Exhibit L - 7

ACOUSTICAL ANALYSIS

TRACT 6376
FRESNO, CALIFORNIA

WJVA Project No. 23-42

PREPARED FOR

BONADELLE NEIGHBORHOODS
7030 N. FRUIT AVENUE, #101
FFRESNO, CALIFORNIA 93711

PREPARED BY

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INTRODUCTION

The project is a proposed 212-lot single-family residential development to be located in Fresno, California. The project site is located at the east side of South Armstrong Avenue, north of East Church Avenue, within the City of Fresno. This analysis, prepared by WJV Acoustics, Inc. (WJVA), is based upon a project site plan provided by the project applicant, traffic data provided by the Fresno Council of Governments (Fresno COG) and the findings of on-site noise level measurements. Revisions to the site plan may affect the findings and recommendations of this report. The site plan is provided as Figure 1.

Appendix A provides a description of the acoustical terminology used in this report. Unless otherwise stated, all sound levels reported are in A-weighted decibels (dB). A-weighting de-emphasizes the very low and very high frequencies of sound in a manner similar to the human ear. Most community noise standards utilize A-weighting, as it provides a high degree of correlation with human annoyance and health effects. Appendix B provides typical A-weighted sound levels for common noise sources.

In terms of human perception, a 5 dB increase or decrease is considered to be a noticeable change in noise levels. Additionally, a 10 dB increase or decrease is perceived by the human ear as half as loud or twice as loud. In terms of perception, generally speaking the human ear cannot perceive an increase (or decrease) in noise levels less than 3 dB.

NOISE EXPOSURE CRITERIA

The City of Fresno General Plan Noise Element (adopted 12/18/14) provides noise level criteria for land use compatibility for both transportation and non-transportation noise sources. The General Plan sets noise compatibility standards for transportation noise sources in terms of the Day-Night Average Level (L_{dn}). The L_{dn} represents the time-weighted energy average noise level for a 24-hour day, with a 10 dB penalty added to noise levels occurring during the nighttime hours (10:00 p.m.-7:00 a.m.). The L_{dn} represents cumulative exposure to noise over an extended period of time and are therefore calculated based upon *annual average* conditions. Table I provides the General Plan noise level standards for transportation noise sources.

TABLE I

CITY OF FRESNO GENERAL PLAN NOISE LEVEL STANDARDS
TRANSPORTATION (NON-AIRCRAFT) NOISE SOURCES

Noise-Sensitive Land Use	Outdoor Activity Areas[1]	Interior Spaces	
	L_{dn}/CNEL, dB	L_{dn}/CNEL, dB	L_{eq} dB[2]
Residential	65	45	---
Transient Lodging	65	45	---
Hospitals, Nursing Homes	65	45	---
Theaters, Auditoriums, Music Halls	---	---	35
Churches, Meeting Halls	65	---	45
Office Buildings	---	---	45
Schools, Libraries, Museums	---	---	45

1 Where the location of the outdoor activity areas is unknown or is not applicable, the exterior noise level standard shall be applied to the property line of the receiving land use.

2 As determined for a typical worst-case hour during periods of use.

Source: City of Fresno General Plan

Additionally, Implementing Policy NS-1-h of the noise element requires that interior noise levels attributable to exterior transportation noise sources not exceed 45 dB L_{dn}. The intent of the interior noise level standard is to provide an acceptable noise environment for indoor communication and sleep.

PROJECT SITE NOISE EXPOSURE

The project site is located at the west side of South Armstrong Avenue, north of East Church Avenue, in Fresno, California. The project site is exposed traffic noise associated with vehicles on S. Armstrong Avenue and train noise associated with train operations on the San Joaquin Valley Railroad (SJVR). The distance from center of the backyards of the closest proposed lots to the centerline of S. Armstrong Avenue is approximately 80 feet. The distance from the center of the backyards of the closest proposed lot to the SJVR line is approximately 70 feet (lot 76). Additionally, the backyards of the remaining lots along the south side of E. Erin Avenue would be located approximately 115 feet from the SJRV line.

Traffic Noise Exposure

Noise exposure from traffic on S. Armstrong Avenue was calculated for existing and future (2046) conditions using the FHWA Traffic Noise Model and traffic data obtained from Fresno COG.

