marengo Street, Los Angeles | 64 (63–66) |
| LT8 | Residence adjacent to Expo Line light rail | 3778 S Harvard Boulevard, Los Angeles | 69 (68–73) |
| LT9 | Residence adjacent to school | 841 W 134th Street, Gardena | 61 (54–65) |
| LT10 | Residences adjacent to a High Injury Network street | 1020 S Cabrillo Avenue, San Pedro | 61 (58–64) |

Source: Noise and Vibration Technical Report for Sidewalk Repair Program (March 2019)

# 5.0 NOISE AND VIBRATION CONCEPTS

Noise, generally defined as unwanted sound, is measured and expressed in decibels (dB) to conveniently discuss quantities across the wide range of human hearing capacity. To better approximate the range of sensitivity of the human ear to sounds of different frequencies, standard “A-weighting” dB adjustments can be applied to measured sound levels that de-emphasize low frequencies and very high frequencies. When such A-weighting is used, the dB levels are noted with a “dBA” descriptor.

While a 10 dBA increase in sound level represents a 10-fold increase of sound energy, average healthy human hearing perceives such an order of magnitude increase as a doubling of loudness. Noise levels from point-type sources (e.g., a stationary air-conditioning unit) attenuate hemispherically at a rate of approximately 6 dB per doubling of distance, while line-type sources (e.g., roadway noise) attenuate cylindrically at a rate of approximately 3 dB per doubling of distance. For purposes of illustration, a stationary air conditioning unit might produce 60 dBA at a distance of 15 feet; therefore, its sound level at a distance of 60 feet would be 48 dBA (i.e., each doubling of distance from this point-type source lowers the sound level by 6 dBA).

Community Noise Equivalent Level (CNEL) represents an energy average of the A-weighted noise levels over a 24-hour period with 5 dBA and 10 dBA increases added for nighttime noise between the hours of 7:00 and 10:00 p.m. and 10:00 p.m. and 7:00 a.m., respectively. The increases were selected to account for reduced ambient noise levels during these time periods and increased human sensitivity to noise during the quieter periods of the day.

Vibration is an oscillatory motion through a solid medium in which amplitude can be described in terms of displacement, velocity, or acceleration. The average vibration amplitude (i.e., the root mean square [RMS] velocity) is the most appropriate descriptor for gauging human response to typical ground vibration. As with airborne sound, the RMS vibration velocity level is often expressed in dB notation as vibration dB (VdB), which serves to compress the range of numbers required to describe vibration. This VdB scale is based on a reference value of 1 micro-inch per second. According to Federal Transit Administration (FTA) guidance, the background vibration velocity level typical of residential areas is approximately 50 VdB (FTA, 2006). Ground-borne vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels (FTA, 2006).

# 6.0 RELEVANT REGULATORY SETTING

## 6.1 State

California 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 presented below under Local Regulations and Standards.

## 6.2 Local

The City of Los Angeles has established policies and regulations concerning the generation and control of noise that could adversely affect its citizens and noise-sensitive land uses.

### City of Los Angeles Municipal Code (LAMC)

City of Los Angeles *Noise Ordinance*: 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.

The City *Noise Ordinance*, 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).

There are no adopted City standards for ground-borne vibration. In the absence of such local regulations, FTA provides guidance on appropriate vibration limits with respect to sensitive receptors. According to FTA, vibration impacts associated with human annoyance would be significant if vibration caused by construction activity assessed at a receptor exceeded 85 VdB, a vibration velocity (Lv) level that is considered acceptable only for an infrequent number of events per day (FTA, 2006).

## 7.0 IMPACT ANALYSIS

This section addresses the potential impacts from construction activities, operational noise from the project, and the CEQA noise impact checklist.

## 7.1 Basis of Analysis

Based on review of the STAP implementation plan, construction activities for the STAP program elements and future advertising displays associated with foreseeable City projects would typically occur Monday through Friday, with construction crews arriving at construction sites around 7:00 a.m. Construction start times may be delayed to 9:00 a.m. for sites in busy areas without on-street parking.

Dismantling, removal, and relocation of existing transit shelters (Scenario 1) and the placement of new shelters at new locations/bus stops that currently do not have transit shelters and/or installation of advertising displays (Scenarios 2a and 2b) are prototypical construction scenarios. Each dismantling/removal of an existing shelter would be unique, and the construction and installation needs would vary depending on several factors including, but not limited to, the condition of the sidewalk and shelter, the adjacent land uses, how busy the adjacent street is, the level of pedestrian traffic, and whether utilities need to be moved/abandoned.

