

APPENDIX F

NOISE AND VIBRATION ASSESSMENT

Memorandum

TO: Jerry Flores, Senior Project Manager
AECOM

FROM: Sam Silverman, Senior Associate
Terry A. Hayes Associates Inc.

DATE: October 20, 2015

RE: **Channel 35 Studio Relocation Project - Noise and Vibration Assessment**

Terry A. Hayes Associates Inc. (TAHA) is pleased to submit this Noise and Vibration Assessment for the Channel 35 Studio Relocation Project (proposed project). The proposed project includes the design and construction of a new digital television studio within the Merced Theatre (420 North Main Street) and Masonic Hall (416 North Main Street) in the El Pueblo de Los Angeles Historic District in the City of Los Angeles. In order to utilize the three-story Merced Theatre and two-story Masonic Hall for studio use, the proposed project would require extensive structural, mechanical, electrical, and plumbing system retrofits. The proposed project would also seismically retrofit the Pico House, which is attached to the Merced Theatre.

The Merced Theatre and Masonic Hall are in the National Register of Historic Places database and located within the El Pueblo de Los Angeles Historic District in downtown Los Angeles. Accessed via Sanchez Street, a private street extending easterly from Arcadia Street, the project site is bordered by several other historic buildings in the El Pueblo de Los Angeles Historic District. Adjacent to the project site are the Pico House to the northeast, the Chinese American Museum to the southeast, U.S. Route 101 (US-101) to the south, a public parking lot to the west and northwest, and LA Plaza de Cultura y Artes to the north.

The analysis below addresses the noise and vibration questions in Appendix G, Section XII, Noise, of the 2015 California Environmental Quality Act (CEQA) Guidelines. It includes assessments of short-term construction noise and vibration and long-term operational noise and vibration.

NOISE IMPACT ANALYSIS

Would the proposed project result in the exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standard of other agencies?

Less-Than-Significant Impact with Mitigation Incorporated. The noise analysis discusses sound levels in terms of Equivalent Noise Level (L_{eq}). L_{eq} is the average noise level on an energy basis for any specific time period. L_{eq} for one hour is the energy average noise level during the hour. The average noise level is based on the energy content (acoustic energy) of the sound. L_{eq} can be thought of as the level of a continuous noise which has the same energy content as the fluctuating noise level. The equivalent noise level is expressed in units of dBA.



Noise levels decrease as the distance from the noise source to the receiver increases. Noise generated by a stationary noise source, or “point source,” decreases by approximately 6 dBA over hard surfaces (e.g., reflective surfaces, such as parking lots or smooth bodies of water) and 7.5 dBA over soft surfaces (e.g., absorptive surfaces, such as soft dirt, grass, or scattered bushes and trees) for each doubling of the distance. For example, if a noise source produces a noise level of 89 dBA at a reference distance of 50 feet, then the noise level is 83 dBA at a distance of 100 feet from the noise source, 77 dBA at a distance of 200 feet, and so on. Noise generated by a mobile source decreases by approximately 3 dBA over hard surfaces and 4.8 dBA over soft surfaces for each doubling of the distance. Generally, noise is most audible when the source is in a direct line-of-sight of the receiver. Barriers, such as walls, berms, or buildings, that break the line-of-sight between the source and the receiver greatly reduce noise levels from the source since sound can only reach the receiver by bending over the top of the barrier. However, if a barrier is not sufficiently high or long to break the line-of-sight from the source to the receiver, its effectiveness is greatly reduced.

Studies have shown that the smallest perceptible change in sound level for a person with normal hearing sensitivity is approximately 3 dBA. A change of at least 5 dBA would be noticeable and may evoke a community reaction. A 10-dBA increase is subjectively heard as a doubling in loudness and would likely cause a community response.

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. Regarding construction, Section 41.40 (Noise Due to Construction, Excavation Work – When Prohibited) of the Los Angeles Municipal Code (LAMC) states that no construction or repair work shall be performed between the hours of 9:00 p.m. and 7:00 a.m. since such activities would generate loud noises and disturb persons occupying sleeping quarters in any adjacent dwelling, hotel, apartment, or other place of residence. Further, no person, other than an individual home owner engaged in the repair or construction of his/her single-family dwelling, shall perform any construction or repair work of any kind or perform such work within 500 feet of land so occupied before 8:00 a.m. or after 6:00 p.m. on any Saturday or on a federal holiday, or at any time on any Sunday. Under certain conditions, the City may grant a waiver to allow limited construction activities to occur outside of the limits described above.