WJVA utilized the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD-77-108). The FHWA Model is a standard analytical method used for roadway traffic noise calculations. The model is based upon reference energy emission levels for automobiles, medium trucks (2 axles) and heavy trucks (3 or more axles), with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. The FHWA Model was developed to predict hourly L_{eq} values for free-flowing traffic conditions, and is generally considered to be accurate within ±1.5 dB. To predict L_{dn} values, it is necessary to determine the hourly distribution of traffic for a typical day and adjust the traffic volume input data to yield an equivalent hourly traffic volume.

Noise level measurements and concurrent traffic counts were conducted by WJVA staff within the project site on October 23, 2023. The purpose of the measurement was to evaluate the accuracy of the FHWA Model in describing traffic noise exposure within the project site. One measurement site was located within the project site at a distance of approximately 40 feet from the centerline of S. Armstrong Avenue. The speed limit posted in the project vicinity along both roadways was 40 mph (miles per hour). The project vicinity and noise monitoring site location are provided as Figure 2. A photograph showing the S. Armstrong Avenue noise measurement site is provided as Figure 3.

Noise monitoring equipment consisted of Larson-Davis Laboratories Model LDL-820 sound level analyzer equipped with a B&K Type 4176 1/2" microphone. The equipment complies with the specifications of the American National Standards Institute (ANSI) for Type I (Precision) sound level meters. The meter was calibrated in the field prior to use with a B&K Type 4230 acoustic calibrator to ensure the accuracy of the measurements. The microphone was located on a tripod at 5 feet above the ground. The project site presently consists of undeveloped land and a portion is currently used for industrial purposes.

Noise measurements were conducted in terms of the equivalent energy sound level (L_{eq}). Measured L_{eq} values were compared to L_{eq} values calculated (predicted) by the FHWA Model

using as inputs the traffic volumes, truck mix and vehicle speed observed during the noise measurements. The results of the comparison are shown in Table II.

From Table II it may be determined that the traffic noise levels predicted by the FHWA Model were 1.5 dB lower than those measured for the conditions observed at the time of the noise measurements for S. Armstrong Avenue. This is considered to be reasonable agreement with the model and therefore no adjustments to the model are necessary.

TABLE II

COMPARISON OF MEASURED AND PREDICTED (FHWA MODEL) NOISE LEVELS TRACT 6376, FRESNO

	S. Armstrong Avenue
Measurement Start Time	8:50 a.m.
Observed # Autos/Hr.	216
Observed # Medium Trucks/Hr.	0
Observed # Heavy Trucks/Hr.	0
Observed Speed (MPH)	40
Distance, ft. (from center of roadway)	40
L_{eq}, dBA (Measured)	61.1
L_{eq}, dBA (Predicted)	59.6
Difference between Predicted and Measured L_{eq}, dBA	**1.5**

Note: FHWA "soft" site assumed for calculations.
Source: WJV Acoustics, Inc.

Annual Average Daily Traffic (AADT) data for S. Armstrong Avenue in the project vicinity was obtained from Fresno COG. Truck percentages and the day/night distribution of traffic were estimated by WJVA, based upon previous studies conducted in the project vicinity since project-specific data were not available from government sources. A speed limit of 40 mph (as posted) was assumed for the roadway. Table III summarizes annual average traffic data used to model noise exposure within the project site.

TABLE III

TRAFFIC NOISE MODELING ASSUMPTIONS
TRACT 6376, FRESNO

	S. Armstrong Ave.	
	Existing	2046
Annual Avenue Daily Traffic (AADT)	1,929	2,304
Day/Night Split (%)	90/10	
Assumed Vehicle Speed (mph)	40	
% Medium Trucks (% AADT)	2	
% Heavy Trucks (% AADT)	1	

Sources: Fresno COG
WJV Acoustics, Inc.

Using data from Table III, the FHWA Model, annual average traffic noise exposure was calculated for the closest proposed backyards from S. Armstrong Avenue. The calculated noise exposures for existing and future (2046) traffic conditions for the closest proposed setbacks to S. Armstrong Avenue were approximately 55 dB L_{dn} for existing traffic conditions and approximately 56 dB L_{dn} future (2046) traffic conditions. Such noise exposure levels are below the City's 65 dB L_{dn} exterior noise level standard and further mitigation of traffic noise is therefore not required.

Railroad Noise Exposure:

The San Joaquin Valley Railroad (SJVR) line is located approximately 70 feet from the backyard of lot 76. Additionally, the backyards of the remaining lots along the south side of E. Erin Avenue would be located approximately 115 feet from the SJRV line. The railroad consists of jointed rails with the top of the rails being approximately one foot above the grade of the project site.