The most conservative construction scenario of the transit shelters under STAP and future advertising displays would occur over a 3-year time span, from 2022–2024. Table 4 illustrates the anticipated improvements during the first 3 years of the program.

**Table 4. Overview of Anticipated Improvements during First 3 Years of the Program**

| Year | Existing Facilities Removed/Replaced | New Transit Shelter Locations | Total New Shelters | Refurbished Shelters to be Replaced** | Refurbished Shelters to be retained/New Shelters constructed | Shade Structures | Total Annual Improvements | Total Citywide Transit Shelter/Sidewalk Locations | Maximum Weekly Improvements | Maximum Daily Improvements |
|---|---|---|---|---|---|---|---|---|---|---|
| STAP Program Elements | | | | | | | | | | |
| 1* | 664 | 664 | 1,328 | - | - | 150 | 1,478 | 2,698 | 30 | 6 |
| 2*** | 610 | 226 | 836 | 266 | 67 | 150 | 1,319 | 3,141 | 25 | 5 |
| 3*** | 610 | 226 | 836 | 265 | 66 | 150 | 1,317 | 3,583 | 25 | 5 |
| Total | 1,884 | 1,116 | 3,000 | 531 | 133 | 450 | 4,114 | 3,583 | | |
| Other Foreseeable Projects | | | | | | | | | | |
| 1 | -- | 167 | | | | | 167 | 167 | 4 | 1 |
| 2 | -- | 167 | | | | | 167 | 334 | 4 | 1 |
| 3 | -- | 166 | | | | | 166 | 500 | 4 | 1 |
| Total | | 500 | | | | | 500 | 500 | | |

Notes:

* 664 new locations in Year 1 use repurposed shelters that are relocated to bus stops without shelters.

** Assumes that 80% (531 refurbished shelters) would be replaced and 20% of refurbished shelters will be retained and 133 new shelters would be constructed at other places (66-67 shelters per year

*** Upgrades in Year 2 and Year 3 include replacement shelters at existing locations (610 shelter sites) and at new sites(226 new sites).

Table 5 summarizes the anticipated daily construction activities that would likely occur for each construction scenario for the STAP and foreseeable City projects. As shown, the project would lead to improvements at a maximum of approximately 6 to 7 sidewalk locations per day over a 3-year period.

Noise from STAP element and future advertising display construction has been predicted using the FTA "general assessment" method that focuses on the anticipated equipment and construction duration onsite 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 factors included in the analysis are as follows:

- On average, construction equipment noise emanates from a single point at the geographic center of the construction activity representing the mobility of construction activities and equipment locations across the entire transit shelter construction site as work proceeds
- Point-source sound propagation and the source emission point are 6 feet above grade
- First-floor receivers are 5 feet above property grade
- Due to the relatively short source-to-receptor distances studied, the effect of acoustical ground and air absorption is conservatively not included

The construction activities for the STAP program elements and future advertising displays are expected to involve equipment that includes concrete mixer; power tools (e.g., concrete cutting saws, chain saws); electric, compressed air, or hydraulic jack hammer; skid steer loader; backhoe; 5- to 10-cubic yard dump truck; flatbed trailer; boom truck; and hand tools (see Table 5). Reference maximum noise levels for such conventional construction equipment range between 65 and 89 dBA at a distance of 50 feet from the sound-producing source (FHWA, 2006).

**Table 5. Daily Construction Activities of Construction Scenarios**

| Scenario | Activity Description | Duration | Daily Frequency (Sites/Day) | Crew Size/ Site | Equipment (Hours) | Max Equipment Operating Simultaneously | Vehicles |
|---|---|---|---|---|---|---|---|
| 1 | Dismantle/ Remove Existing Shelter | 2 to 3 hours total (1 hour for traffic lane management) | 6 | 3 to 5 workers 3 to 4 vehicles | Backhoe (1 hour) | 2 pieces | Boom Truck |
| | | | | | Jackhammer (0.5 hour) | (e.g., jackhammer+ backhoe; backhoe+ skid steer) | Dump Trucks (2 per 6 sites) |
| | | | | | Air Compressor (0.5 hour) | | Flatbed Trailer Truck |
| | | | | | Generator (0.5 hour) | | Crew Vehicle |
| | | | | | Skid Steer Loader (0.5 hour) | | |
| 2 | New Components Construction | 2.5 days | see below | see below | see below | see below | see below |
| 2a | Site Prep | 1 day | 6 | 3 to 7 workers 4 to 6 vehicles | Jackhammer (1 hour) | 3 pieces | Boom Truck |
| | | | | | Backhoe (2 hours) | | Dump Trucks (2 per site) |
| | | | | | Skid Steer (2 hours) | | Flatbed Trailer Truck |
| | | | | | Generator (1 hour) | | Crew Vehicle(s) |
| | | | | | Air Compressor (2 hours) | | |
| 2b | Construction | 1.5 days | 6 | 3 to 7 workers 4 to 5 vehicles | Backhoe (4 hours) | 3 pieces | Boom Truck |
| | | | | | Air Compressor (2 hours) | | Concrete Truck |
| | | | | | Generator (2 hours) | | Flatbed Trailer Truck |
| | | | | | Electric/Hand Tools | | Crew Vehicle(s) |

