Lincoln 40 Residential

City of Davis, California

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Table of Contents

List of Tables

List of Figures

List of Appendices

NOISE AND VIBRATION

INTRODUCTION

This section describes the existing noise environment in the area of the proposed Lincoln 40 residential project (Proposed Project) in the City of Davis, California, and the potential of the Proposed Project to be exposed to noise and vibration levels exceeding the City of Davis's applicable standards, or to result in increased noise levels at adjacent uses.

LOCATION

The project site is located on Olive Drive east of Richards Boulevard. The proposed Project is bordered by the Union Pacific Railroad (UPRR) track and 2nd Street to the north, Olive drive to the south and east, and existing houses on Hickory Lane to the west.

Figure 1 shows the project location. Figure 2 shows the project site plan.

PROJECT DESCRIPTION

The proposed project is a residential apartment development which is expected to be used for student housing. There are a total of 130 dwelling units with a total of 473 rooms.

ENVIRONMENTAL SETTING

BACKGROUND INFORMATION ON NOISE AND VIBRATION

Fundamentals of Acoustics

Acoustics is the science of sound. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), then they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second or Hertz (Hz).

Noise is a subjective reaction to different types of sounds. Noise is typically defined as (airborne) sound that is loud, unpleasant, unexpected or undesired, and may therefore be classified as a more specific group of sounds. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by A-weighted sound

levels. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels, but are expressed as dB, unless otherwise noted.

The decibel scale is logarithmic, not linear. In other words, two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70 dBA sound is half as loud as an 80 dBA sound, and twice as loud as a 60 dBA sound.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}), which corresponds to a steady-state A weighted sound level containing the same total energy as a time varying signal over a given time period (usually one hour). The L_{eq} is the foundation of the composite noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

The day/night average level (L_{dn}) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures.

Table 1 lists several examples of the noise levels associated with common situations. Appendix A provides a summary of acoustical terms used in this report.

Lincoln 40 Residential

Figure 1: Location and Noise Monitoring Sites

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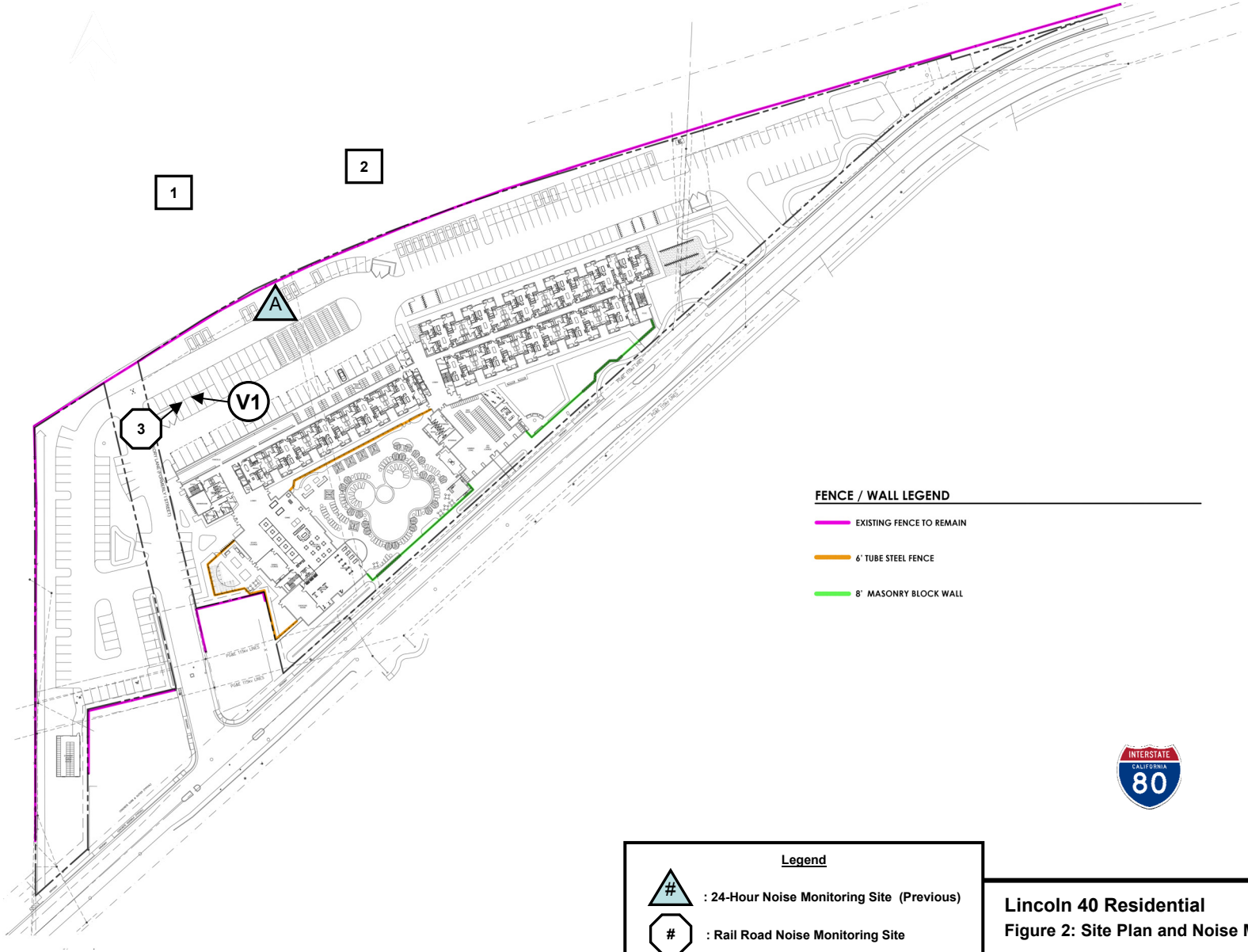

Legend

- # : 24-Hour Noise Monitoring Site (Previous)
- # : Rail Road Noise Monitoring Site
- # :Short-Term Noise Monitoring Site
- # : Vibration Level Monitoring Site

Lincoln 40 Residential

Figure 2: Site Plan and Noise Monitoring Sites

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TABLE 1: TYPICAL NOISE LEVELS

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	--110--	Rock Band
Jet Fly-over at 300 m (1,000 ft)	--100--	
Gas Lawn Mower at 1 m (3 ft)	--90--	
Diesel Truck at 15 m (50 ft), at 80 km/hr (50 mph)	--80--	Food Blender at 1 m (3 ft) Garbage Disposal at 1 m (3 ft)
Noisy Urban Area, Daytime Gas Lawn Mower, 30 m (100 ft)	--70--	Vacuum Cleaner at 3 m (10 ft)
Commercial Area Heavy Traffic at 90 m (300 ft)	--60--	Normal Speech at 1 m (3 ft)
Quiet Urban Daytime	--50--	Large Business Office Dishwasher in Next Room
Quiet Urban Nighttime	--40--	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	--30--	Library
Quiet Rural Nighttime	--20--	Bedroom at Night, Concert Hall (Background)
	--10--	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	--0--	Lowest Threshold of Human Hearing

Source: Caltrans, Technical Noise Supplement, Traffic Noise Analysis Protocol. November 2009.

Effects of Noise on People

The effects of noise on people can be placed in three categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as hearing loss or sudden startling

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so-called ambient noise level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it.

With regard to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- Outside of the laboratory, a 3 dBA change is considered a just-perceivable difference;
- A change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and
- A 10 dBA change is subjectively heard as approximately a doubling in loudness, and can cause an adverse response.

Stationary point sources of noise – including stationary mobile sources such as idling vehicles – attenuate (lessen) at a rate of approximately 6 dB per doubling of distance from the source, depending on environmental conditions (i.e. atmospheric conditions and either vegetative or manufactured noise barriers, etc.). Widely distributed noises, such as a large industrial facility spread over many acres, or a street with moving vehicles, would typically attenuate at a lower rate.

EXISTING CONDITIONS

The existing noise environment on the project site is defined primarily by roadway traffic on the local roadway network, and railroad operations along the Capital Corridor track to the north.

Existing Noise Receptors

Some land uses are considered more sensitive to ambient noise levels than others. Land uses often associated with sensitive receptors generally include residences, schools, libraries, hospitals, and passive recreational areas. Sensitive noise receptors may also include threatened or endangered noise sensitive biological species, although many jurisdictions have not adopted noise standards for wildlife areas. Noise sensitive land uses are typically given special attention in order to achieve protection from excessive noise. Sensitivity is a function of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities involved.

In the immediate vicinity of the project site, sensitive land uses include single-family residential uses located to the north and across the railroad tracks, and as close as 135-feet from the site. Residential uses are located directly adjacent to the west and a cut-out portion at the southwest corner. Additional multi-family residential uses are located across Olive Drive at distances of approximately 75-feet from the site. These land uses could potentially experience noise impacts associated with project construction, and/or increased roadway traffic associated with the project. In addition, this analysis will evaluate the potential for any increased railroad noise levels at residential uses to the north due to reflections off of building facades or any proposed sound barriers.

Existing Ambient Noise Levels

To quantify existing ambient noise levels in the vicinity of the project site, j.c. brennan & associates, Inc. staff conducted short-term noise level measurements on the project site and at residential areas to the north. In addition, continuous 24-hour noise level measurements were conducted on the site. Figures 1 and 2 show the locations of the noise measurement sites. The noise level measurements were conducted in 2015 and 2016 for this project. The noise level measurements were conducted to determine typical background noise levels and for comparison to the project related noise levels. In addition, the noise measurements were collected to specifically identify both freight train and Amtrak noise levels as they may affect the project site. Table 2 shows a summary of the noise measurement results. Appendix B provides the complete results of the 24-hr hour noise measurements.

The sound level meters were programmed to record the hourly maximum, median, and average noise levels at each site during the survey. The maximum value, denoted L_{max}, represents the highest noise level measured during each hour. The average value, denoted L_{eq}, represents the energy average of all of the noise received by the sound level meter microphone. The median value, denoted L_{50}, represents the sound level exceeded 50 percent of the time during the monitoring period. The noise level measurements of train operations also included collecting the sound exposure levels (SEL) for train passbys, arrivals and departures. This allows for determining the overall Ldn contribution of railroad operations on the project site. Table 2 shows the results of the noise level measurements. Appendix B graphically shows the results of the continuous 24-hour noise measurements.

Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meters were used for the ambient noise level measurement survey. The meters were calibrated before and after use with an LDL Model CAL200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

TABLE 2: MEASURED AMBIENT NOISE LEVELS

Site	Location	Date	Average Measured Hourly Noise Levels, Low-High (Average)						
				Daytime (7:00 am - 10:00 pm)			Nighttime (10:00 pm – 7:00 am)		
			L_{dn}	L_{eq}	L_{50}	L_{max}	L_{eq}	L_{50}	L_{max}
Continuous 24-hour Noise Measurement Site									
A	Central Portion of the Northern edge of Project Site	07/15-16/2015	76.8 dBA	69.4 dBA	48.3 dBA	93.2 dBA	70.6 dBA	52.1 dBA	92.8 dBA
Short-term Noise Measurement Sites			**N/A**	L_{eq}	L_{50}	L_{max}	**Time**		
1	Southern end of J St.	08/15/2016	N/A	49.2 dBA	48.2 dBA	63.9 dBA	11:02 A.M.		
2	Southern end of K St.	08/15/2016	N/A	48.1 dBA	47.3 dBA	58.4 dBA	11:34 A.M.		
Source: j.c. brennan & associates, Inc. – 2017									

Existing Roadway Noise Levels

To predict noise levels due to traffic, the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. The model is used in conjunction with the Calveno reference noise emission curves, and accounts for vehicle volume and speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the project site. The FHWA Model was developed to predict hourly L_{eq} values for free-flowing traffic conditions. To calculate Ldn, average daily traffic (ADT) volume data is adjusted based on the assumed day/night distribution of traffic on the project roadways.

Traffic volumes for existing conditions were obtained from the traffic consultant Fehr & Peers (December 2016), in the form of peak hour intersection movements. The p.m. peak hour traffic volumes were compiled into segment volumes and converted into daily traffic volumes. Truck usage and vehicle speeds on the local area roadways were estimated from field observations.

Table 3 summarizes the modeled existing traffic noise levels along each roadway segment in the project area. Appendix C provides the complete inputs and results of the FHWA traffic modeling.

TABLE 3: PREDICTED EXISTING TRAFFIC NOISE LEVELS

Roadway	Segment	Ldn, dBA	Contour Noise Levels (Ldn, dBA)			
			Distance (feet)	Distance to Contours (feet)		
				70	65	60
First St	C St to D St	61.0	50	13	27	59
D St	First St to Second St	55.8	50	6	12	26
First St	D St to E St	61.8	50	14	31	66
E St	First St to Second St	57.0	50	7	15	32
First St	E St to F St	54.4	50	5	10	21
Richards Blvd	Olive Dr to First St	66.6	50	30	64	137
Olive Dr	West of Richards Blvd	56.8	50	7	14	30
Olive Dr	East of Richards Blvd	60.3	50	11	24	53
Richards Blvd	I-80 WB ramp to Olive Dr	66.5	50	29	63	136
Richards Blvd	I-80 EB ramp to W Chiles Rd	67.5	50	34	73	157
Cowell Blvd	Research Park Dr to Drew Ave	66.1	50	27	59	127

[1] Distances to traffic noise contours are measured in feet from the centerlines of the Roadways.
[2] Traffic noise levels do not account for shielding from existing noise barriers or intervening structures. Traffic noise levels may vary depending on actual setback distances and localized shielding.
Source: Fehr & Peers Traffic Consultants - 2016, j.c. brennan & associates, Inc. - 2017

Existing Railroad Noise Levels

To quantify existing railroad noise levels in the vicinity of the project site, j.c. brennan & associates, Inc. staff utilized continuous 24-hour noise level measurements, which were previously conducted at the project site, to discern the contribution of noise due to train activity. The noise level measurements were conducted between Wednesday July 15, 2015 and Thursday July 16, 2015.