LAMC Section 112.05 (Maximum Noise Level of Powered Equipment or Powered Hand Tools) specifies the maximum noise level of powered equipment or powered hand tools. Any powered equipment or hand tool that produces a maximum noise level exceeding 75 dBA at a distance of 50 feet is prohibited. However, this noise limitation does not apply where compliance is technically infeasible. Technically infeasible means the above noise limitation cannot be met despite the use of mufflers, shields, sound barriers and/or any other noise reduction device or techniques during the operation of equipment.

Noise- and vibration-sensitive land uses are locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Residences, schools, hospitals, guest lodging, museums, libraries, and some passive recreation areas would each be considered noise- and vibration-sensitive and may warrant unique measures for protection from intruding noise. Based on the LAMC regulations, sensitive receptors have been identified within 500 feet of the project site. Receptors include the following:

- Chinese American Museum located approximately 20 feet to the southeast
- LA Plaza de Cultura y Artes located approximately 70 feet to the north
- Los Angeles Plaza Park located approximately 85 feet to the northeast
- Our Lady Queen of Angels Church located approximately 140 feet to the north
- La Plaza United Methodist Church located approximately 330 feet to the northeast

The existing noise environment near these receptors is predominantly characterized by vehicular traffic and to a lesser extent by occasional aircraft flyovers and other typical urban noise. Sound measurements were taken using a SoundPro DL Sound Level Meter on March 31, 2015, to determine existing noise levels in the project vicinity. Daytime measurements were used to establish existing ambient noise conditions and to provide a baseline for evaluating construction impacts and to assess operational impacts. As shown in **Table 1**, daytime existing ambient sound levels near the project site ranged between 63.9 and 71.5 dBA L_{eq} .

TABLE 1: EXISTING NOISE LEVELS	
Location	Sound Levels (dBA, L_{eq})
Chinese American Museum	71.5
Los Angeles Plaza Park	64.8
La Plaza United Methodist Church	63.9
SOURCE: TAHA, 2015.	

Construction Activity

Construction activity is anticipated to begin in October 2016 and take approximately 14 months to complete, concluding in December 2017. It is estimated that approximately 20 to 30 construction personnel would be on-site per day. LAMC allow construction activity to occur Monday through Friday between the hours of 7:00 a.m. and 9:00 p.m., although daily construction would not likely occur after 6:00 p.m. Construction would occur between the hours of 8:00 a.m. and 6:00 p.m. on Saturdays and federal holidays. No construction activities would occur on Sundays or during prohibited hours.

Construction of the proposed project would involve interior and exterior retrofits to the existing historic structures. Interior rehabilitation would mostly involve the removal of non-original tenant improvements. Partitions, doors, ceilings, mechanical ducts, plumbing, unused electrical equipment, and finishes would be removed throughout the Merced Theatre and Masonic Hall for new tenant improvements. Improvements would include new roofing and new plumbing, electrical, and mechanical distribution. Anticipated equipment for the grading phase includes two excavators, a bulldozer or skip loader, a backhoe loader, a soil compactor, shoring elements, and dump trucks. The concrete placement phase would require concrete mixing trucks and the steel erection phase would require a crane.

The remaining exterior historical facades are located along Main and Sanchez Streets. Although they have been altered throughout the years, the majority of the facades exist as originally constructed. No alterations would be made to these exteriors. Exterior retrofits would be limited to the non-historical facade. New openings would be made in the Masonic Hall for doors and staff access. To allow for the installation of an elevator at the rear of the Masonic Hall, the south end of the balcony would be removed and rebuilt in a straighter configuration. In addition, several non-original windows will be converted to door openings to provide access to the elevator walkway and the new roof deck above the Masonic Hall. Improvements will also be made to the existing parking lot. The proposed project would also seismically retrofit the Pico House, which is attached to the Merced Theatre.