## 7.2 Construction Noise and Vibration

Noise generated by construction activity is temporary and intermittent in nature, and is dependent on the various construction phases, activity, and the associated reequipment fleet mix, duration, and the distance between the construction activity and receptor location.

Construction activities are divided into two basic phases consisting of (1) dismantling and removal of existing shelters and (2) construction and installation of new shelters and future advertising displays. Table 6 presents the estimated noise levels during STAP element and future advertising display construction for the worst-case noise hour. During the construction phase, the projected construction activity noise levels have been estimated to range from 75 to 78 dBA at 50 feet, which would result in a noise impact for construction sites that are within 50 feet of a residential property. At a distance of 75 feet, the estimated construction noise levels would range from 71 to 75 dBA; therefore, it can be assumed that any residential property beyond 75 feet of a site location would not be impacted by construction noise.

The estimated noise levels as presented in Table 6 are at each of the individual sites; thus, they are very localized for each location. As such, similar noise levels can also be expected for construction of the foreseeable future advertising kiosks at about 500 locations throughout the City. Similar impacts during construction on nearby noise-sensitive receptors can also be anticipated.

The removal and dismantling of an existing concrete sidewalk is the only construction activity with a potential for creating ground-borne vibration. Any jackhammering of sidewalks occurring within the transit shelter construction sites should not generate excessive vibration. Some faint ground-borne noise may be possible if there is an adjacent building adjoined with a sidewalk to be replaced as part of the project, but it would likely not be perceptible without the use of sensitive vibration measuring equipment. Vibration impacts due to planned construction activities and construction equipment to be utilized are not anticipated.

## Table 6. Estimated Construction Noise Levels

| Equipment Type | No. of Items | Maximum Equipment Noise Levels at 50 ft dBA | Hourly Equivalent Noise Levels at 50 ft, dBA | Hourly Equipment Usage Percentage | Percent Time at Full Power | Effective Equipment Usage Factor Percentage |
|---|---|---|---|---|---|---|
| **Shelter Dismantling and Removal** | | | | | | |
| *Dismantling and removal of existing transit shelters, kiosks and associated amenities* | | | | | | |
| Backhoe (Small, rubber-tired) | 1 | 71 | 59 | 33% | 21% | 7% |
| Skid Steer Loader | 1 | 80 | 69 | 17% | 43% | 7% |
| Jackhammer | 1 | 89 | 74 | 17% | 21% | 4% |
| Air Compressor | 1 | 65 | 54 | 17% | 43% | 7% |
| Generator | 1 | 81 | 70 | 17% | 50% | 8% |
| Boom Truck | 1 | 73 | 66 | 67% | 30% | 20% |
| Dump Truck | 1 | 75 | 71 | 67% | 59% | 39% |
| Flatbed truck | 1 | 73 | 60 | 17% | 30% | 5% |
| | | **Combined $L_{eq}(h)$** | **78** | | | |
| **Shelter Construction and Installation** | | | | | | |
| *Site preparation, including removal of existing sidewalks, foundations, and utility connections* | | | | | | |
| Backhoe (Small, rubber-tired) | 1 | 71 | 58 | 25% | 21% | 5% |
| Skid Steer Loader | 1 | 80 | 70 | 25% | 43% | 11% |
| Jackhammer | 1 | 89 | 73 | 13% | 21% | 3% |
| Air Compressor | 1 | 65 | 55 | 25% | 43% | 11% |
| Generator | 1 | 81 | 69 | 13% | 50% | 6% |
| Boom Truck | 1 | 73 | 64 | 38% | 30% | 11% |
| Dump Truck | 1 | 75 | 68 | 38% | 59% | 22% |
| Flatbed truck | 1 | 73 | 56 | 6% | 30% | 2% |
| | | **Combined $L_{eq}(h)$** | **77** | | | |
| *Installation of a new/refurbished and renewed/ transit shelter or a new transit shelter at a bus stop that previously or did not previously have a shelter or amenities* | | | | | | |
| Backhoe (Small, rubber-tired) | 1 | 71 | 61 | 50% | 21% | 11% |
| Air Compressor | 1 | 65 | 55 | 25% | 43% | 11% |
| Generator | 1 | 81 | 72 | 25% | 50% | 13% |
| Power Tools (Impact Driver) | 1 | 80 | 69 | 25% | 30% | 8% |
| Boom Truck | 1 | 73 | 62 | 25% | 30% | 8% |
| Ready-Mix Concrete Truck | 1 | 72 | 62 | 25% | 43% | 11% |
| Flatbed truck | 1 | 73 | 56 | 6% | 30% | 2% |
| | | **Combined $L_{eq}(h)$** | **75** | | | |