Train engineers are required to sound warning horns when within approximately ¼ mile of a grade crossing. As the entire project site railroad frontage is located within ¼ mile of the S. Armstrong Avenue grade crossing, all lots adjacent to the SJRV line would be impacted by train warning horns.

According to data obtained from the U.S. Department of Transportation Federal Railroad Administration (FRA), trains along this portion of the railroad line do not exceed 25 mph in speed. According to the local trainmaster they typically pass by at speeds in the range of 10-20 mph. Additionally, according to both the FRA and the SJVR trainmaster, typical operations consist of two train movements per day along the line, typically one occurring during daytime hours and one occurring during nighttime hours. There is a grade crossing at South Armstrong Avenue where locomotive engineers are required to blow their warning horn.

WJVA observed one train movement on January 22, 2018 at a different project site located along the same section of SJVR railroad line, east of the project site. A westbound freight train passby occurred at approximately 2:45 p.m. Noise levels were measured from two locations along the track using automated sound level meters. Both meters were located approximately 50 feet from

the tracks. One meter was located approximately 500 feet west of the grade crossing, and noise levels of the train event were measured to 102.8 dB (SEL). The second meter was located approximately 1,300 feet from the grade crossing at South Temperance, and noise levels of the train event were measured to be 98.6 dB (SEL). The difference in noise levels is a result of varying distances from the grade crossing, where the engineer is required to sound their warning horn. WJVA also reviewed other noise measurements obtained along the SJVR to assess noise levels for parcels closer to grade crossings along the SJVR railroad line, and determined the average SEL at the closest lots adjacent to the SJVR railroad line to be 105.8 dB (SEL).

Railroad noise exposure may be quantified in terms of the L_{dn} using the following formula:

L_{dn} =SEL+ 10 log Neq – 49.4

where,

SEL is the average SEL for a train pass-by, Neq is the equivalent number of pass-bys in a typical 24-hour period determined by adding 10 times the number of nighttime movements (10 p.m.-7 a.m.) to the actual number of daytime movements (7 a.m.-10 p.m.). 49.4 is a time constant equal to 10 times the log of the number of seconds in a day.

Using the above-described formula, railroad operations data (assuming one train event during daytime hours and one train event during nighttime hours) and noise measurement results, the railroad noise exposure within the backyards of the proposed lots closest to the SJVR line. Using the above-described train noise measurements and calculations, SJVR train noise was calculated to be as follows:

- Lot 76: 68 dB L_{dn}
- Lots along south side of E. Erin Avenue: 65 dB L_{dn}

These noise levels indicate that exterior noise levels along the lots closest to the SJVR railroad line exceed the City's exterior maximum noise level standard, and mitigation measures must be incorporated into project design.

NOISE MITIGATION

Exterior Noise Mitigation:

The City of Fresno Noise Element of the General Plan establishes a 65 dB L_{dn} criterion within outdoor activity areas (backyards) of single-family homes. Exterior noise levels at the closest proposed lots to the SJVR line exceed this City of Fresno noise level standard, and mitigation must be incorporated.

A sound wall insertion loss program based on the FHWA Model was utilized to calculate the minimum required height of a noise barrier along the southern portion of the project site. The model calculates the insertion loss (noise reduction) of a wall of given height based on the effective height of the noise source, height of the receiver, distance from the receiver to the wall, and distance from the noise source to the wall. It was assumed for the sound wall calculations that the effective railroad source height is 10 feet above the tracks. For traffic noise sources, the standard assumptions used in the sound wall calculations are effective source heights of 8, 2 and 0 feet above the roadway for heavy trucks, medium trucks, and automobiles, respectively. The standard height of a residential receiver is five feet above the ground elevation.

Based upon the above-described calculated noise exposure levels, standard assumptions, and method of analysis, WJVA determined that a sound wall constructed along the entire project site frontage with the SJVR line. In the vicinity of Lot 76, the wall must be constructed to a minimum height of eight feet six inches (8'6") above project site grade, and a sound wall constructed to a minimum height of seven (7) feet above project site grade must be constructed along the remainder of the SJVR project site frontage. In order to be effective, the sound wall must be turned inward (southward) for a minimum distance of twenty (20) feet along the east side of Lot 76. The locations and heights of the required sound walls are provided on Figure 1.