Typical noise levels from various types of equipment that may be used during construction are listed in **Table 2**. The table shows noise levels at distances of 50 and 100 feet from the construction noise source. Construction activities typically require the use of numerous pieces of noise-generating equipment. The noise levels shown in **Table 3** take into account that multiple pieces of construction equipment would be operating

simultaneously. When considered as an entire process with multiple pieces of equipment, project-related activity (i.e., structural and finishing work) would generate noise levels between 85 and 89 dBA L_{eq} at 50 feet.

TABLE 2: MAXIMUM NOISE LEVELS OF COMMON CONSTRUCTION MACHINES			
Noise Source	Noise Level (dBA)		
	50 Feet		100 Feet /a/
Excavator		76.7	70.7
Dozer		81.7	75.7
Loader		79.1	73.1
Soil Compactor		83.2	77.2
Truck		76.5	70.5
Cranes		80.6	74.6

*/a/ Assumes a 6-dBA drop-off rate for noise generated by a "point source" and traveling over hard surfaces.
 SOURCE: FHWA, Roadway Construction Noise Model, Version 1.1, December 8, 2008.*

TABLE 3: TYPICAL OUTDOOR CONSTRUCTION NOISE LEVELS	
Construction Phase	Noise Level at 50 Feet (dBA)
Structural	85
Finishing	89

SOURCE: USEPA, Noise from Construction Equipment and Operations, Building Equipment and Home Appliances, PB 206717, 1971.

Table 4 presents the estimated noise levels at sensitive receptors within 500 feet of the project site. The noise level at each receptor location was calculated by making a distance adjustment to the construction source sound level and logarithmically adding the adjusted construction noise source level to the ambient noise level. Existing noise levels at sensitive receptors range from 63.9 to 71.5 dBA L_{eq} and existing noise levels with construction activity would range from 71.9 to 89.1 dBA L_{eq} .

TABLE 4: ESTIMATED CONSTRUCTION NOISE LEVELS				
Sensitive Receptor	Distance (feet)	Maximum Noise Level (dBA)	Existing Ambient (dBA, L_{eq})	New Ambient (dBA, L_{eq})
Chinese American Museum	20	89.0	71.5	89.1
Los Angeles Plaza Park	70	86.1	64.8	86.1
La Plaza de Culturas y Artes	85	84.4	71.5	84.6
Our Lady Queen of Angels Church	140	80.1	64.8	80.2
La Plaza United Methodist Church	330	72.6	63.9	73.2

SOURCE: TAHA, 2015.

The sensitive receptors listed in **Table 4** would experience an increase in ambient noise levels during construction activity. Interior construction activity would not be audible beyond the property line; however, exterior construction activity would utilize heavy-duty equipment and trucks, and the proposed project would be required to comply with these LAMC requirements. Pursuant to LAMC Section 112.05, construction noise levels are exempt from the 75 dBA noise threshold if all technically feasible noise

attenuation measures are implemented. The estimated construction-related noise levels associated with the proposed project would exceed the numerical noise threshold of 75 dBA at 50 feet from the noise source as outlined in the LAMC. However, the applicant would be required to comply with Mitigation Measures **N-1** through **N-10**, which are feasible measures to control noise levels, including engine mufflers and noise blanket barriers. Mitigation Measure **N-3** would reduce construction noise levels by approximately 3 dBA. Mitigation Measure **N-4** would reduce equipment-related noise levels at Los Angeles Plaza Park and beyond by at least 5 dBA. The other mitigation measures, while difficult to quantify, would assist in attenuating construction noise levels. Implementation of these mitigation measures would reduce the noise levels associated with construction of the proposed project to the maximum extent that is technically feasible. Therefore, with mitigation, the proposed project would result in a less-than-significant impact related to construction noise.