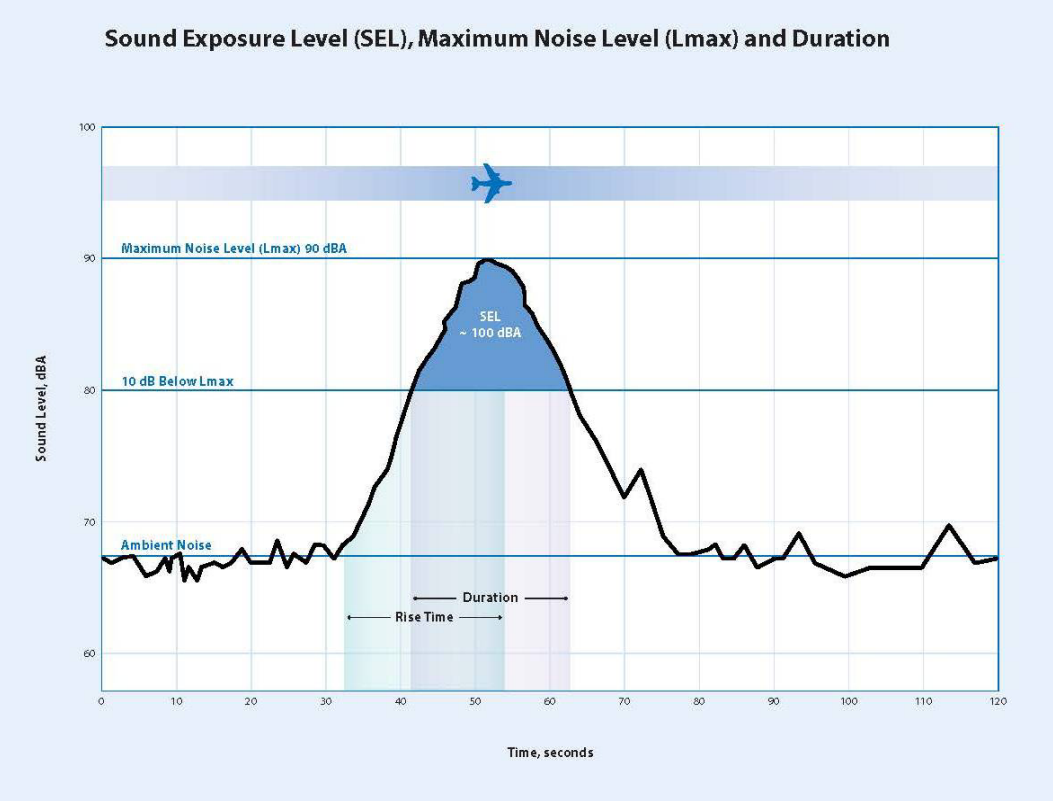
The noise level measurements were conducted to determine typical noise levels due to train operations as they affect the project site. Table 2 previously discussed, under the ambient noise

levels, shows a summary of the noise monitoring results at Noise Measurement Site A. Appendix B provides the complete results of the 24-hr hour noise measurements. Based upon the noise measurement results, the overall Ldn measured at Site A was 76.8 dBA Ldn. See Figure 2 for the noise monitoring location.

The sound level meter was programmed to record the maximum, median, and average noise levels during the survey. The maximum value, denoted L_{max}, represents the highest noise level measured. The average value, denoted L_{eq}, represents the energy average of all of the noise received by the sound level meter microphone during the monitoring period. The median value, denoted L_{50}, represents the sound level exceeded 50 percent of the time during the monitoring period. In addition, the sound level meter was programmed to identify train pass-bys at the site. In this case, noise levels due to train pass-bys are represented by the graphed sound exposure levels (SEL's). The measured SEL's account for the sound energy during each train pass-by, and the overall duration (number of seconds) of the train event. The SEL essentially compresses all of the sound energy during the entire event into 1 second. In general, the measured SEL due to a train pass-by is approximately 10 dB higher than the measured maximum noise level. Figure 3 shows the relationship between a maximum noise level and an SEL. Figure 3 is based upon an aircraft overflight, however, it is the same principle for a train pass-by.

A Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meter was used for the ambient noise level measurement survey. The meter was calibrated before and after use with an LDL Model CAL200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

Figure 3



In addition, noise level measurements and field observations of Amtrak trains were conducted at the site on August 15th and October 13th, 2016. Detailed notes on the arrivals and departures from the Rail Station were also included in the observations. Table 4 shows the results of the Amtrak noise measurements.

TABLE 4: MEASURED AMTRAK EVENT NOISE LEVELS

Site	Location	Date	Event Description	Duration (Min:Sec)	SEL	L_{eq}	L_{max}
Rail Road Noise Monitoring Site							
3	See Figure 1	08/15/16	AMTRAK arriving	00:25	88.8 dBA	74.8 dBA	82.6 dBA
3	See Figure 1	08/15/16	AMTRAK departing	00:39	89.6 dBA	73.8 dBA	80.9 dBA
3	See Figure 1	10/13/16	AMTRAK arriving from Sacramento	00:23	83.6 dBA	70.0 dBA	75.4 dBA
3	See Figure 1	10/13/16	AMTRAK arriving from Martinez	02:59	97.0 dBA	74.5 dBA	93.0 dBA
3	See Figure 1	10/13/16	AMTRAK arriving from Sacramento	01:05	90.3 dBA	72.2 dBA	77.6 dBA
Source: j.c. brennan & associates, Inc. – 2016							

Based upon the noise measurement data shown in Tables 2 and 4, and the single event noise measurements collected in 2015 at the site, between 30 and 40 daily Amtrak trains were identified at the noise measurement site, and 21 daily freight train operations. The Amtrak schedule assumes no more than 30 trains per day, as reported in the traffic report for the project. Therefore, the 30 to 40 train operations captured during the noise measurement period may be considered to be conservative. Assuming that a maximum of 40 Amtrak trains occurred, the Ldn associated with the Amtrak trains was 67 dBA Ldn, and the overall noise level associated with freight train operations was 76.7 dBA Ldn. Therefore, the freight train operations clearly dominate the overall noise environment associated with both freight and Amtrak operations. Table 5 shows the distances to the overall railroad noise contours.

TABLE 5: DISTANCES TO RAILROAD NOISE CONTOURS

Site	Location	Date - Time	Distance to Noise Contours			
			75 dBA Ldn Contour	70 dBA Ldn Contour	65 dBA Ldn Contour	60 dBA Ldn Contour
A	South of Railroad track, 50 feet from track centerline	July 15-16, 2015	65 feet	139 feet	300 feet	647 feet
Source: j.c. brennan & associates, Inc. – 2017						

REGULATORY CONTEXT

FEDERAL

There are no federal regulations related to noise that apply to the Proposed Project.

State

California Environmental Quality Act

The California Environmental Quality Act (CEQA) Guidelines, Appendix G, indicate that a significant noise impact may occur if a project exposes persons to noise levels in excess of local general plans or noise ordinance standards, or cause a substantial permanent or temporary increase in ambient noise levels.

California State Building Codes

The State Building Code, Title 24, Part 2 of the State of California Code of Regulations establishes uniform minimum noise insulation performance standards to protect persons within new buildings which house people, including hotels, motels, dormitories, apartment houses and dwellings other than single-family dwellings. Title 24 mandates that interior noise levels attributable to exterior sources shall not exceed 45 dB L_{dn} or CNEL in any habitable room.

Title 24 also mandates that for structures containing noise-sensitive uses to be located where the L_{dn} or CNEL exceeds 60 dB, an acoustical analysis must be prepared to identify mechanisms for limiting exterior noise to the prescribed allowable interior levels. If the interior allowable noise levels are met by requiring that windows be kept closed, the design for the structure must also specify a ventilation or air conditioning system to provide a habitable interior environment.

LOCAL

City of Davis General Plan

Policy NOISE 1.1 Minimize vehicular and stationary noise sources, and noise emanating from temporary activities.

Standards

a. The City shall strive to achieve the “normally acceptable” exterior noise levels shown in Table 6 (Table 19 of the General Plan) and the target interior noise levels in Table 7 (Table 20 of the General Plan) in future development areas and in currently developed areas.

b. New development shall generally be allowed only in areas where exterior and interior noise levels consistent with Table 6 (Table 19 of the General Plan) and Table 7 (Table 20 of the General Plan) can be achieved.

c. New development and changes in use shall generally be allowed only if they will not adversely impact attainment within the community of the exterior and interior noise

standards shown in Table 6 (Table 19 of the General Plan) and Table 7 (Table 20 of the General Plan). Cumulative and project specific impacts by new development on existing residential land uses shall be mitigated consistent with the standards in Table 6 (Table 19 of the General Plan) and Table 7 (Table 20 of the General Plan).

d. Required noise mitigation measures for new and existing housing shall be provided with the first stage and prior to completion of new developments or the completion of capacity-enhancing roadway changes wherever noise levels currently exceed or are projected within 5 years to exceed the normally acceptable exterior noise levels in Table 6 (Table 19 of the General Plan).

TABLE 6: EXTERIOR NOISE LEVEL STANDARDS

(CITY OF DAVIS GENERAL PLAN TABLE 19)

LAND USE CATEGORY	COMMUNITY NOISE EXPOSURE LDN OR CNEL, DBA			
	NORMALLY ACCEPTABLE	CONDITIONALLY ACCEPTABLE	UNACCEPTABLE	CLEARLY UNACCEPTABLE
Residential	Under 60	60-70*	70-75	Above 75
Transient Lodging - Motels, Hotels	Under 60	65-75	75-80	Above 80
Schools, Libraries, Churches, Hospitals, Nursing Homes	Under 60	60-70	70-80	Above 80
Auditoriums, Concert Halls, Amphitheaters	Under 50	50-70	NA	Above 70
Sports Arenas, Outdoor Spectator Sports	NA	Under 75	NA	Above 75
Playgrounds, Neighborhood Parks	Under 70	NA	70-75	Above 75
Golf Courses, Riding Stables, Water Recreation, Cemeteries	Under 70	NA	70-80	Above 80
Office Buildings, Business Commercial and Professional	Under 65	65-75	Above 75	NA
Industrial, Manufacturing, Utilities, Agriculture	Under 65	70-80	Above 80	NA

Normally Acceptable: *Specified land use is satisfactory based upon the assumption that any buildings involved are of normal conventional construction, without special noise insulation requirements.*

Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is conducted, and needed noise attenuation features are included in the construction or development.

Normally Unacceptable: *New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be conducted and needed noise attenuation features shall be included in the construction or development.*

Clearly Unacceptable: *New construction or development shall not be undertaken.*

NA: *Not applicable*

** The City Council shall have discretion within the "conditionally acceptable" range for residential use to allow levels in outdoor spaces to go up to 65 dBA if cost effective or aesthetically acceptable measures are not available to reduce noise levels in outdoor spaces to the "normally acceptable" levels. Outdoor spaces which are designed for visual use only (for example, street-side landscaping in an apartment project), rather than outdoor use space may be considered acceptable up to 70 dBA.*

Source: City of Davis, 2010

TABLE 7: STANDARDS FOR INTERIOR NOISE LEVELS

(CITY OF DAVIS GENERAL PLAN TABLE 20)

Use	Noise Level (dBA)
Residences, schools through grade 12, hospitals and churches	45
Offices	55

Source: City of Davis, 2010

Policy NOISE 1.2 Discourage the use of sound walls whenever alternative mitigation measures are feasible, while also facilitating the construction of sound walls where desired by the neighborhood and there is no other way to reduce noise to acceptable exterior levels shown in Table 19.

Standards

a. Where sound walls are built, they should include dense landscaping along them to mitigate their visual impact, as illustrated in Figure 38 (Of the General Plan).

b. Where sound walls are built, they should provide adequate openings and visibility from surrounding areas to increase safety and access, as illustrated in Figure 38 (Of the General Plan). Openings should be designed so as to maintain necessary noise attenuation.

c. Review sound walls and other noise mitigations through the design review process.

GOAL NOISE 2. Provide for indoor noise environments that are conducive to living and working.

Policy NOISE 2.1 Take all technically feasible steps to ensure that interior noise levels can be maintained at the levels shown in Table 7 (Table 20 of the General Plan)

Standards

a. New residential development or construction shall include noise attenuation measures necessary to achieve acceptable interior noise levels shown in Table 7 (Table 20 of the General Plan).

b. Existing areas that will be subjected to noise levels greater than the acceptable noise levels shown in Table 7 (Table 20 of the General Plan) as a result of increased traffic on existing city streets (including streets remaining in existing configurations and streets being widened) shall be mitigated to the acceptable levels in Table 7 (Table 20 of the General Plan). If traffic increases are caused by specific projects, then the City shall be the lead agency in implementing cumulative noise mitigation projects. Project applicants shall pay their fair share for any mitigation.

City of Davis Noise Ordinance

The City of Davis has a noise ordinance which is used to evaluated stationary noise sources, such as on-site construction activities. Section 24 of the City of Davis City Code establishes a maximum noise level standard of 55 dB during the hours of 7:00 a.m. to 9:00 p.m., and 50 dB during the hours of 9:00 p.m. to 7:00 a.m. The ordinance defines maximum noise level as the "maximum continuous sound level or repetitive peak level produced by a sound source or group of sources. For the purposes of this analysis, j.c. brennan & associates, Inc. interprets this definition to be equivalent to the average noise level descriptor, Leq. The City Code makes exemptions for certain typical activities which may occur within the city. These exemptions are listed in Article 24.02.040, Special Provisions, and are summarized below:

a) Normal operation of power tools for non-commercial purposes are typically exempted between the hours of 8 am and 8 pm unless the operation unreasonably disturbs the peace and quiet of any neighborhood.

b) Construction or landscape operations would be exempt during the hours of 7am to 7 pm Mondays through Fridays and between the hours of 8 am to 8 pm Saturdays and Sundays assuming that the operations are authorized by valid city permit or business license, or carried out by employees or contractors of the city and one of the following conditions apply (conditions summarized, please see section 24.02.040 of the City Code for the full text):

    1) No piece of equipment produces a noise level exceeding 83 dBA at 25-feet.

    2) The noise level at any point outside the property plane of the project shall not exceed 86 dBA.

    3) Requires that impact equipment and tools be fitted with the best available silencing equipment.

    4) Limits individual powered blowers to a noise level of 70 dBA at 50 feet.

    5) Prohibits more than one blower from simultaneously operating within 100 feet of another blower.

    6) On single-family residential property, the 70 dBA at 50 feet requirement would not apply to blowers operated on single-family residential property.

c) The City Code also exempts air conditioners, pool pumps, and similar equipment from the noise regulations, provided that they are in good working order.

d) Work related to public health and safety is exempt from the noise requirements.

e) Safety devices are exempt from the noise requirements.

f) Emergencies are exempt from the noise requirements.

The noise standards applicable to the project include the relevant portions of the City of Davis General Plan, the City of Davis Noise Ordinance described in the Regulatory Framework section above (Section 3.11.2), and the following standards. Generally, a project may have a significant effect on the environment if it will substantially increase the ambient noise levels for adjoining areas or expose people to severe noise levels. In practice, more specific professional standards have been developed. These standards state that a noise impact may be considered significant if it would generate noise that would conflict with local project criteria or ordinances, or substantially increase noise levels at noise sensitive land uses. The potential increase in traffic noise from the project is a factor in determining significance. Research into the human perception of changes in sound level indicates the following:

- A 3-dB change is barely perceptible,
- A 5-dB change is clearly perceptible, and
- A 10-dB change is perceived as being twice or half as loud.