Interior Noise Exposure:

The City of Fresno interior noise level standard is 45 dB L_{dn}. The worst-case noise exposure within the proposed residential development would be approximately 68 dB L_{dn} (existing conditions). This means that the proposed residential construction must be capable of providing a minimum outdoor-to-indoor noise level reduction (NLR) of approximately 23 dB (68-45=23).

A specific analysis of interior noise levels was not performed. However, it may be assumed that residential construction methods complying with current building code requirements will reduce exterior noise levels by approximately 25 dB if windows and doors are closed. This will be sufficient for compliance with the City's 45 dB L_{dn} interior standard at all proposed lots. Requiring that it be possible for windows and doors to remain closed for sound insulation means that air conditioning or mechanical ventilation will be required.

CONCLUSIONS AND RECOMMENDATIONS

The proposed 212-lot single-family residential development will comply with all City of Fresno exterior and interior noise level standards, provided the following mitigation measures are incorporated into project design.

- A sound wall constructed along the entire project site frontage with the SJVR railroad line. In the vicinity of Lot 76, the wall must be constructed to a minimum height of eight feet six inches (8'6") above project site grade, and the sound wall must be constructed to a minimum height of seven (7) feet above project site grade along the remainder of the SJVR project site frontage. In order to be effective, the sound wall must be turned inward (southward) for a minimum distance of twenty (20) feet along the east side of Lot 76. The locations and heights of the required sound walls are provided on Figure 1. Suitable construction materials include concrete blocks, masonry, or stucco on both sides of a wood or steel stud wall.

- Mechanical ventilation or air conditioning must be provided for all homes so that windows and doors can remain closed for sound insulation purposes.

The conclusions and recommendations of this acoustical analysis are based upon the best information known to WJV Acoustics Inc. (WJVA) at the time the analysis was prepared concerning the proposed lot layout plan, project site elevation, railroad operations, traffic volumes and roadway configurations. Any significant changes in these factors will require a reevaluation of the findings of this report. Additionally, any significant future changes in motor vehicle technology, noise regulations or other factors beyond WJVA's control may result in long-term noise results different from those described by this analysis.