Mitigation Measures

- N-1** Construction activity shall comply with the City's Noise Ordinance No. 144,331 and 161,574, and any subsequent ordinances, which prohibit the emission or creation of noise beyond certain levels at adjacent uses unless technically infeasible.
- N-2** Construction activity shall be restricted to the hours of 7:00 a.m. and 6:00 p.m. Monday through Friday, and 8:00 a.m. to 6:00 p.m. on Saturday.
- N-3** Construction equipment shall be properly maintained and equipped with mufflers and other suitable noise attenuation devices.
- N-4** A temporary noise barrier shall be erected between the project site and the Los Angeles Plaza Park. The barriers shall be constructed of acoustic material, be at least six feet tall, and block the line-of-sight from equipment engines to the receptors.
- N-5** Construction activity shall use rubber-tired equipment rather than track equipment.
- N-6** Stockpiling of materials and vehicle staging areas shall be located away from noise-sensitive receivers.
- N-7** A public liaison shall be established to address public concerns about construction activities.
- N-8** Construction supervisors shall be informed of project-specific noise requirements.
- N-9** Prior to construction work, the public shall be notified of the anticipated construction schedule.
- N-10** Construction supervisors shall coordinate with the site administrator for institutional land uses, including the Chinese American Museum, LA Plaza de Cultura y Artes, and Our Lady Queen of Angels Church. Coordination between the site administrators and the City shall continue on an as-needed basis while construction is occurring adjacent to these land uses to minimize potential disruption to the land uses.

Operational Activity

The proposed project would employ approximately 22 people, and the studio would operate from 6:00 a.m. to 6:00 p.m. Operational activity would be conducted inside the studio and would not be audible outside the

buildings. Regarding mobile noise, the California Department of Transportation *Technical Noise Supplement* has established that a doubling of traffic is needed to audibly increase traffic noise by 3 dBA. The proposed project would generate less than 22 peak hour trips and would not double traffic volumes on any roadway segment. Each roadway segment near the project site supports well over 100 vehicles during peak hours. Regarding stationary noise, mechanical equipment (e.g., heating, ventilation, and air conditioning equipment) would either be on the roof of the buildings or within the basements. If located on the roof, mechanical equipment would be screened from view to comply with the LAMC requirements for both daytime (65 dBA) and nighttime (60 dBA) operation at the property line. This noise level is reduced by at least 10 dBA when the equipment is enclosed within a structure. Based on these requirements, mechanical equipment would increase noise by less than 3 dBA. Therefore, the proposed project would result in a less-than-significant impact related to operational noise.

Would the proposed project result in the exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

Less-Than-Significant Impact with Mitigation Incorporated. A significant impact would occur if the proposed project would cause excessive vibration levels. High levels of vibration may cause damage to buildings or interfere with the activities within buildings. The City of Los Angeles has not established significance thresholds for assessing impacts from vibration. The Federal Transit Administration has established impact criteria for assessing building damage and annoyance. The relevant criteria in vibration decibels (VdB) are in **Table 5** and used in this analysis to assess vibration impacts. **Table 5** also shows the distance from the receptor at which construction activity that involves heavy-duty equipment. For example, construction activities could result in building damage when located within 20 feet of an historic structure or interfere with building activities when located within 65 feet of institutional land uses.

TABLE 5: VIBRATION SIGNIFICANCE THRESHOLDS AND IMPACT DISTANCES		
Building Damage	Vibration Level (VdB)	Distance to Impact (Feet) /a/
Buildings Extremely Susceptible to Vibration Damage (e.g., Historic Structures)	90	20
Non-Engineered Timber and Masonry Buildings	94	15
Engineered Concrete and Masonry Buildings (No Plaster)	98	11
Reinforced Concrete, Steel, or Timber (No Plaster)	102	8
Activity Interference /b/		
Institutional Land Uses With Primarily Daytime Use	75	64
/a/ The distance is based on a bulldozer, which generate a vibration level of 87 VdB at 25 feet.		
/b/ Construction activity is a frequent event occurring more than 70 times per day.		
SOURCE: FTA, <i>Transit Noise and Vibration Impact Assessment</i> , May 2006.		

Construction Activity

The project site is located within the Merced Theatre and Masonic Hall buildings, both of which are historic structures. The proposed project would also seismically retrofit the Pico House, which is attached to the Merced Theatre. Construction activity would occur adjacent to and within these structures and vibration would potentially damage the buildings. Mitigation Measure **N-11** would ensure that the historic structures would not be irreparably damaged by construction-related vibration.

The project site is bordered by several other historic buildings in the El Pueblo de Los Angeles Historic District. The nearest building to the project site is located approximately 30 feet to the east (e.g., Chinese American Museum) across Sanchez Street. Exterior facade work would not occur along Sanchez Street although improvements would be made to the parking area located at the southeast portion of the project site. Equipment would be located within 20 feet of the Chinese American Museum. Mitigation Measure **N-11** would ensure that the adjacent historic structures would not be irreparably damaged by construction-related vibration. No other buildings would be located within 20 feet of construction activity, including the LA Plaza de Cultura y Artes located to the west across Main Street.