A limitation of using a single noise level increase value to evaluate noise impacts is that it fails to account for pre-project-noise conditions. Table 8 is based upon recommendations made by the Federal Interagency Committee on Noise (FICON) to provide guidance in the assessment of changes in ambient noise levels resulting from aircraft operations. The recommendations are based upon studies that relate aircraft noise levels to the percentage of persons highly annoyed by the noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, it has been accepted that they are applicable to all sources of noise described in terms of cumulative noise exposure metrics such as the Ldn.

Table 8: Significance of Changes in Noise Exposure

Ambient Noise Level Without Project, Ldn	Increase Required for Significant Impact
<60 dB	+5.0 dB or more
60-65 dB	+3.0 dB or more
>65 dB	+1.5 dB or more

Source: Federal Interagency Committee on Noise (FICON)

Based on the Table 8 data, an increase in the traffic noise level of 5 dB or more would be significant where the pre-project noise level are less than 60 dB Ldn. Extending this concept to higher noise levels, an increase in the traffic noise level of 1.5 dB or more may be significant where the pre-project traffic noise level exceeds 65 dB Ldn. The rationale for the Table 8 criteria is that, as ambient noise levels increase, a smaller increase in noise resulting from a project is sufficient to cause annoyance.

CRITERIA FOR ACCEPTABLE VIBRATION

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While

vibration is related to noise, it differs in that in that noise is generally considered to be pressure waves transmitted through air, whereas vibration usually consists of the excitation of a structure or surface. As with noise, vibration consists of an amplitude and frequency. A person's perception to the vibration will depend on their individual sensitivity to vibration, as well as the amplitude and frequency of the source and the response of the system which is vibrating.

Vibration can be measured in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration measures in terms of peak particle velocities in inches per second. Standards pertaining to perception as well as damage to structures have been developed for vibration levels defined in terms of peak particle velocities.

The City of Davis does not contain specific policies pertaining to vibration levels. However, vibration levels associated with construction activities are discussed in this report.

Human and structural response to different vibration levels is influenced by a number of factors, including ground type, distance between source and receptor, duration, and the number of perceived vibration events. Table 9, which was developed by Caltrans, shows the vibration levels which would normally be required to result in damage to structures. The vibration levels are presented in terms of peak particle velocity in inches per second.

Table 9 indicates that the threshold for architectural damage to structures is 0.20 in/sec p.p.v. and continuous vibrations of 0.10 in/sec p.p.v., or greater, would likely cause annoyance to sensitive receptors.

TABLE 9: **EFFECTS OF VARIOUS VIBRATION LEVELS ON PEOPLE AND BUILDINGS**

Vibration Level (Peak Particle Velocity)*		Human Reaction	Effect on Buildings
mm/s	in/sec		
0.15-0.30	0.006-0.019	Threshold of perception; possibility of intrusion	Vibrations unlikely to cause damage of any type
2.0	0.08	Vibrations readily perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
2.5	0.10	Level at which continuous vibrations begin to annoy people	Virtually no risk of "architectural" damage to normal buildings
5.0	0.20	Vibrations annoying to people in buildings (this agrees with the levels established for people standing on bridges and subjected to relative short periods of vibrations)	Threshold at which there is a risk of "architectural" damage to normal dwelling - houses with plastered walls and ceilings Special types of finish such as lining of walls, flexible ceiling treatment, etc., would minimize "architectural" damage
10-15	0.4-0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause "architectural" damage and possibly minor structural damage.

Source: Transportation Related Earthborne Vibrations, Caltrans Experiences. Technical Advisory: TAV-02-01-R9601. February 20, 2002.

IMPACTS AND MITIGATION MEASURES

Existing literature, noise measurements, and application of accepted noise and vibration prediction and propagation algorithms were used to predict impacts due to and upon development of the proposed project. Details with regards to the analysis for each impact and mitigation measure are described within this report.

Impacts of the environment on a project, as opposed to impacts of a project on the environment are beyond the scope of required CEQA review. However, the impacts of the environment on the project are discussed so that the reviewer and decision maker can determine compliance with the appropriate noise level criteria contained within the General Plan Noise Element and Noise Ordinance.

THRESHOLDS OF SIGNIFICANCE

Appendix G of the CEQA Guidelines states that a project would normally be considered to result in significant noise impacts if noise levels conflict with adopted environmental standards or plans or if noise generated by the project would substantially increase existing noise levels at sensitive receivers on a permanent or temporary basis. Significance criteria for noise impacts are drawn from CEQA Guidelines Appendix G (Items XI [a-f]).

Additional thresholds included in the General Plan EIR also are shown.

Would the project:

a. Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

b. Expose persons to, or generate, excessive groundborne vibration or groundborne noise levels;

c. Cause a substantial permanent increase in ambient noise levels in the project vicinity above existing levels without the project;

d. Cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above existing levels without the project;

e. Expose persons residing or working in the project area to excessive noise levels if located within an airport land use plan or where such a plan has not been adopted within 2 miles of a public airport or public use airport; or

f. Expose persons residing or working in the project area to excessive noise levels if located within the vicinity of a private airstrip.

The proposed project is not located within two miles of a public or private airport, therefore items “e” and “f” are not discussed any further in this study.

Off-site traffic noise increase threshold test

The test of significance for increases in off-site traffic noise is two-fold. First, traffic noise levels are reviewed to see if the project's contribution to traffic noise would exceed the FICON levels identified in Table 8. If the project's increase in traffic noise levels along surrounding roadways would exceed the FICON criteria shown in Table 8, the proposed project would be considered to have a significant noise impact along that roadway segment.

The second part of the significance test would be applied if the project does not result in the traffic noise level increases shown in Table 8 (i.e., the project does not exceed the FICON criteria). In this case, each roadway segment is assessed to determine whether the project's traffic noise contribution would cause any receptors along the roadway to be exposed to exterior noise levels exceeding the City's General Plan Noise Element standards. Specifically, Noise Element Policy 1.1-c requires the following:

> New development and changes in use shall generally be allowed only if they will not adversely impact attainment within the community of the exterior and interior noise standards shown in Table 19 [Table 6] and Table 20 [Table 7] Cumulative and project specific impacts by new development on existing residential land uses shall be mitigated consistent with the standards in Table 19 [Table 6] and Table 20 [Table 7].

For residential uses, Table 19 [Table 6] establishes a Normally Acceptable exterior noise level standard of 60 dB Ldn. Therefore, if an existing residential receptor is exposed to existing noise levels of less than 60 dB Ldn, any project-related traffic noise level increase that causes noise levels to exceed 60 dB Ldn would be considered significant. If an existing receptor is exposed to conditionally acceptable exterior noise levels (60 to 70 dB) the FICON criteria shown in Table 8 would be used as the test of significance.

It should be noted that except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived by the human ear. Therefore, where a project's traffic noise contribution is 1 dBA or less, a project is not considered to adversely impact attainment.

PROJECT-SPECIFIC IMPACTS AND MITIGATION MEASURES

Impact 1 Construction Noise at Sensitive Receptors

> Construction of the Proposed Project would temporarily increase noise levels during construction. This would be a ***less than significant*** impact.

The new development, maintenance of roadways, installation of public utilities, and infrastructure improvements associated with the project will require construction activities. These activities include the use of heavy equipment and impact tools. Table 10 provides a list of the types of equipment which may be associated with construction activities and the associated noise levels.

Table 10: Construction Equipment Noise

Type of Equipment	Predicted Noise Levels, Lmax dB				Distances to Noise Contours (feet)	
	Noise Level At 25'	Noise Level at 50'	Noise Level at 100'	Noise Level at 200'	70 dB Lmax contour	65 dB Lmax contour
Backhoe	84	78	72	66	126	223
Compactor	89	83	77	71	223	397
Compressor (air)	84	78	72	66	126	223
Concrete Saw	96	90	84	78	500	889
Dozer	88	82	76	70	199	354
Dump Truck	82	76	70	64	100	177
Excavator	87	81	75	69	177	315
Generator	87	81	75	69	177	315
Jackhammer	94	89	83	77	446	792
Pneumatic Tools	91	85	79	73	281	500

Source: Roadway Construction Noise Model User's Guide. Federal Highway Administration. FHWA-HEP-05-054. January 2006. j.c. brennan & associates, Inc. 2016.

Activities involved in project construction would typically generate maximum noise levels ranging from 82 dB and 96 dB at a distance of 25 feet. The nearest residence is located adjacent to the southwest portion of the project site. There is a significant setback from the where the majority of construction will occur on the site to those residences to the west based upon the proposed landscape buffer along the west side of the project site. The majority of construction is expected to occur at distances of 100 to 200-feet from the nearest property line. Therefore, noise levels would range between 66 dB and 83 dB. However, it can be expected that some construction will occur within 50 feet of the nearest residences to the west, and therefore, the worst case maximum noise levels are expected to range between 76 dB and 90 dB.

Construction could result in periods of elevated ambient noise levels and the potential for annoyance. The City of Davis Noise Ordinance which is discussed earlier in this report, provides provisions for reducing overall noise levels due to construction activities.

The most restrictive standard would be the requirement that construction equipment does not exceed 83 dBA at a distance of 25-feet or 86 dBA at the property plane. Construction noise levels can comply with the City of Davis Municipal Code through the implementation of the strategies contained in the Noise Ordinance.

Specifically as a means of complying with the 83 dBA at a distance of 25-feet, the project should employ sound control devices on equipment, muffled exhausts on equipment, and installation of acoustic barriers around stationary equipment which block line-of-sight to the equipment.

As a means of complying with the 86 dBA at the property line, the installation of 6-foot tall barriers at the property line can be employed. These barriers can be constructed of plywood, prefabricated temporary acoustic barriers or tightly fitted straw or hay bales.

A complete list of potential noise reduction strategies is as follows:

- Use of electric construction equipment as an alternative to diesel-powered equipment;
- Sound control devices on equipment;
- Muffled exhaust on construction equipment;
- Staging of construction equipment from nearby residences;
- Limits on idling time for construction equipment and vehicles;
- Installation of acoustic barriers around stationary construction noise sources;
- Installation of temporary barriers between the project site and adjacent sensitive receptors.

Mitigation Measure for Impact 1:

None required

Significance after Mitigation

Less than Significant.

Impact 2: Construction Vibration.

Construction vibration impacts include human annoyance and building structural damage. Human annoyance occurs when construction vibration rises significantly above the threshold of perception. Building damage can take the form of cosmetic or structural. Table 11 shows the typical vibration levels produced by construction equipment.

The primary vibration-generating activities associated with the project would occur when the infrastructure such as grading, utilities, and foundations are constructed. The most significant source of ground-borne vibrations during the project construction would occur from the use of vibratory compactors. Vibratory compactors would generate typical vibration levels of 0.210 in/sec at a distance of 25 feet. Vibratory compactors are generally used at building sites, or where retaining walls are located. The closest portions of the project site where construction activities would include vibratory compactors is more than 50 feet from any adjacent buildings. Table 9, above, indicates that the threshold for architectural damage to buildings is 0.20 in/sec. Table 11 data also indicates vibratory compactors would not generate vibration levels exceeding safe levels at these distances, therefore mitigation measures would not be required. This is a ***less than significant impact.***

Mitigation Measure for Impact 2:

None Required

TABLE 11: VIBRATION LEVELS FOR VARIOUS CONSTRUCTION EQUIPMENT

Type of Equipment	Peak Particle Velocity @ 25 feet (inches/second)	Peak Particle Velocity @ 50 feet (inches/second)
Large Bulldozer	0.089	0.029
Loaded Trucks	0.076	0.025
Pile Driving (Sonic)	0.734	0.50
Small Bulldozer	0.003	0.000
Auger/drill Rigs	0.089	0.029
Jackhammer	0.035	0.011
Vibratory Hammer	0.070	0.023
Vibratory Compactor/roller	0.210	0.070

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Guidelines*, May 2006

Impact 3 Project Generated Traffic Noise at Existing Sensitive Receptors

Traffic generated by the Proposed Project will not generate traffic noise increases exceeding the substantial increase criteria, as outlined above. This is a **less than significant** impact.

Traffic noise levels are predicted at a distance of 50 feet from the roadway centerline. For each roadway analyzed, the 50 feet represents the nearest residence to the roadway. The actual distances to noise level contours may vary from the distances predicted by the FHWA model due to roadway curvature, grade, shielding from local topography or structures, elevated roadways, or elevated receivers. The distances reported in Tables 12 and 13 are generally considered to be conservative estimates of noise exposure along the project-area roadways.

With respect to the first part of the test of significance, Table 12 shows the predicted traffic noise level increases on the local roadway network for the "Existing" and "Existing Plus Project" scenarios. Table 13 shows the predicted traffic noise level increases on the local roadway network for the "Cumulative" and the Cumulative Plus Project" scenarios. Appendix C provides the complete inputs and results of the FHWA traffic noise modeling.

Based upon Tables 12 and 13, the project will result in a changes in traffic noise levels between 0 dBA and 0.4 dBA Ldn. Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived. The change in traffic noise levels caused by the proposed project is not considered a significant increase in traffic noise levels. At no point will the project result in an increase in traffic noise levels in excess of 1 dBA. This is a less than significant impact.

With respect to the second part of the test of significance, Table 12 demonstrates that the proposed project is not predicted to cause increases in existing traffic noise levels which would trigger a new exceedance of the City of Davis' 60 dB L_{dn} exterior noise level standard at sensitive receptor locations. In some cases, existing residences currently exceed the 60 dB

CNEL/Ldn exterior noise level standard. Under the Existing and Existing + Project scenarios, predicted noise levels are as follows at the nearest residences:

- First Street - 61 dB to 62 dB CNEL/Ldn
- Richards Blvd - 67 dB CNEL/Ldn
- Cowell Blvd - 66 dB CNEL/Ldn

The traffic noise level increases are between 0 and 0.4 dBA Ldn/CNEL. The increase in traffic noise levels are not considered to be perceptible to the human ear.

Under the Cumulative and Cumulative + Project scenarios, predicted traffic noise levels are as follows at the nearest residence:

- First Street - 61 dB to 62 dB CNEL/Ldn
- Olive Drive - 61 dB CNEL/Ldn
- Richards Blvd - 67 dB CNEL/Ldn
- Cowell Blvd - 67 dB CNEL/Ldn

However, as discussed above, the project will not cause these existing residences to exceed the City of Davis traffic noise level increase standards in Table 8. The traffic noise level increases are between 0 and 0.4 dBA Ldn/CNEL. The increase in traffic noise levels are not considered to be perceptible to the human ear.