## 7.3 Operational Noise

Because the project consists of adding or improving transit shelters along existing transit service lines, there is no assumed increase in transit or ambient noise due to implementation of the proposed project features. Maintenance of the transit shelters would be performed on an ongoing basis over a 10-year period. As previously shown in Table 2, the maintenance consists of weekly and some biannual deep cleaning for all shelter locations.

Table 7 presents examples of estimated noise levels for instances when noise-generating equipment may need to be employed during the operational life span of the shelters/shade structure and future advertising displays. The deep cleaning maintenance would likely be the only activity that has the potential to result in a noise impact.

As with construction noise, the operational noise for each of the sites is also localized and independent of each other. Therefore, the estimated noise levels presented in Table 7 would also be valid for amenities installed as a result of potential future projects.

**Table 7. Estimated Operational Maintenance Noise Levels**

| Equipment Type | No. of Items | Maximum Equipment Noise Levels at 50 ft dBA | Hourly Equivalent Noise Levels at 50 ft, dBA | Hourly Equipment Usage Percentage | Percent Time at Full Power | Effective Equipment Usage Factor Percentage |
|---|---|---|---|---|---|---|
| **Shelter Operations and Maintenance** | | | | | | |
| *Cleaning of shelter, associated program elements, and sidewalk area on a regularly scheduled (generally twice per week) and emergency basis, including use of power-washing equipment* | | | | | | |
| Utility Truck | 1 | 69 | 64 | 100% | 30% | 30% |
| Power Washer | 1 | 80 | 75 | 50% | 59% | 30% |
| | | **Combined $L_{eq}(h)$** | **75** | | | |
| *Shelter repair work, including fixing broken ad panels, shelter structures, benches, litter receptacles, and other program elements* | | | | | | |
| Utility Truck | 1 | 69 | 64 | 100% | 30% | 30% |
| Power Tools (Impact Driver) | 1 | 80 | 72 | 50% | 30% | 15% |
| | | **Combined $L_{eq}(h)$** | **72** | | | |
| *Minor utility repair, such as electrical and utility box repairs* | | | | | | |
| Utility Truck | 1 | 69 | 64 | 100% | 30% | 30% |
| Boom Truck | 1 | 73 | 68 | 100% | 30% | 30% |
| | | **Combined $L_{eq}(h)$** | **69** | | | |

## 7.4 CEQA Checklist

This section describes the CEQA noise analysis for the proposed project. The CEQA Guidelines included five CEQA issues related to noise. 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 result in: | | | | |
| 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? | ☐ | ☐ | ☐ | ☒ |

## 7.5 Thresholds of Significance

According to the *L.A. CEQA Thresholds Guide,* Section XI, (2006), a project would normally have a significant impact on noise levels from construction 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.

Because there are no construction activities anticipated to occur during night-time hours and lasting more than 10 days at any single transit shelter site, only the first item above is applicable to this project. Shelter construction and installation is planned

to occur over a 2- to 3-day period. Because the project will upgrade and install transit shelters at approximately 3,500 locations and install future advertising displays at 500 sidewalk locations across the entire City, the average daytime ambient noise levels during which construction activity would take place, as presented in Table 3, could range between 61 dBA and 75 dBA. These measured ambient levels would be used for analyzing potential impacts of the project per CEQA guidelines.

## 7.6 Response to CEQA Checklist

Using the Initial Study Checklist questions in Appendix I of the CEQA Guidelines and the City's thresholds, project impacts are analyzed for significance as follows:

a) *Would the project result in the 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?*

**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.

**Less than Significant Impact with Mitigation Incorporated.** The STAP and future advertising displays would generate noise during transit shelter construction and maintenance activities. As discussed above, the estimated construction noise levels would range from 75 to 78 dBA at a distance of 50 feet from the center of construction activities, which may exceed the 10 dB above ambient noise level threshold for residential and commercial properties with measured ambient noise levels of 67 dBA and lower. At receptor locations where ambient noise levels are 68 dBA and higher, the 10-dB increase threshold would not be exceeded. For locations where ambient noise is lower than 68 dBA, construction noise are expected to be reduced to less than the 10-dB increase due to distance attenuation at a distance between 75 and 120 feet, depending on specific ambient noise levels at the receptor location. Mitigation measure NOI-1 would reduce impacts at these locations to less than significant levels.