Respectfully submitted,

Walter J. Van Groningen
President

WJV:wjv

FIGURE 1: SITE PLAN

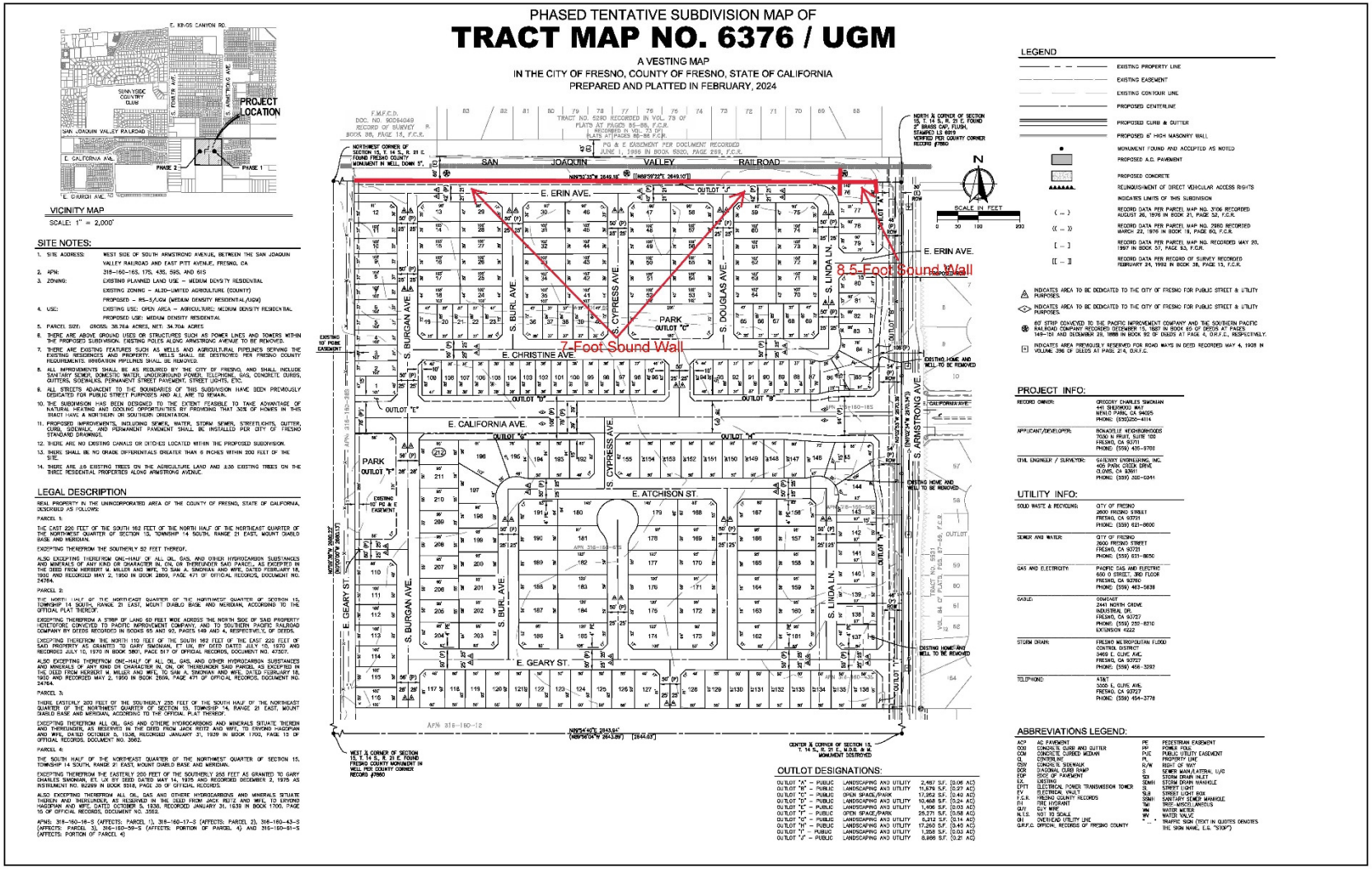

FIGURE 2: PROJECT SITE VICINITY AND NOISE MEASUREMENT LOCATION

FIGURE 3: S. ARMSTRONG AVENUE NOISE MEASUREMENT SITE

APPENDIX A

ACOUSTICAL TERMINOLOGY

AMBIENT NOISE LEVEL: The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

CNEL: Community Noise Equivalent Level. The average equivalent sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night before 7:00 a.m. and after 10:00 p.m.

DECIBEL, dB: A unit for describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).

DNL/L_{dn}: Day/Night Average Sound Level. The average equivalent sound level during a 24-hour day, obtained after addition of ten decibels to sound levels in the night after 10:00 p.m. and before 7:00 a.m.

L_{eq}: Equivalent Sound Level. The sound level containing the same total energy as a time varying signal over a given sample period. L_{eq} is typically computed over 1, 8 and 24-hour sample periods.

NOTE: The CNEL and DNL represent daily levels of noise exposure averaged on an annual basis, while L_{eq} represents the average noise exposure for a shorter time period, typically one hour.

L_{max}: The maximum noise level recorded during a noise event.

L_n: The sound level exceeded "n" percent of the time during a sample interval (L_{90}, L_{50}, L_{10}, etc.). For example, L_{10} equals the level exceeded 10 percent of the time.

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ACOUSTICAL TERMINOLOGY

NOISE EXPOSURE CONTOURS: Lines drawn about a noise source indicating constant levels of noise exposure. CNEL and DNL contours are frequently utilized to describe community exposure to noise.

NOISE LEVEL REDUCTION (NLR): The noise reduction between indoor and outdoor environments or between two rooms that is the numerical difference, in decibels, of the average sound pressure levels in those areas or rooms. A measurement of "noise level reduction" combines the effect of the transmission loss performance of the structure plus the effect of acoustic absorption present in the receiving room.

SEL or SENEL: Sound Exposure Level or Single Event Noise Exposure Level. The level of noise accumulated during a single noise event, such as an aircraft overflight, with reference to a duration of one second. More specifically, it is the time-integrated A-weighted squared sound pressure for a stated time interval or event, based on a reference pressure of 20 micropascals and a reference duration of one second.

SOUND LEVEL: The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear and gives good correlation with subjective reactions to noise.

SOUND TRANSMISSION CLASS (STC): The single-number rating of sound transmission loss for a construction element (window, door, etc.) over a frequency range where speech intelligibility largely occurs.

APPENDIX B
EXAMPLES OF SOUND LEVELS