This would be a ***less than significant*** impact.

Mitigation Measure for Impact 3:

None Required

TABLE 12: EXISTING AND EXISTING + PROJECT TRAFFIC NOISE LEVELS

Roadway	Segment	Traffic Noise Levels Ldn, dB)				Distance to Noise Level Contours (feet)					
		Distance (feet)	Existing	Existing + Project	Δ Change	Existing (Ldn, dB)			Existing + Project (Ldn, dB)		
						70	65	60	70	65	60
First St	C St to D St	50	61.0	61.1	0.1	13	27	59	13	27	59
D St	First St to Second St	50	55.8	55.8	0.0	6	12	26	6	12	26
First St	D St to E St	50	61.8	61.8	0.0	14	31	66	14	31	66
E St	First St to Second St	50	57.0	57.1	0.1	7	15	32	7	15	32
First St	E St to F St	50	54.4	54.5	0.1	5	10	21	5	10	22
Richards Blvd	Olive Dr to First St	50	66.6	66.6	0.0	30	64	137	30	64	138
Olive Dr	West of Richards Blvd	50	56.8	56.8	0.0	7	14	30	7	14	31
Olive Dr	East of Richards Blvd	50	60.3	60.7	0.4	11	24	53	12	26	56
Richards Blvd	I-80 WB ramp to Olive Dr	50	66.5	66.6	0.1	29	63	136	30	64	138
Richards Blvd	I-80 EB ramp to W Chiles Rd	50	67.5	67.5	0.0	34	73	157	34	73	158
Cowell Blvd	Research Park Dr to Drew Ave	50	66.1	66.1	0.0	27	59	127	27	59	127

[1] Distances to traffic noise contours are measured in feet from the centerlines of the Roadways.
[2] Traffic noise levels do not account for shielding from existing noise barriers or intervening structures. Traffic noise levels may vary depending on actual setback distances and localized shielding.
Source: Fehr & Peers Transportation Engineering - 2017, j.c. brennan & associates, Inc. - 2017

Table 13: Cumulative No Project and Cumulative + Project Traffic Noise Levels

Roadway	Segment	Traffic Noise Levels Ldn, dB)				Distance to Noise Level Contours (feet)					
		Distance (feet)	Cumulative No Project	Cumulative + Project	Δ Change	Cumulative No Project (Ldn, dB)			Cumulative + Project (Ldn, dB)		
						70	65	60	70	65	60
First St	C St to D St	50	61.9	61.9	0.0	14	31	67	15	31	67
D St	First St to Second St	50	57.2	57.2	0.0	7	15	32	7	15	32
First St	D St to E St	50	62.7	62.7	0.0	16	35	76	16	35	76
E St	First St to Second St	50	58.3	58.3	0.0	8	18	39	8	18	39
First St	E St to F St	50	55.5	55.6	0.1	5	12	25	5	12	25
Richards Blvd	Olive Dr to First St	50	67.4	67.4	0.0	34	72	156	34	73	157
Olive Dr	West of Richards Blvd	50	60.8	60.9	0.1	12	26	57	12	27	57
Olive Dr	East of Richards Blvd	50	60.9	61.3	0.4	12	27	58	13	28	61
Richards Blvd	I-80 WB ramp to Olive Dr	50	67.3	67.4	0.1	33	71	154	33	72	155
Richards Blvd	I-80 EB ramp to W Chiles Rd	50	68.9	68.9	0.0	42	91	197	43	92	197
Cowell Blvd	Research Park Dr to Drew Ave	50	67.2	67.2	0.0	32	70	151	33	70	151

[1] Distances to traffic noise contours are measured in feet from the centerlines of the Roadways.
[2] Traffic noise levels do not account for shielding from existing noise barriers or intervening structures. Traffic noise levels may vary depending on actual setback distances and localized shielding.
Source: Fehr & Peers Transportation Engineers - 2017, j.c. brennan & associates, Inc. - 2017

Impact 4: **CEQA Cumulative Alternatives Generated Traffic Noise at Existing Sensitive Receptors**

Traffic generated by the five CEQA Cumulative Alternatives will not generate traffic noise increases exceeding the substantial increase criteria, as outlined above. This is a **less than significant** impact.

Traffic noise levels are predicted at distance of 50 feet from the roadway centerlines which represent the nearest residences to each of the roadways. The actual distances to noise level contours may vary from the distances predicted by the FHWA model due to roadway curvature, grade, shielding from local topography or structures, elevated roadways, or elevated receivers. The distances reported in Tables 14 through 18 show the "Cumulative" and the "Cumulative Plus Project" scenarios for CEQA Alternatives 1 through 5, respectively. The “CEQA Cumulative Condition”, includes the Embassy Suites Hotel / Conference Center project and adds traffic generated by the MRIC project and the Nishi project. Within this scenario are included several sub-scenarios that include different combinations of roadway improvements currently being evaluated by the City of Davis within the project vicinity. These sub-scenarios are addressed in this section and described below:

CEQA Cumulative Scenario 1
- Nishi
- MRIC

CEQA Cumulative Scenario 2
- Nishi
- MRIC
- I-80 / Richards Boulevard

CEQA Cumulative Scenario 3
- Nishi
- MRIC
- I-80 / Richards Boulevard
- Olive Drive to L Street

CEQA Cumulative Scenario 4
- Nishi
- MRIC
- I-80 / Richards Boulevard
- I-80 / Olive Drive Ramp Closure

CEQA Cumulative Scenario 5
- Nishi
- MRIC
- I-80 / Richards Boulevard
- Olive Drive to L Street
- I-80 / Olive Drive Ramp Closure

The analyses for each CEQA alternative are generally considered to be conservative estimates of noise exposure along the project-area roadways. Appendix C provides the complete inputs and results of the FHWA traffic noise modeling.

With respect to the first part of the test of significance, based upon Tables 14 through 18, the Cumulative CEQA Alternatives 1 through 5 will result in changes in traffic noise levels between 0 dBA and 0.5 dBA CNEL/Ldn. Except in calfuly controlled laboratory experiments, a change of 1 dBA cannot be perceived. Thus the change in traffic noise levels caused by the project is not considered to be a cumulatively considerable increase in noise levels per Table 8.

With respect to the second part of the test of significance, Tables 14 through 18 demonstrate that the proposed project's incremental contribution is not predicted to cause increases in traffic noise levels which would trigger a new exceedance of the City of Davis' 60 dB L_{dn} exterior noise level standard at sensitive receptor locations. In some cases, existing residences will exceed the City of Davis 60 dB CNEL/Ldn exterior noise level standard under each of the CEQA Cumulative scenarios. However, as discussed above, the project's incremental contribution of traffic noise in the CEQA Cumulative scenarios will not cause existing residences to exceed the City of Davis noise level increase criteria in Table 8.

This would be a ***less than significant*** impact for CEQA Alternatives 1, 2, 3, 4 and 5.

Mitigation Measure for Impact 4:

None required

Table 14: Cumulative No Project and Cumulative + Project Traffic Noise Levels CEQA Scenario 1

Roadway	Segment	Traffic Noise Levels Ldn, dB)				Distance to Noise Level Contours (feet)					
		Distance (feet)	Cumulative No Project	Cumulative + Project	Δ Change	Cumulative No Project (Ldn, dB)			Cumulative + Project (Ldn, dB)		
						70	65	60	70	65	60
First St	C St to D St	50	61.6	61.7	0.1	14	30	64	14	30	65
D St	First St to Second St	50	58.0	58.1	0.1	8	17	37	8	17	37
First St	D St to E St	50	62.5	62.5	0.0	16	34	74	16	34	74
E St	First St to Second St	50	58.3	58.4	0.1	8	18	39	8	18	39
First St	E St to F St	50	56.0	56.0	0.0	6	12	27	6	13	27
Richards Blvd	Olive Dr to First St	50	67.2	67.3	0.1	33	70	152	33	71	153
Olive Dr	West of Richards Blvd	50	62.8	62.9	0.1	17	36	77	17	36	78
Olive Dr	East of Richards Blvd	50	61.2	61.5	0.3	13	28	60	14	29	63
Richards Blvd	I-80 WB ramp to Olive Dr	50	68.3	68.3	0.0	38	82	178	38	83	178
Richards Blvd	I-80 EB ramp to W Chiles Rd	50	69.3	69.3	0.0	45	97	208	45	97	209
Cowell Blvd	Research Park Dr to Drew Ave	50	67.6	67.6	0.0	35	74	160	35	74	160

[1] Distances to traffic noise contours are measured in feet from the centerlines of the Roadways.
[2] Traffic noise levels do not account for shielding from existing noise barriers or intervening structures. Traffic noise levels may vary depending on actual setback distances and localized shielding.
Source: Fehr & Peers Transportation Engineering - 2017, j.c. brennan & associates, Inc. - 2017

Table 15: Cumulative No Project and Cumulative + Project Traffic Noise Levels CEQA Scenario 2

Roadway	Segment	Traffic Noise Levels Ldn, dB)				Distance to Noise Level Contours (feet)					
		Distance (feet)	Cumulative No Project	Cumulative + Project	Δ Change	Cumulative No Project (Ldn, dB)			Cumulative + Project (Ldn, dB)		
						70	65	60	70	65	60
First St	C St to D St	50	61.6	61.7	0.1	14	30	64	14	30	65
D St	First St to Second St	50	58.0	58.1	0.1	8	17	37	8	17	37
First St	D St to E St	50	62.5	62.5	0.0	16	34	74	16	34	74
E St	First St to Second St	50	58.3	58.4	0.1	8	18	39	8	18	39
First St	E St to F St	50	56.0	56.1	0.1	6	12	27	6	13	27
Richards Blvd	Olive Dr to First St	50	67.2	67.3	0.1	33	70	152	33	71	154
Olive Dr	West of Richards Blvd	50	62.8	62.9	0.1	17	36	77	17	36	78
Olive Dr	East of Richards Blvd	50	61.2	61.7	0.5	13	28	60	14	30	65
Richards Blvd	I-80 WB ramp to Olive Dr	50	68.3	68.3	0.0	38	82	178	39	83	179
Richards Blvd	I-80 EB ramp to W Chiles Rd	50	69.3	69.3	0.0	45	97	208	45	97	209
Cowell Blvd	Research Park Dr to Drew Ave	50	67.6	67.6	0.0	35	74	160	35	75	161
Third St.	J St. to K St.	50	63.5	63.5	0.0	18	40	85	18	40	86
K St.	Second St. to Third St.	50	47.4	47.4	0.0	2	3	7	2	3	7
Third St.	K St. to L St.	50	63.5	63.5	0.0	18	40	85	18	40	86
L St.	Second St. to Third St.	50	65.4	65.4	0.0	25	53	115	25	53	115

[1] Distances to traffic noise contours are measured in feet from the centerlines of the Roadways.
[2] Traffic noise levels do not account for shielding from existing noise barriers or intervening structures. Traffic noise levels may vary depending on actual setback distances and localized shielding.
Source: Fehr & Peers Transportation Engineering - 2017, j.c. brennan & associates, Inc. - 2017

Table 16: Cumulative No Project and Cumulative + Project Traffic Noise Levels CEQA Scenario 3

Roadway	Segment	Traffic Noise Levels Ldn, dB)				Distance to Noise Level Contours (feet)					
		Distance (feet)	Cumulative No Project	Cumulative + Project	Δ Change	Cumulative No Project (Ldn, dB)			Cumulative + Project (Ldn, dB)		
						70	65	60	70	65	60
First St	C St to D St	50	62.0	62.0	0.0	15	31	68	15	32	68
D St	First St to Second St	50	58.2	58.2	0.0	8	18	38	8	18	38
First St	D St to E St	50	62.9	62.9	0.0	17	36	78	17	36	78
E St	First St to Second St	50	58.1	58.1	0.0	8	17	37	8	17	37
First St	E St to F St	50	53.8	53.8	0.0	4	9	19	4	9	19
Richards Blvd	Olive Dr to First St	50	66.4	66.5	0.1	29	62	134	29	63	135
Olive Dr	West of Richards Blvd	50	62.7	62.8	0.1	16	35	76	16	35	76
Olive Dr	East of Richards Blvd	50	63.0	63.1	0.1	17	37	79	17	38	81
Richards Blvd	I-80 WB ramp to Olive Dr	50	68.5	68.5	0.0	40	86	184	40	86	185
Richards Blvd	I-80 EB ramp to W Chiles Rd	50	69.1	69.2	0.1	44	94	203	44	95	204
Cowell Blvd	Research Park Dr to Drew Ave	50	67.4	67.4	0.0	33	72	155	34	72	156
Third St.	J St. to K St.	50	64.9	64.9	0.0	23	49	105	23	49	106
K St.	Second St. to Third St.	50	65.4	65.4	0.0	25	53	114	25	53	115
Third St.	K St. to L St.	50	65.8	65.8	0.0	26	56	121	26	57	123
L St.	Second St. to Third St.	50	65.9	66.0	0.1	27	57	123	27	58	125

[1] Distances to traffic noise contours are measured in feet from the centerlines of the Roadways.
[2] Traffic noise levels do not account for shielding from existing noise barriers or intervening structures. Traffic noise levels may vary depending on actual setback distances and localized shielding.
Source: Fehr & Peers Transportation Engineering - 2017, j.c. brennan & associates, Inc. - 2017

Table 17: Cumulative No Project and Cumulative + Project Traffic Noise Levels CEQA Scenario 4

Roadway	Segment	Traffic Noise Levels Ldn, dB)				Distance to Noise Level Contours (feet)					
		Distance (feet)	Cumulative No Project	Cumulative + Project	Δ Change	Cumulative No Project (Ldn, dB)			Cumulative + Project (Ldn, dB)		
						70	65	60	70	65	60
First St	C St to D St	50	61.6	61.6	0.0	14	30	64	14	30	64
D St	First St to Second St	50	58.0	58.0	0.0	8	17	37	8	17	37
First St	D St to E St	50	62.5	62.5	0.0	16	34	74	16	34	74
E St	First St to Second St	50	58.3	58.3	0.0	8	18	39	8	18	39
First St	E St to F St	50	56.0	56.0	0.0	6	12	27	6	12	27
Richards Blvd	Olive Dr to First St	50	67.2	67.2	0.0	33	70	152	33	70	152
Olive Dr	West of Richards Blvd	50	62.8	62.8	0.0	17	36	77	17	36	77
Olive Dr	East of Richards Blvd	50	60.3	60.3	0.0	11	24	52	11	24	52
Richards Blvd	I-80 WB ramp to Olive Dr	50	68.3	68.3	0.0	38	83	179	38	83	179
Richards Blvd	I-80 EB ramp to W Chiles Rd	50	69.3	69.3	0.0	45	97	208	45	97	208
Cowell Blvd	Research Park Dr to Drew Ave	50	67.6	67.6	0.0	34	74	160	34	74	160
Third St.	J St. to K St.	50	63.5	63.5	0.0	18	40	85	18	40	85
K St.	Second St. to Third St.	50	47.4	47.4	0.0	2	3	7	2	3	7
Third St.	K St. to L St.	50	63.5	63.5	0.0	18	40	85	18	40	85
L St.	Second St. to Third St.	50	65.4	65.4	0.0	25	53	115	25	53	115