N-11 Prior to commencement of construction activity, a qualified structural engineer licensed in California shall survey the existing foundation and other structural aspects of the Merced Theatre, Masonic Hall, the Pico House, the Chinese American Museum, and the Old Plaza Fire House. The survey shall provide a shoring design to protect the identified land uses from potential damage. The qualified structural engineer shall submit a pre-construction survey letter establishing baseline conditions at the historic buildings. These baseline conditions shall be forwarded to the lead agency and to the mitigation monitor prior to issuance of any foundation only or building permit. At the conclusion of vibration causing activities, the qualified structural engineer shall issue a follow-on letter describing damage, if any, to the historic buildings. The letter shall include recommendations for any repair, as may be necessary, in conformance with the Secretary of the Interior Standards. Repairs to historic buildings shall be undertaken and completed in conformance with all applicable codes including the California Historical Building Code (Part 8 of Title 24) prior to issuance of any temporary or permanent certificate of occupancy for the new building.

Regarding interference with activities, **Table 5** shows that construction activity located within 64 feet of institutional land uses could generate annoying vibration levels. It is anticipated that construction equipment would be located within 20 feet of the Chinese American and Old Plaza Fire House Museums. No other building would be located within 64 feet of the project site, including the LA Plaza de Cultura y Artes and Los Angeles Plaza Park. Mitigation Measure **N-12** would ensure that construction-related vibration would not interfere with activities at the Chinese American or Old Plaza Fire House Museums.

N-12 The construction contractor shall coordinate with the site administrators for the Chinese American and Old Plaza Fire House Museums to discuss construction activities that generate high vibration levels and notify site administrators when periods of peak vibration producing construction activities are likely to occur. Coordination between the site administrator and contractor shall continue on an as-needed basis throughout the construction process. When vibration generated by construction activity interferes with activities at the Chinese American and Old Plaza Fire House Museums according to the site administrator, construction activity shall be stopped and a less intense construction method shall be employed by the contractor (e.g., smaller equipment).

Operational Activity

The proposed project would not include significant stationary sources of vibration, such as heavy equipment operations. Operational vibration in the project vicinity would be generated by vehicular travel on the local roadways. Similar to existing conditions, traffic-related vibration levels would not be perceptible by sensitive receptors. Therefore, the proposed project would result in a less-than-significant impact related to operational vibration levels.

Would the proposed project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the proposed project?

Less-Than-Significant Impact. A significant impact would occur if the proposed project would cause a substantial permanent increase in noise levels above existing ambient levels. Potential permanent increases in ambient noise levels were assessed above for on-road vehicles, mechanical equipment, and parking activity. As discussed, operational noise level would not exceed the standards established by the City. Therefore, the proposed project would result in a less-than-significant impact related to substantial permanent increase in ambient noise levels.

Would the proposed project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the proposed project?

Less-Than-Significant Impact with Mitigation Incorporated. A significant impact would occur if the proposed project would result in a substantial temporary or periodic increase in ambient noise levels. As discussed above, construction activities would result in temporary increases in noise levels at the project site. With implementation of Mitigation Measures N-1 through N-10, construction noise impacts would be less than significant.

For a proposed project located within 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 proposed project expose people residing or working in the project area to excessive noise levels?

No Impact. A significant impact would occur if the proposed project would expose people residing or working in the project area to excessive noise levels from a public airport or public use airport. The proposed project is not located within the vicinity (i.e., two miles) of any public airport. The nearest public airport or public use airport is Hawthorne Municipal Airport located approximately 10.5 miles to the southwest. The proposed project would not expose people to excessive noise levels associated with public airport activities. Therefore, the proposed project would not result in an impact related to public airport noise level.

For a proposed project within the vicinity of a private airstrip, would the proposed project expose people residing or working in the proposed project area to excessive noise levels?

No Impact. A significant impact would occur if the proposed project would expose people residing or working in the project area to excessive noise levels from a private airstrip. The proposed project is not located within the vicinity (i.e., two miles) of any private airstrip. The proposed project would not expose any people to excessive noise levels associated with any private airstrip activities. Therefore, the proposed project would not result in an impact related to private airstrip noise levels.