**Mitigation Measure**

**NOI-1** At project construction sites when noise levels may approach or exceed City noise criteria, such that if there are noise sensitive receptors closer than 75 feet or when receptors with existing ambient noise levels of 68 dBA and lower are located within 120 feet of project construction activity, the following noise abatement measures or combination thereof shall be implemented to reduce noise levels from construction activities to be below 10 dBA over ambient levels:

- Construction or use of temporary construction noise barriers, enclosures, or sound blankets

- Use of low noise, low vibration, low emission-generating construction equipment (e.g., *[quieter]* Tier 4 engines), as needed
- Maintenance of mufflers and ancillary noise abatement equipment
- Scheduling high noise-producing activities during periods that are least sensitive when most people are at work during daytime hours
- Routing construction-related truck traffic away from noise-sensitive areas
- Reducing construction vehicle speeds

If noise complaints due to construction activities should arise, construction noise monitoring may be needed to document the ambient noise levels and further analyze the area where the complaint occurred to determine which of the above recommendations specifically may be needed, if any. This would be site specific and dependent on the specific construction activity and the degrees of exceedances. Construction hours may need to be amended when using the loudest equipment, such as jackhammers. If a hoe ram attachment for either a backhoe or skid steer is used in place of hand-use jackhammers, vibration monitoring might be needed during instances of sidewalk removal where there is an adjoining structure next to the sidewalk which is to be removed.

Regarding permanent increases in ambient noise levels, as discussed above, STAP project features and future advertising displays would not generate any additional noise at the existing and future transit shelter sites and sidewalk locations. No permanent noise impacts would occur.

*b) Would the project result in the generation of excessive ground-borne vibration or ground-borne noise levels?*

**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.** Any jackhammering of sidewalks occurring within the construction area of each transit shelter/shade structure or future advertising display should not generate excessive ground-borne vibration. Some faint ground-borne noise may be possible if there is an adjacent building adjoined with a sidewalk to be replaced as part of the project, but it would likely not be perceptible without the use of sensitive vibration measuring equipment. Vibration impacts would be less than significant.

*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?*

**No Impact.** Some transit shelters and future advertising displays may be located near an airstrip or airport, but the transit shelter and advertising display removal/construction and routine maintenance activities would not expose people

residing or working in the project area to excessive noise levels. Construction and maintenance crews, as well as transit riders, would only be at the transit shelters for short periods of time. No impacts related to noise from aircraft operations would occur.

# 8.0 RECOMMENDED MEASURES

As shown in the impact analysis, some construction activities may result in an exceedance of the City threshold of 10-dB above ambient noise levels if the ambient noise levels at noise sensitive receptors adjacent to construction activity are 68 dBA and below. To mitigate this potentially significant construction noise impacts, NOI-1 is recommended to reduce the noise levels to a less than significant level.

If noise complaints due to construction activities should arise, construction noise monitoring may be needed to document the ambient noise levels and further analyze the area where the complaint occurred to determine which of the following recommendations may be needed, if any. Construction hours may need to be amended when using the loudest equipment, such as jackhammers. If a hoe ram attachment for either a backhoe or skid steer is used in place of hand-use jackhammers, vibration monitoring might be needed during instances of sidewalk removal where there is an adjoining structure next to the sidewalk which is to be removed.

**NOI-1:** At project construction sites when noise levels may approach or exceed City noise criteria, such that if there are noise sensitive receptors closer than 75 feet or when receptors with existing ambient noise levels of 68 dBA and lower are located within 120 feet of project construction activity, the following noise abatement measures or combination thereof shall be implemented to reduce noise levels from construction activities to be below 10 dBA over ambient levels:

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

If noise complaints due to construction activities should arise, construction noise monitoring may be needed to document the ambient noise levels and further analyze the area where the complaint occurred to determine which of the above recommendations specifically may be needed, if any. This would be site specific and dependent on the specific construction activity and the degrees of exceedances. Construction hours may need to be amended when using the loudest equipment, such as jackhammers. If a

hoe ram attachment for either a backhoe or skid steer is used in place of hand-use jackhammers, vibration monitoring might be needed during instances of sidewalk removal where there is an adjoining structure next to the sidewalk which is to be removed.

## 9.0 REFERENCES

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## Attachment A – Project Site Location