[1] Distances to traffic noise contours are measured in feet from the centerlines of the Roadways.
[2] Traffic noise levels do not account for shielding from existing noise barriers or intervening structures. Traffic noise levels may vary depending on actual setback distances and localized shielding.
Source: Fehr & Peers Transportation Engineering - 2015, j.c. brennan & associates, Inc. - 2017

Table 18: Cumulative No Project and Cumulative + Project Traffic Noise Levels CEQA Scenario 5

Roadway	Segment	Traffic Noise Levels Ldn, dB)				Distance to Noise Level Contours (feet)					
		Distance (feet)	Cumulative No Project	Cumulative + Project	Δ Change	Cumulative No Project (Ldn, dB)			Cumulative + Project (Ldn, dB)		
						70	65	60	70	65	60
First St	C St to D St	50	62.1	62.1	0.0	15	32	69	15	32	69
D St	First St to Second St	50	57.6	57.6	0.0	7	16	35	7	16	35
First St	D St to E St	50	62.7	62.7	0.0	16	35	75	16	35	75
E St	First St to Second St	50	58.4	58.4	0.0	8	18	39	8	18	39
First St	E St to F St	50	53.8	53.8	0.0	4	9	19	4	9	19
Richards Blvd	Olive Dr to First St	50	66.8	66.8	0.0	30	65	141	30	65	141
Olive Dr	West of Richards Blvd	50	62.8	62.8	0.0	16	35	76	17	36	77
Olive Dr	East of Richards Blvd	50	63.5	63.6	0.1	18	40	86	19	41	87
Richards Blvd	I-80 WB ramp to Olive Dr	50	69.1	69.2	0.1	44	94	203	44	95	204
Richards Blvd	I-80 EB ramp to W Chiles Rd	50	69.3	69.3	0.0	45	97	208	45	97	209
Cowell Blvd	Research Park Dr to Drew Ave	50	67.6	67.6	0.0	34	74	160	35	74	160
Third St.	J St. to K St.	50	64.6	64.6	0.0	22	47	101	22	47	102
K St.	Second St. to Third St.	50	65.5	65.6	0.1	25	54	117	25	54	117
Third St.	K St. to L St.	50	65.3	65.4	0.1	24	53	113	25	53	115
L St.	Second St. to Third St.	50	65.3	65.4	0.1	24	52	112	25	53	114

[1] Distances to traffic noise contours are measured in feet from the centerlines of the Roadways.
[2] Traffic noise levels do not account for shielding from existing noise barriers or intervening structures. Traffic noise levels may vary depending on actual setback distances and localized shielding.
Source: Fehr & Peers Transportation Engineering - 2017, j.c. brennan & associates, Inc. - 2017

Impact 5: Traffic Noise at New Sensitive Receptors (Compliance with the Davis Noise Level Standards)

Although CEQA is not intended to determine environmental impacts from noise sources as they affect the project site, this analysis provides the necessary information to determine the ability of the project to comply with the City of Davis noise level criteria. The proposed project includes a barrier between 6-feet and 8-feet in height along the property line of the common outdoor activity areas adjacent to Olive Drive. The new noise-sensitive uses within the project will not exceed the City of Davis exterior and interior noise level standards. This is a ***less than significant*** *impact.*

Exterior Traffic Noise Level Impacts:

Under the project Existing and Existing + Project and the Cumulative and Cumulative + Project conditions, the project site would be exposed to traffic noise levels between 60 dBA and 62 dBA CNEL/Ldn, without any sound barriers. The proposed project includes a sound level barrier between 6-feet and 8-feet in height at the proposed common outdoor activity areas adjacent to Olive Drive. Based upon a barrier calculation, a barrier 6-feet in height at the proposed common outdoor activity areas would result in traffic noise levels of less than 60 dBA CNEL/Ldn. The common outdoor areas are where individuals can congregate and have an area which provides a quiet environment for relaxation.

Under all of the Cumulative CEQA scenarios, the project site would be exposed to traffic noise levels betweem 61 dBA and 64 dBA CNEL/Ldn. The proposed project includes sound level barriers between 6-feet and 8-feet in height at the proposed common outdoor activity areas adjacent to Olive Drive. Based upon a barrier calculation, a barrier 6-feet in height at the proposed common outdoor activity areas would result in traffic noise levels of less than 60 dBA CNEL/Ldn. The common outdoor areas are where individuals can congregate and have an area which provides a quiet environment for relaxation.

See Figure 2 for the locations of the sound barriers.

Interior Traffic Noise Impacts:

Modern construction typically provides a 25 dB exterior-to-interior noise level reduction with windows closed. Therefore, sensitive receptors exposed to exterior noise of 70 dB Ldn, or less, will typically comply with the City's 45 dB CNEL/Ldn interior noise level standard. Under all scenarios, the exterior traffic noise levels are less than 65 dB CNEL/Ldn. The interior traffic noise levels will comply with the City's interior noise level standard of 45 dB CNEL/Ldn.

Significance after Mitigation

None Required

Impact 6: Railroad Noise at New Sensitive Receptors (Compliance with the Davis Noise Level Standards)

Although CEQA is not intended to determine environmental impacts from noise sources as they affect the project site, this analysis provides the necessary information to determine the ability of the project to comply with the City of Davis noise level criteria. The proposed project could expose new noise-sensitive uses within the project site to Railroad noise levels that exceed the City of Davis exterior and interior noise level standards. This is considered to be a ***potentially significant*** *impact.*

Exterior Railroad Noise Level Impacts:

Based upon the previous analysis of railroad noise levels and distances to the railroad noise contours shown in Tables 2 and 5, the overall noise level due to rail operations is 77 dB Ldn at a distance of 50-feet from the rail centerline. Based upon a distance of 230-feet to the common outdoor area, the predicted railroad noise levels would be 64 dB Ldn at the common outdoor area. The common area is shielded by buildings on the project site, and would receive a minimum of 5 dB of shielding. Therefore, the predicted noise levels due to rail operations at the common outdoor area is less than 60 dB Ldn and would comply with the City of Davis exterior noise level standard. This is a **less than significant** impact.

Interior Railroad Noise Impacts:

The nearest first row of proposed residential buildings is approximately 150-feet from the centerline of the railroad track. The predicted exterior noise levels at the nearest residences is 71 dB Ldn. Modern construction typically provides a 25 dB exterior-to-interior noise level reduction with windows closed. Therefore, the first row of residences may exceed the interior noise level standard of 45 dB Ldn. This is a **significant** impact.

Mitigation Measure for Impact 6:

Depending upon final building designs and plans, the project may have a slight exceedance of the 45 dB CNEL/Ldn interior noise level standard at some units. The mitigation measure listed below is ensures the project is consistent with the General Plan Noise Element interior noise level standard.

MM 6-1 To ensure interior noise levels do not exceed 45 dB CNEL/Ldn, the project applicant shall do the following:

- Retain an expert noise consultant to perform a focused noise analysis to evaluate interior noise levels taking into consideration final building materials, and adjustments to building locations, facade construction, etc. to determine if the final site and building plans will result in interior noise levels with the potential to exceed the standard of 45 dB CNEL/Ldn.

- If the final site and building plans result in interior noise levels with the potential to exceed the standard of 45 dB CNEL/Ldn within one or more residential units, then windows facing the railroad tracks for all such residential units shall include recommended improvements to the building facades. Improvements can include upgraded STC rated windows, or other construction-related facade improvements.

Significance after Mitigation

Less than Significant

Impact 7: Railroad Noise May Increase at Residences North of the Project Site Due to Reflections of Sound Off of Building Facades

Concern has been raised by residents which are located north of the project site and on the other side of the railroad tracks. The concern which has been raised is with regard to potential reflections of sound associated with railroad operations off of the building facades or any proposed barriers.

Reflections of sound can occur off of long lengths of building facades when individual trains pass by. A perfect reflection can produce an increase in sound of 3 dB (a doubling of sound energy) when the sound does not travel an additional distance, is not scattered (known as refraction) due to irregular surfaces, or is shielded by passing railroad cars. However, in the case of the Lincoln 40 project site, the additional distance the sound would need to travel (attenuate) from the railroad track to the project residential building facades, and then back to the residences to the north is approximately 470-feet. Therefore, the sound would attenuate by approximately 13 dBA. The reflected sound would be less than 63 dBA, and would be approximately 10 dBA less than the noise level currently experienced at the residences to the north. In addition, some of the reflected sound would be blocked by the train vehicles. It is not expected that any reflected noise would result in an increase in overall noise levels due to rail operations at the residences to the north. This is a **less than significant** impact.

Mitigation Measure for Impact 7:

None Required

CUMULATIVE IMPACTS AND MITIGATION MEASURES

The cumulative context for noise impacts associated with the Proposed Project consists of the existing and future noise sources that could affect the surrounding uses. Noise generated by construction would be temporary, and would not add to the permanent noise environment or be considered as part of the cumulative context. Cumulative increases in noise have been discussed throughout this chapter, and have determined that there will be no significant cumulative increase in noise levels due to the project. No mitigation is required.

Appendix A
Acoustical Terminology

Acoustics	The science of sound.
Ambient Noise	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
Attenuation	The reduction of an acoustic signal.
A-Weighting	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
Decibel or dB	Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
CNEL	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.
Frequency	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz (Hz).
L_{dn}	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
L_{eq}	Equivalent or energy-averaged sound level.
L_{max}	The highest root-mean-square (RMS) sound level measured over a given period of time.
$L_{(n)}$	The sound level exceeded a described percentile over a measurement period. For instance, an hourly L_{50} is the sound level exceeded 50% of the time during the one hour period.
Loudness	A subjective term for the sensation of the magnitude of sound.
Noise	Unwanted sound.
NRC	Noise Reduction Coefficient. NRC is a single-number rating of the sound-absorption of a material equal to the arithmetic mean of the sound-absorption coefficients in the 250, 500, 1000, and 2,000 Hz octave frequency bands rounded to the nearest multiple of 0.05. It is a representation of the amount of sound energy absorbed upon striking a particular surface. An NRC of 0 indicates perfect reflection; an NRC of 1 indicates perfect absorption.
Peak Noise	The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the AMaximum@ level, which is the highest RMS level.
RT_{60}	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
Sabin	The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 Sabin.
SEL	Sound Exposure Level. SEL is s rating, in decibels, of a discrete event, such as an aircraft flyover or train passby, that compresses the total sound energy into a one-second event.
STC	Sound Transmission Class. STC is an integer rating of how well a building partition attenuates airborne sound. It is widely used to rate interior partitions, ceilings/floors, doors, windows and exterior wall configurations.
Threshold of Hearing	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
Threshold of Pain	Approximately 120 dB above the threshold of hearing.
Impulsive	Sound of short duration, usually less than one second, with an abrupt onset and rapid decay.
Simple Tone	Any sound which can be judged as audible as a single pitch or set of single pitches.

Appendix B
Lincoln 40 Residential
24hr Continuous Noise Monitoring - Site A
Wednesday, July 15, 2015 - Thursday, July 16, 2015

Hour	Leq	Lmax	L50	L90
13:00	59.4	87.7	48.0	45.9
14:00	62.7	90.0	45.9	43.8
15:00	63.5	88.3	47.2	44.0
16:00	65.4	92.6	47.8	45.5
17:00	62.0	89.5	49.3	47.6
18:00	63.1	88.7	49.5	48.0
19:00	63.2	89.0	49.2	47.7
20:00	64.2	91.9	50.6	48.9
21:00	73.5	99.8	56.3	51.9
22:00	72.5	98.0	55.7	54.3
23:00	63.6	89.1	54.7	53.7
0:00	75.2	104.1	54.7	53.2
1:00	56.8	80.2	53.7	52.5
2:00	56.1	74.7	52.6	46.2
3:00	73.4	98.5	50.1	48.1
4:00	60.9	87.4	50.5	49.1
5:00	70.7	100.5	49.6	47.1
6:00	71.4	102.4	47.1	45.2
7:00	61.5	91.1	48.2	45.7
8:00	70.3	91.5	47.1	44.2
9:00	67.7	95.6	45.7	43.1
10:00	75.8	108.7	46.6	43.8
11:00	67.0	95.6	46.0	43.3
12:00	74.7	98.8	47.7	45.4

Statistical Summary						
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	75.8	59.4	69.4	75.2	56.1	70.6
Lmax (Maximum)	108.7	87.7	93.2	104.1	74.7	92.8
L50 (Median)	56.3	45.7	48.3	55.7	47.1	52.1
L90 (Background)	51.9	43.1	45.9	54.3	45.2	49.9

Computed Ldn, dB	76.8
% Daytime Energy	56%
% Nighttime Energy	44%

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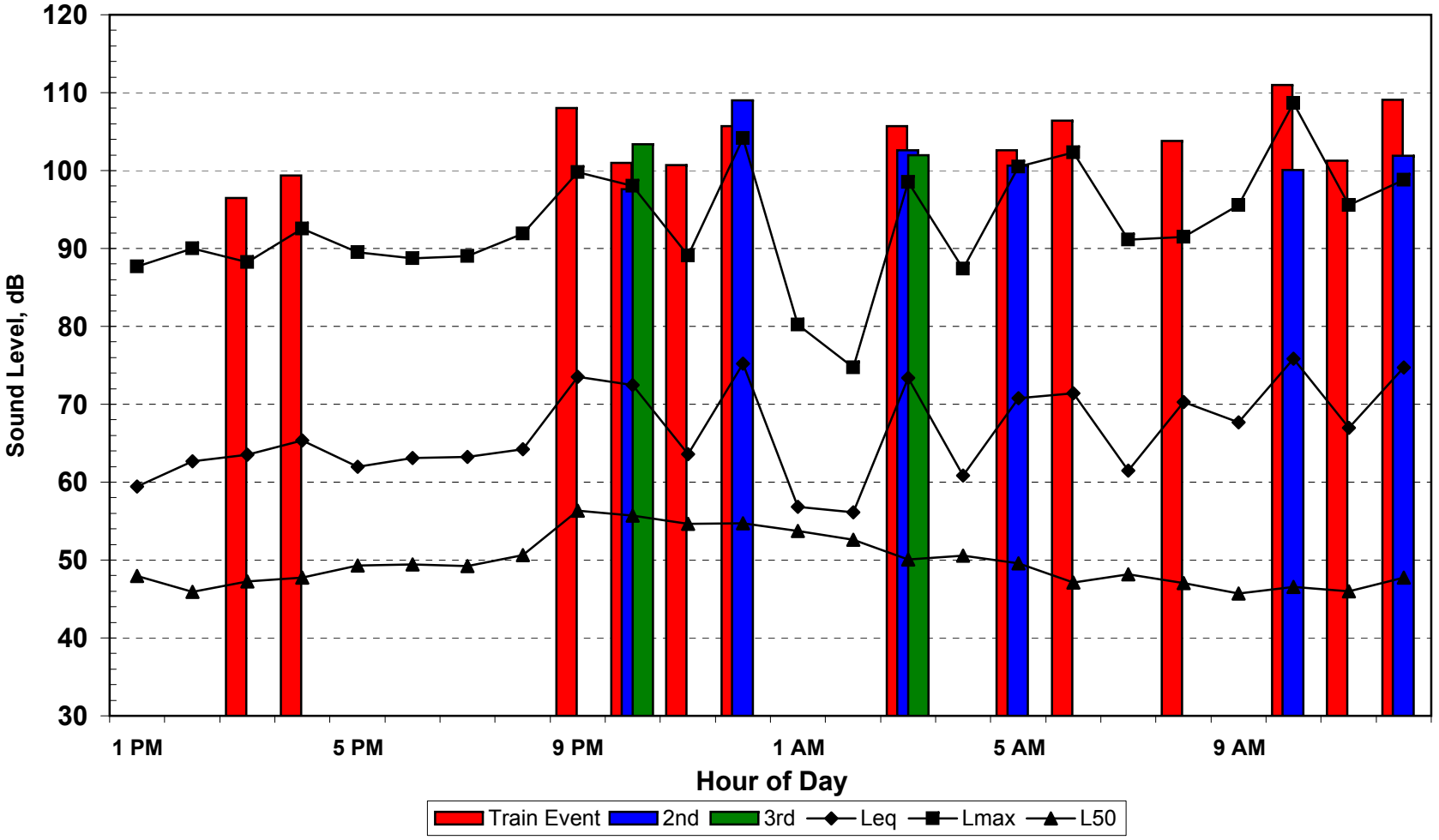
Appendix B

24hr Continuous Noise Monitoring - Site A

Lincoln 40 Residential

Wednesday, July 15, 2015 - Thursday, July 16, 2015



Ldn : 76.8 dB Train Ldn: 76.7 dB

Mean Train SEL: 105.0 dB

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Appendix C
FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2016-180 Lincoln 40 Residential
Description: Existing Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	First St	C St to D St	8,030	85	0	15	2.0	1.0	25	50	0
2	D St	First St to Second St	2,380	85	0	15	2.0	1.0	25	50	0
3	First St	D St to E St	9,530	85	0	15	2.0	1.0	25	50	0
4	E St	First St to Second St	3,170	85	0	15	2.0	1.0	25	50	0
5	First St	E St to F St	5,520	85	0	15	2.0	1.0	25	50	-5
6	Richards Blvd	Olive Dr to First St	15,580	85	0	15	2.0	1.0	35	50	0
7											
8	Olive Dr	West of Richards Blvd	2,080	85	0	15	2.0	1.0	30	50	0
9	Olive Dr	East of Richards Blvd	4,740	85	0	15	2.0	1.0	30	50	0
10	Richards Blvd	I-80 WB ramp to Olive Dr	15,480	85	0	15	2.0	1.0	35	50	0
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	19,200	85	0	15	2.0	1.0	35	50	0
12	Cowell Blvd	Research Park Dr to Drew Ave	13,930	85	0	15	2.0	1.0	35	50	0

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Predicted Levels

Project #: 2016-180 Lincoln 40 Residential
Description: Existing Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	First St	C St to D St	57.7	52.5	57.1	61.0
2	D St	First St to Second St	52.4	47.2	51.8	55.8
3	First St	D St to E St	58.4	53.2	57.8	61.8
4	E St	First St to Second St	53.7	48.4	53.0	57.0
5	First St	E St to F St	51.1	45.8	50.4	54.4
6	Richards Blvd	Olive Dr to First St	64.8	57.6	59.8	66.6
8	Olive Dr	West of Richards Blvd	54.1	47.8	51.9	56.8
9	Olive Dr	East of Richards Blvd	57.7	51.4	55.5	60.3
10	Richards Blvd	I-80 WB ramp to Olive Dr	64.7	57.6	59.8	66.5
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	65.7	58.5	60.7	67.5
12	Cowell Blvd	Research Park Dr to Drew Ave	64.3	57.1	59.3	66.1

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Noise Contour Output

Project #: 2016-180 Lincoln 40 Residential
Description: Existing Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	-------- Distances to Traffic Noise Contours -------- 75	70	65	60	55
1	First St	C St to D St	6	13	27	59	127
2	D St	First St to Second St	3	6	12	26	56
3	First St	D St to E St	7	14	31	66	142
4	E St	First St to Second St	3	7	15	32	68
5	First St	E St to F St	2	5	10	21	46
6	Richards Blvd	Olive Dr to First St	14	30	64	137	295
8	Olive Dr	West of Richards Blvd	3	7	14	30	65
9	Olive Dr	East of Richards Blvd	5	11	24	53	113
10	Richards Blvd	I-80 WB ramp to Olive Dr	14	29	63	136	294
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	16	34	73	157	339
12	Cowell Blvd	Research Park Dr to Drew Ave	13	27	59	127	274

Appendix C
FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2016-180 Lincoln 40 Residential
Description: Existing + Project Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	First St	C St to D St	8,080	85	0	15	2.0	1.0	25	50	0
2	D St	First St to Second St	2,380	85	0	15	2.0	1.0	25	50	0
3	First St	D St to E St	9,590	85	0	15	2.0	1.0	25	50	0
4	E St	First St to Second St	3,210	85	0	15	2.0	1.0	25	50	0
5	First St	E St to F St	5,630	85	0	15	2.0	1.0	25	50	-5
6	Richards Blvd	Olive Dr to First St	15,790	85	0	15	2.0	1.0	35	50	0
7											
8	Olive Dr	West of Richards Blvd	2,120	85	0	15	2.0	1.0	30	50	0
9	Olive Dr	East of Richards Blvd	5,210	85	0	15	2.0	1.0	30	50	0
10	Richards Blvd	I-80 WB ramp to Olive Dr	15,700	85	0	15	2.0	1.0	35	50	0
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	19,320	85	0	15	2.0	1.0	35	50	0
12	Cowell Blvd	Research Park Dr to Drew Ave	13,980	85	0	15	2.0	1.0	35	50	0

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Predicted Levels

Project #: 2016-180 Lincoln 40 Residential
Description: Existing + Project Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	First St	C St to D St	57.7	52.5	57.1	61.1
2	D St	First St to Second St	52.4	47.2	51.8	55.8
3	First St	D St to E St	58.5	53.2	57.8	61.8
4	E St	First St to Second St	53.7	48.5	53.1	57.1
5	First St	E St to F St	51.1	45.9	50.5	54.5
6	Richards Blvd	Olive Dr to First St	64.8	57.7	59.9	66.6
8	Olive Dr	West of Richards Blvd	54.2	47.9	52.0	56.8
9	Olive Dr	East of Richards Blvd	58.1	51.8	55.9	60.7
10	Richards Blvd	I-80 WB ramp to Olive Dr	64.8	57.6	59.8	66.6
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	65.7	58.5	60.7	67.5
12	Cowell Blvd	Research Park Dr to Drew Ave	64.3	57.1	59.3	66.1

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Noise Contour Output

Project #: 2016-180 Lincoln 40 Residential
Description: Existing + Project Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	-------- Distances to Traffic Noise Contours -------- 75	70	65	60	55
1	First St	C St to D St	6	13	27	59	127
2	D St	First St to Second St	3	6	12	26	56
3	First St	D St to E St	7	14	31	66	142
4	E St	First St to Second St	3	7	15	32	69
5	First St	E St to F St	2	5	10	22	46
6	Richards Blvd	Olive Dr to First St	14	30	64	138	298
8	Olive Dr	West of Richards Blvd	3	7	14	31	66
9	Olive Dr	East of Richards Blvd	6	12	26	56	121
10	Richards Blvd	I-80 WB ramp to Olive Dr	14	30	64	138	297
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	16	34	73	158	341
12	Cowell Blvd	Research Park Dr to Drew Ave	13	27	59	127	275

Appendix C
FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2016-180 Lincoln 40 Residential
Description: Cumulative Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	First St	C St to D St	9,790	85	0	15	2.0	1.0	25	50	0
2	D St	First St to Second St	3,290	85	0	15	2.0	1.0	25	50	0
3	First St	D St to E St	11,750	85	0	15	2.0	1.0	25	50	0
4	E St	First St to Second St	4,270	85	0	15	2.0	1.0	25	50	0
5	First St	E St to F St	7,050	85	0	15	2.0	1.0	25	50	-5
6	Richards Blvd	Olive Dr to First St	18,850	85	0	15	2.0	1.0	35	50	0
7											
8	Olive Dr	West of Richards Blvd	5,310	85	0	15	2.0	1.0	30	50	0
9	Olive Dr	East of Richards Blvd	5,420	85	0	15	2.0	1.0	30	50	0
10	Richards Blvd	I-80 WB ramp to Olive Dr	18,560	85	0	15	2.0	1.0	35	50	0
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	26,840	85	0	15	2.0	1.0	35	50	0
12	Cowell Blvd	Research Park Dr to Drew Ave	17,990	85	0	15	2.0	1.0	35	50	0

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Predicted Levels

Project #: 2016-180 Lincoln 40 Residential
Description: Cumulative Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	First St	C St to D St	58.6	53.3	57.9	61.9
2	D St	First St to Second St	53.8	48.6	53.2	57.2
3	First St	D St to E St	59.3	54.1	58.7	62.7
4	E St	First St to Second St	54.9	49.7	54.3	58.3
5	First St	E St to F St	52.1	46.9	51.5	55.5
6	Richards Blvd	Olive Dr to First St	65.6	58.4	60.6	67.4
8	Olive Dr	West of Richards Blvd	58.2	51.9	56.0	60.8
9	Olive Dr	East of Richards Blvd	58.3	52.0	56.1	60.9
10	Richards Blvd	I-80 WB ramp to Olive Dr	65.5	58.4	60.6	67.3
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	67.1	60.0	62.2	68.9
12	Cowell Blvd	Research Park Dr to Drew Ave	65.4	58.2	60.4	67.2

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Noise Contour Output

Project #: 2016-180 Lincoln 40 Residential
Description: Cumulative Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	-------- Distances to Traffic Noise Contours -------- 75	70	65	60	55
1	First St	C St to D St	7	14	31	67	144
2	D St	First St to Second St	3	7	15	32	70
3	First St	D St to E St	8	16	35	76	163
4	E St	First St to Second St	4	8	18	39	83
5	First St	E St to F St	2	5	12	25	54
6	Richards Blvd	Olive Dr to First St	16	34	72	156	335
8	Olive Dr	West of Richards Blvd	6	12	26	57	122
9	Olive Dr	East of Richards Blvd	6	12	27	58	124
10	Richards Blvd	I-80 WB ramp to Olive Dr	15	33	71	154	332
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	20	42	91	197	424
12	Cowell Blvd	Research Park Dr to Drew Ave	15	32	70	151	325

Appendix C
FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2016-180 Lincoln 40 Residential
Description: Cumulative + Project Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	First St	C St to D St	9,860	85	0	15	2.0	1.0	25	50	0
2	D St	First St to Second St	3,300	85	0	15	2.0	1.0	25	50	0
3	First St	D St to E St	11,830	85	0	15	2.0	1.0	25	50	0
4	E St	First St to Second St	4,310	85	0	15	2.0	1.0	25	50	0
5	First St	E St to F St	7,170	85	0	15	2.0	1.0	25	50	-5
6	Richards Blvd	Olive Dr to First St	19,090	85	0	15	2.0	1.0	35	50	0
7											
8	Olive Dr	West of Richards Blvd	5,360	85	0	15	2.0	1.0	30	50	0
9	Olive Dr	East of Richards Blvd	5,890	85	0	15	2.0	1.0	30	50	0
10	Richards Blvd	I-80 WB ramp to Olive Dr	18,740	85	0	15	2.0	1.0	35	50	0
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	26,930	85	0	15	2.0	1.0	35	50	0
12	Cowell Blvd	Research Park Dr to Drew Ave	18,030	85	0	15	2.0	1.0	35	50	0

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Predicted Levels

Project #: 2016-180 Lincoln 40 Residential
Description: Cumulative + Project Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	First St	C St to D St	58.6	53.3	58.0	61.9
2	D St	First St to Second St	53.8	48.6	53.2	57.2
3	First St	D St to E St	59.4	54.1	58.8	62.7
4	E St	First St to Second St	55.0	49.8	54.4	58.3
5	First St	E St to F St	52.2	47.0	51.6	55.6
6	Richards Blvd	Olive Dr to First St	65.7	58.5	60.7	67.4
8	Olive Dr	West of Richards Blvd	58.2	51.9	56.0	60.9
9	Olive Dr	East of Richards Blvd	58.6	52.3	56.5	61.3
10	Richards Blvd	I-80 WB ramp to Olive Dr	65.6	58.4	60.6	67.4
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	67.2	60.0	62.2	68.9
12	Cowell Blvd	Research Park Dr to Drew Ave	65.4	58.2	60.4	67.2

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Noise Contour Output

Project #: 2016-180 Lincoln 40 Residential
Description: Cumulative + Project Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	-------- Distances to Traffic Noise Contours -------- 75	70	65	60	55
1	First St	C St to D St	7	15	31	67	145
2	D St	First St to Second St	3	7	15	32	70
3	First St	D St to E St	8	16	35	76	164
4	E St	First St to Second St	4	8	18	39	84
5	First St	E St to F St	3	5	12	25	54
6	Richards Blvd	Olive Dr to First St	16	34	73	157	338
8	Olive Dr	West of Richards Blvd	6	12	27	57	123
9	Olive Dr	East of Richards Blvd	6	13	28	61	131
10	Richards Blvd	I-80 WB ramp to Olive Dr	15	33	72	155	334
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	20	43	92	197	425
12	Cowell Blvd	Research Park Dr to Drew Ave	15	33	70	151	325

Appendix C
FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2016-180 Lincoln 40 Residential
Description: Scenario 1 Cumulative No Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	First St	C St to D St	9,220	85	0	15	2.0	1.0	25	50	0
2	D St	First St to Second St	4,020	85	0	15	2.0	1.0	25	50	0
3	First St	D St to E St	11,270	85	0	15	2.0	1.0	25	50	0
4	E St	First St to Second St	4,280	85	0	15	2.0	1.0	25	50	0
5	First St	E St to F St	7,870	85	0	15	2.0	1.0	25	50	-5
6	Richards Blvd	Olive Dr to First St	18,160	85	0	15	2.0	1.0	35	50	0
7					0						
8	Olive Dr	West of Richards Blvd	8,410	85	0	15	2.0	1.0	30	50	0
9	Olive Dr	East of Richards Blvd	5,720	85	0	15	2.0	1.0	30	50	0
10	Richards Blvd	I-80 WB ramp to Olive Dr	22,990	85	0	15	2.0	1.0	35	50	0
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	29,240	85	0	15	2.0	1.0	35	50	0
12	Cowell Blvd	Research Park Dr to Drew Ave	19,710	85	0	15	2.0	1.0	35	50	0

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Predicted Levels

Project #: 2016-180 Lincoln 40 Residential
Description: Scenario 1 Cumulative No Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	First St	C St to D St	58.3	53.1	57.7	61.6
2	D St	First St to Second St	54.7	49.4	54.1	58.0
3	First St	D St to E St	59.2	53.9	58.5	62.5
4	E St	First St to Second St	55.0	49.7	54.3	58.3
5	First St	E St to F St	52.6	47.4	52.0	56.0
6	Richards Blvd	Olive Dr to First St	65.4	58.3	60.5	67.2
8	Olive Dr	West of Richards Blvd	60.2	53.9	58.0	62.8
9	Olive Dr	East of Richards Blvd	58.5	52.2	56.3	61.2
10	Richards Blvd	I-80 WB ramp to Olive Dr	66.5	59.3	61.5	68.3
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	67.5	60.3	62.5	69.3
12	Cowell Blvd	Research Park Dr to Drew Ave	65.8	58.6	60.8	67.6

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Noise Contour Output

Project #: 2016-180 Lincoln 40 Residential
Description: Scenario 1 Cumulative No Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	-------- Distances to Traffic Noise Contours -------- 75	70	65	60	55
1	First St	C St to D St	6	14	30	64	139
2	D St	First St to Second St	4	8	17	37	80
3	First St	D St to E St	7	16	34	74	159
4	E St	First St to Second St	4	8	18	39	83
5	First St	E St to F St	3	6	12	27	58
6	Richards Blvd	Olive Dr to First St	15	33	70	152	327
8	Olive Dr	West of Richards Blvd	8	17	36	77	166
9	Olive Dr	East of Richards Blvd	6	13	28	60	129
10	Richards Blvd	I-80 WB ramp to Olive Dr	18	38	82	178	383
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	21	45	97	208	449
12	Cowell Blvd	Research Park Dr to Drew Ave	16	35	74	160	345

Appendix C
FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2016-180 Lincoln 40 Residential
Description: Scenario 1 Cumulative + Project Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	First St	C St to D St	9,270	85	0	15	2.0	1.0	25	50	0
2	D St	First St to Second St	4,030	85	0	15	2.0	1.0	25	50	0
3	First St	D St to E St	11,330	85	0	15	2.0	1.0	25	50	0
4	E St	First St to Second St	4,320	85	0	15	2.0	1.0	25	50	0
5	First St	E St to F St	7,990	85	0	15	2.0	1.0	25	50	-5
6	Richards Blvd	Olive Dr to First St	18,380	85	0	15	2.0	1.0	35	50	0
7											
8	Olive Dr	West of Richards Blvd	8,480	85	0	15	2.0	1.0	30	50	0
9	Olive Dr	East of Richards Blvd	6,190	85	0	15	2.0	1.0	30	50	0
10	Richards Blvd	I-80 WB ramp to Olive Dr	23,170	85	0	15	2.0	1.0	35	50	0
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	29,330	85	0	15	2.0	1.0	35	50	0
12	Cowell Blvd	Research Park Dr to Drew Ave	19,750	85	0	15	2.0	1.0	35	50	0

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Predicted Levels

Project #: 2016-180 Lincoln 40 Residential
Description: Scenario 1 Cumulative + Project Traffic
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	First St	C St to D St	58.3	53.1	57.7	61.7
2	D St	First St to Second St	54.7	49.5	54.1	58.1
3	First St	D St to E St	59.2	53.9	58.6	62.5
4	E St	First St to Second St	55.0	49.8	54.4	58.4
5	First St	E St to F St	52.7	47.4	52.1	56.0
6	Richards Blvd	Olive Dr to First St	65.5	58.3	60.5	67.3
8	Olive Dr	West of Richards Blvd	60.2	53.9	58.0	62.9
9	Olive Dr	East of Richards Blvd	58.8	52.6	56.7	61.5
10	Richards Blvd	I-80 WB ramp to Olive Dr	66.5	59.3	61.5	68.3
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	67.5	60.4	62.5	69.3
12	Cowell Blvd	Research Park Dr to Drew Ave	65.8	58.6	60.8	67.6

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Noise Contour Output

Project #: 2016-180 Lincoln 40 Residential

Description: Scenario 1 Cumulative + Project Traffic

Ldn/CNEL: Ldn

Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	First St	C St to D St	6	14	30	65	139
2	D St	First St to Second St	4	8	17	37	80
3	First St	D St to E St	7	16	34	74	159
4	E St	First St to Second St	4	8	18	39	84
5	First St	E St to F St	3	6	13	27	59
6	Richards Blvd	Olive Dr to First St	15	33	71	153	330
8	Olive Dr	West of Richards Blvd	8	17	36	78	167
9	Olive Dr	East of Richards Blvd	6	14	29	63	135
10	Richards Blvd	I-80 WB ramp to Olive Dr	18	38	83	178	385
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	21	45	97	209	450
12	Cowell Blvd	Research Park Dr to Drew Ave	16	35	74	160	346

Appendix C
FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2016-180
Description: Scenario 2 Cumulative No Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	First St	C St to D st	9220	85	0	15	2.0	1.0	25	50	0
2	D St	First St to Second St	4020	85	0	15	2.0	1.0	25	50	0
3	First St	D St to E St	11270	85	0	15	2.0	1.0	25	50	0
4	E St	First St to Second St	4280	85	0	15	2.0	1.0	25	50	0
5	First St	E St to F St	7870	85	0	15	2.0	1.0	25	50	-5
6	Richards Blvd	Olive Dr to First St	18160	85	0	15	2.0	1.0	35	50	0
7											
8	Olive Dr	West of Richards Blvd	8410	85	0	15	2.0	1.0	30	50	0
9	Olive Dr	East of Richards Blvd	5720	85	0	15	2.0	1.0	30	50	0
10	Richards Blvd	I-80 WB ramp to Olive Dr	22990	85	0	15	2.0	1.0	35	50	0
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	29240	85	0	15	2.0	1.0	35	50	0
12	Cowell Blvd	Research Park Dr to Drew Ave	19710	85	0	15	2.0	1.0	35	50	0
13	Third St.	J St. to K St.	7660	85	0	15	2.0	1.0	35	50	0
14	K St.	Second St. to Third St.	190	85	0	15	2.0	1.0	35	50	0
15	Third St.	K St. to L St.	7660	85	0	15	2.0	1.0	35	50	0
16	L St.	Second St. to Third St.	11950	85	0	15	2.0	1.0	35	50	0

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Predicted Levels

Project #: 2016-180
Description: Scenario 2 Cumulative No Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	First St	C St to D st	58.3	53.1	57.7	61.6
2	D St	First St to Second St	54.7	49.4	54.1	58.0
3	First St	D St to E St	59.2	53.9	58.5	62.5
4	E St	First St to Second St	55.0	49.7	54.3	58.3
5	First St	E St to F St	52.6	47.4	52.0	56.0
6	Richards Blvd	Olive Dr to First St	65.4	58.3	60.5	67.2
8	Olive Dr	West of Richards Blvd	60.2	53.9	58.0	62.8
9	Olive Dr	East of Richards Blvd	58.5	52.2	56.3	61.2
10	Richards Blvd	I-80 WB ramp to Olive Dr	66.5	59.3	61.5	68.3
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	67.5	60.3	62.5	69.3
12	Cowell Blvd	Research Park Dr to Drew Ave	65.8	58.6	60.8	67.6
13	Third St.	J St. to K St.	61.7	54.5	56.7	63.5
14	K St.	Second St. to Third St.	45.6	38.5	40.7	47.4
15	Third St.	K St. to L St.	61.7	54.5	56.7	63.5
16	L St.	Second St. to Third St.	63.6	56.5	58.6	65.4

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Noise Contour Output

Project #: 2016-180

Description: Scenario 2 Cumulative No Project

Ldn/CNEL: Ldn

Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	First St	C St to D st	6	14	30	64	139
2	D St	First St to Second St	4	8	17	37	80
3	First St	D St to E St	7	16	34	74	159
4	E St	First St to Second St	4	8	18	39	83
5	First St	E St to F St	3	6	12	27	58
6	Richards Blvd	Olive Dr to First St	15	33	70	152	327
8	Olive Dr	West of Richards Blvd	8	17	36	77	166
9	Olive Dr	East of Richards Blvd	6	13	28	60	129
10	Richards Blvd	I-80 WB ramp to Olive Dr	18	38	82	178	383
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	21	45	97	208	449
12	Cowell Blvd	Research Park Dr to Drew Ave	16	35	74	160	345
13	Third St.	J St. to K St.	9	18	40	85	184
14	K St.	Second St. to Third St.	1	2	3	7	16
15	Third St.	K St. to L St.	9	18	40	85	184
16	L St.	Second St. to Third St.	11	25	53	115	247

Appendix C
FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2016-180
Description: Scenario 2 Cumulative + Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	First St	C St to D St	9280	85	0	15	2.0	1.0	25	50	0
2	D St	First St to Second St	4030	85	0	15	2.0	1.0	25	50	0
3	First St	D St to E St	11320	85	0	15	2.0	1.0	25	50	0
4	E St	First St to Second St	4340	85	0	15	2.0	1.0	25	50	0
5	First St	E St to F St	8060	85	0	15	2.0	1.0	25	50	-5
6	Richards Blvd	Olive Dr to First St	18480	85	0	15	2.0	1.0	35	50	0
7											
8	Olive Dr	West of Richards Blvd	8540	85	0	15	2.0	1.0	30	50	0
9	Olive Dr	East of Richards Blvd	6490	85	0	15	2.0	1.0	30	50	0
10	Richards Blvd	I-80 WB ramp to Olive Dr	23310	85	0	15	2.0	1.0	35	50	0
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	29410	85	0	15	2.0	1.0	35	50	0
12	Cowell Blvd	Research Park Dr to Drew Ave	19790	85	0	15	2.0	1.0	35	50	0
13	Third St.	J St. to K St.	7700	85	0	15	2.0	1.0	35	50	0
14	K St.	Second St. to Third St.	190	85	0	15	2.0	1.0	35	50	0
15	Third St.	K St. to L St.	7700	85	0	15	2.0	1.0	35	50	0
16	L St.	Second St. to Third St.	11980	85	0	15	2.0	1.0	35	50	0

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Predicted Levels

Project #: 2016-180
Description: Scenario 2 Cumulative + Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	First St	C St to D St	58.3	53.1	57.7	61.7
2	D St	First St to Second St	54.7	49.5	54.1	58.1
3	First St	D St to E St	59.2	53.9	58.6	62.5
4	E St	First St to Second St	55.0	49.8	54.4	58.4
5	First St	E St to F St	52.7	47.5	52.1	56.1
6	Richards Blvd	Olive Dr to First St	65.5	58.4	60.5	67.3
8	Olive Dr	West of Richards Blvd	60.2	54.0	58.1	62.9
9	Olive Dr	East of Richards Blvd	59.0	52.8	56.9	61.7
10	Richards Blvd	I-80 WB ramp to Olive Dr	66.5	59.4	61.5	68.3
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	67.5	60.4	62.6	69.3
12	Cowell Blvd	Research Park Dr to Drew Ave	65.8	58.6	60.8	67.6
13	Third St.	J St. to K St.	61.7	54.6	56.7	63.5
14	K St.	Second St. to Third St.	45.6	38.5	40.7	47.4
15	Third St.	K St. to L St.	61.7	54.6	56.7	63.5
16	L St.	Second St. to Third St.	63.6	56.5	58.7	65.4

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Noise Contour Output

Project #: 2016-180

Description: Scenario 2 Cumulative + Project

Ldn/CNEL: Ldn

Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	First St	C St to D St	6	14	30	65	139
2	D St	First St to Second St	4	8	17	37	80
3	First St	D St to E St	7	16	34	74	159
4	E St	First St to Second St	4	8	18	39	84
5	First St	E St to F St	3	6	13	27	59
6	Richards Blvd	Olive Dr to First St	15	33	71	154	331
8	Olive Dr	West of Richards Blvd	8	17	36	78	168
9	Olive Dr	East of Richards Blvd	6	14	30	65	140
10	Richards Blvd	I-80 WB ramp to Olive Dr	18	39	83	179	386
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	21	45	97	209	451
12	Cowell Blvd	Research Park Dr to Drew Ave	16	35	75	161	346
13	Third St.	J St. to K St.	9	18	40	86	185
14	K St.	Second St. to Third St.	1	2	3	7	16
15	Third St.	K St. to L St.	9	18	40	86	185
16	L St.	Second St. to Third St.	11	25	53	115	248

Appendix C
FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2016-180
Description: Scenario 3 Cumulative No Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	First St	C St to D st	9960	85	0	15	2.0	1.0	25	50	0
2	D St	First St to Second St	4180	85	0	15	2.0	1.0	25	50	0
3	First St	D St to E St	12230	85	0	15	2.0	1.0	25	50	0
4	E St	First St to Second St	4030	85	0	15	2.0	1.0	25	50	0
5	First St	E St to F St	4800	85	0	15	2.0	1.0	25	50	-5
6	Richards Blvd	Olive Dr to First St	15150	85	0	15	2.0	1.0	35	50	0
7											
8	Olive Dr	West of Richards Blvd	8220	85	0	15	2.0	1.0	30	50	0
9	Olive Dr	East of Richards Blvd	8740	85	0	15	2.0	1.0	30	50	0
10	Richards Blvd	I-80 WB ramp to Olive Dr	24330	85	0	15	2.0	1.0	35	50	0
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	28180	85	0	15	2.0	1.0	35	50	0
12	Cowell Blvd	Research Park Dr to Drew Ave	18800	85	0	15	2.0	1.0	35	50	0
13	Third St.	J St. to K St.	10500	85	0	15	2.0	1.0	35	50	0
14	K St.	Second St. to Third St.	11830	85	0	15	2.0	1.0	35	50	0
15	Third St.	K St. to L St.	13010	85	0	15	2.0	1.0	35	50	0
16	L St.	Second St. to Third St.	13260	85	0	15	2.0	1.0	35	50	0

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Predicted Levels

Project #: 2016-180

Description: Scenario 3 Cumulative No Project

Ldn/CNEL: Ldn

Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	First St	C St to D st	58.6	53.4	58.0	62.0
2	D St	First St to Second St	54.9	49.6	54.2	58.2
3	First St	D St to E St	59.5	54.3	58.9	62.9
4	E St	First St to Second St	54.7	49.5	54.1	58.1
5	First St	E St to F St	50.5	45.2	49.8	53.8
6	Richards Blvd	Olive Dr to First St	64.7	57.5	59.7	66.4
8	Olive Dr	West of Richards Blvd	60.1	53.8	57.9	62.7
9	Olive Dr	East of Richards Blvd	60.3	54.1	58.2	63.0
10	Richards Blvd	I-80 WB ramp to Olive Dr	66.7	59.5	61.7	68.5
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	67.4	60.2	62.4	69.1
12	Cowell Blvd	Research Park Dr to Drew Ave	65.6	58.4	60.6	67.4
13	Third St.	J St. to K St.	63.1	55.9	58.1	64.9
14	K St.	Second St. to Third St.	63.6	56.4	58.6	65.4
15	Third St.	K St. to L St.	64.0	56.8	59.0	65.8
16	L St.	Second St. to Third St.	64.1	56.9	59.1	65.9

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Noise Contour Output

Project #: 2016-180

Description: Scenario 3 Cumulative No Project

Ldn/CNEL: Ldn

Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	First St	C St to D st	7	15	31	68	146
2	D St	First St to Second St	4	8	18	38	82
3	First St	D St to E St	8	17	36	78	168
4	E St	First St to Second St	4	8	17	37	80
5	First St	E St to F St	2	4	9	19	42
6	Richards Blvd	Olive Dr to First St	13	29	62	134	290
8	Olive Dr	West of Richards Blvd	8	16	35	76	164
9	Olive Dr	East of Richards Blvd	8	17	37	79	171
10	Richards Blvd	I-80 WB ramp to Olive Dr	18	40	86	184	397
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	20	44	94	203	438
12	Cowell Blvd	Research Park Dr to Drew Ave	16	33	72	155	335
13	Third St.	J St. to K St.	11	23	49	105	227
14	K St.	Second St. to Third St.	11	25	53	114	246
15	Third St.	K St. to L St.	12	26	56	121	262
16	L St.	Second St. to Third St.	12	27	57	123	265

Appendix C
FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2016-180
Description: Scenario 3 Cumulative + Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	First St	C St to D st	9980	85	0	15	2.0	1.0	25	50	0
2	D St	First St to Second St	4180	85	0	15	2.0	1.0	25	50	0
3	First St	D St to E St	12250	85	0	15	2.0	1.0	25	50	0
4	E St	First St to Second St	4050	85	0	15	2.0	1.0	25	50	0
5	First St	E St to F St	4810	85	0	15	2.0	1.0	25	50	-5
6	Richards Blvd	Olive Dr to First St	15190	85	0	15	2.0	1.0	35	50	0
7											
8	Olive Dr	West of Richards Blvd	8270	85	0	15	2.0	1.0	30	50	0
9	Olive Dr	East of Richards Blvd	9030	85	0	15	2.0	1.0	30	50	0
10	Richards Blvd	I-80 WB ramp to Olive Dr	24530	85	0	15	2.0	1.0	35	50	0
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	28280	85	0	15	2.0	1.0	35	50	0
12	Cowell Blvd	Research Park Dr to Drew Ave	18860	85	0	15	2.0	1.0	35	50	0
13	Third St.	J St. to K St.	10570	85	0	15	2.0	1.0	35	50	0
14	K St.	Second St. to Third St.	11930	85	0	15	2.0	1.0	35	50	0
15	Third St.	K St. to L St.	13210	85	0	15	2.0	1.0	35	50	0
16	L St.	Second St. to Third St.	13580	85	0	15	2.0	1.0	35	50	0

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Predicted Levels

Project #: 2016-180
Description: Scenario 3 Cumulative + Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	First St	C St to D st	58.6	53.4	58.0	62.0
2	D St	First St to Second St	54.9	49.6	54.2	58.2
3	First St	D St to E St	59.5	54.3	58.9	62.9
4	E St	First St to Second St	54.7	49.5	54.1	58.1
5	First St	E St to F St	50.5	45.2	49.8	53.8
6	Richards Blvd	Olive Dr to First St	64.7	57.5	59.7	66.5
8	Olive Dr	West of Richards Blvd	60.1	53.8	57.9	62.8
9	Olive Dr	East of Richards Blvd	60.5	54.2	58.3	63.1
10	Richards Blvd	I-80 WB ramp to Olive Dr	66.7	59.6	61.8	68.5
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	67.4	60.2	62.4	69.2
12	Cowell Blvd	Research Park Dr to Drew Ave	65.6	58.4	60.6	67.4
13	Third St.	J St. to K St.	63.1	55.9	58.1	64.9
14	K St.	Second St. to Third St.	63.6	56.5	58.6	65.4
15	Third St.	K St. to L St.	64.1	56.9	59.1	65.8
16	L St.	Second St. to Third St.	64.2	57.0	59.2	66.0

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Noise Contour Output

Project #: 2016-180

Description: Scenario 3 Cumulative + Project

Ldn/CNEL: Ldn

Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	First St	C St to D st	7	15	32	68	146
2	D St	First St to Second St	4	8	18	38	82
3	First St	D St to E St	8	17	36	78	168
4	E St	First St to Second St	4	8	17	37	80
5	First St	E St to F St	2	4	9	19	42
6	Richards Blvd	Olive Dr to First St	13	29	63	135	290
8	Olive Dr	West of Richards Blvd	8	16	35	76	164
9	Olive Dr	East of Richards Blvd	8	17	38	81	174
10	Richards Blvd	I-80 WB ramp to Olive Dr	19	40	86	185	399
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	20	44	95	204	439
12	Cowell Blvd	Research Park Dr to Drew Ave	16	34	72	156	335
13	Third St.	J St. to K St.	11	23	49	106	228
14	K St.	Second St. to Third St.	11	25	53	115	247
15	Third St.	K St. to L St.	12	26	57	123	264
16	L St.	Second St. to Third St.	13	27	58	125	269

Appendix C
FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2016-180
Description: Scenario 4 Cumulative No Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	First St	C St to D st	9220	85	0	15	2.0	1.0	25	50	0
2	D St	First St to Second St	4020	85	0	15	2.0	1.0	25	50	0
3	First St	D St to E St	11270	85	0	15	2.0	1.0	25	50	0
4	E St	First St to Second St	4280	85	0	15	2.0	1.0	25	50	0
5	First St	E St to F St	7870	85	0	15	2.0	1.0	25	50	-5
6	Richards Blvd	Olive Dr to First St	18160	85	0	15	2.0	1.0	35	50	0
7											
8	Olive Dr	West of Richards Blvd	8410	85	0	15	2.0	1.0	30	50	0
9	Olive Dr	East of Richards Blvd	4660	85	0	15	2.0	1.0	30	50	0
10	Richards Blvd	I-80 WB ramp to Olive Dr	23190	85	0	15	2.0	1.0	35	50	0
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	29160	85	0	15	2.0	1.0	35	50	0
12	Cowell Blvd	Research Park Dr to Drew Ave	19630	85	0	15	2.0	1.0	35	50	0
13	Third St.	J St. to K St.	7660	85	0	15	2.0	1.0	35	50	0
14	K St.	Second St. to Third St.	190	85	0	15	2.0	1.0	35	50	0
15	Third St.	K St. to L St.	7660	85	0	15	2.0	1.0	35	50	0
16	L St.	Second St. to Third St.	11950	85	0	15	2.0	1.0	35	50	0

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Predicted Levels

Project #: 2016-180
Description: Scenario 4 Cumulative No Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	First St	C St to D st	58.3	53.1	57.7	61.6
2	D St	First St to Second St	54.7	49.4	54.1	58.0
3	First St	D St to E St	59.2	53.9	58.5	62.5
4	E St	First St to Second St	55.0	49.7	54.3	58.3
5	First St	E St to F St	52.6	47.4	52.0	56.0
6	Richards Blvd	Olive Dr to First St	65.4	58.3	60.5	67.2
8	Olive Dr	West of Richards Blvd	60.2	53.9	58.0	62.8
9	Olive Dr	East of Richards Blvd	57.6	51.3	55.4	60.3
10	Richards Blvd	I-80 WB ramp to Olive Dr	66.5	59.3	61.5	68.3
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	67.5	60.3	62.5	69.3
12	Cowell Blvd	Research Park Dr to Drew Ave	65.8	58.6	60.8	67.6
13	Third St.	J St. to K St.	61.7	54.5	56.7	63.5
14	K St.	Second St. to Third St.	45.6	38.5	40.7	47.4
15	Third St.	K St. to L St.	61.7	54.5	56.7	63.5
16	L St.	Second St. to Third St.	63.6	56.5	58.6	65.4

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Noise Contour Output

Project #: 2016-180

Description: Scenario 4 Cumulative No Project

Ldn/CNEL: Ldn

Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	First St	C St to D st	6	14	30	64	139
2	D St	First St to Second St	4	8	17	37	80
3	First St	D St to E St	7	16	34	74	159
4	E St	First St to Second St	4	8	18	39	83
5	First St	E St to F St	3	6	12	27	58
6	Richards Blvd	Olive Dr to First St	15	33	70	152	327
8	Olive Dr	West of Richards Blvd	8	17	36	77	166
9	Olive Dr	East of Richards Blvd	5	11	24	52	112
10	Richards Blvd	I-80 WB ramp to Olive Dr	18	38	83	179	385
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	21	45	97	208	448
12	Cowell Blvd	Research Park Dr to Drew Ave	16	34	74	160	344
13	Third St.	J St. to K St.	9	18	40	85	184
14	K St.	Second St. to Third St.	1	2	3	7	16
15	Third St.	K St. to L St.	9	18	40	85	184
16	L St.	Second St. to Third St.	11	25	53	115	247

Appendix C
FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2016-180
Description: Scenario 4 Cumulative + Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	First St	C St to D st	9220	85	0	15	2.0	1.0	25	50	0
2	D St	First St to Second St	4020	85	0	15	2.0	1.0	25	50	0
3	First St	D St to E St	11270	85	0	15	2.0	1.0	25	50	0
4	E St	First St to Second St	4280	85	0	15	2.0	1.0	25	50	0
5	First St	E St to F St	7870	85	0	15	2.0	1.0	25	50	-5
6	Richards Blvd	Olive Dr to First St	18160	85	0	15	2.0	1.0	35	50	0
7											
8	Olive Dr	West of Richards Blvd	8410	85	0	15	2.0	1.0	30	50	0
9	Olive Dr	East of Richards Blvd	4660	85	0	15	2.0	1.0	30	50	0
10	Richards Blvd	I-80 WB ramp to Olive Dr	23190	85	0	15	2.0	1.0	35	50	0
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	29160	85	0	15	2.0	1.0	35	50	0
12	Cowell Blvd	Research Park Dr to Drew Ave	19630	85	0	15	2.0	1.0	35	50	0
13	Third St.	J St. to K St.	7660	85	0	15	2.0	1.0	35	50	0
14	K St.	Second St. to Third St.	190	85	0	15	2.0	1.0	35	50	0
15	Third St.	K St. to L St.	7660	85	0	15	2.0	1.0	35	50	0
16	L St.	Second St. to Third St.	11950	85	0	15	2.0	1.0	35	50	0

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Predicted Levels

Project #: 2016-180
Description: Scenario 4 Cumulative + Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	First St	C St to D st	58.3	53.1	57.7	61.6
2	D St	First St to Second St	54.7	49.4	54.1	58.0
3	First St	D St to E St	59.2	53.9	58.5	62.5
4	E St	First St to Second St	55.0	49.7	54.3	58.3
5	First St	E St to F St	52.6	47.4	52.0	56.0
6	Richards Blvd	Olive Dr to First St	65.4	58.3	60.5	67.2
8	Olive Dr	West of Richards Blvd	60.2	53.9	58.0	62.8
9	Olive Dr	East of Richards Blvd	57.6	51.3	55.4	60.3
10	Richards Blvd	I-80 WB ramp to Olive Dr	66.5	59.3	61.5	68.3
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	67.5	60.3	62.5	69.3
12	Cowell Blvd	Research Park Dr to Drew Ave	65.8	58.6	60.8	67.6
13	Third St.	J St. to K St.	61.7	54.5	56.7	63.5
14	K St.	Second St. to Third St.	45.6	38.5	40.7	47.4
15	Third St.	K St. to L St.	61.7	54.5	56.7	63.5
16	L St.	Second St. to Third St.	63.6	56.5	58.6	65.4

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Noise Contour Output

Project #: 2016-180

Description: Scenario 4 Cumulative + Project

Ldn/CNEL: Ldn

Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	First St	C St to D st	6	14	30	64	139
2	D St	First St to Second St	4	8	17	37	80
3	First St	D St to E St	7	16	34	74	159
4	E St	First St to Second St	4	8	18	39	83
5	First St	E St to F St	3	6	12	27	58
6	Richards Blvd	Olive Dr to First St	15	33	70	152	327
8	Olive Dr	West of Richards Blvd	8	17	36	77	166
9	Olive Dr	East of Richards Blvd	5	11	24	52	112
10	Richards Blvd	I-80 WB ramp to Olive Dr	18	38	83	179	385
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	21	45	97	208	448
12	Cowell Blvd	Research Park Dr to Drew Ave	16	34	74	160	344
13	Third St.	J St. to K St.	9	18	40	85	184
14	K St.	Second St. to Third St.	1	2	3	7	16
15	Third St.	K St. to L St.	9	18	40	85	184
16	L St.	Second St. to Third St.	11	25	53	115	247

Appendix C
FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2016-180
Description: Scenario 5 Cumulative No Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	First St	C St to D st	10170	85	0	15	2.0	1.0	25	50	0
2	D St	First St to Second St	3630	85	0	15	2.0	1.0	25	50	0
3	First St	D St to E St	11610	85	0	15	2.0	1.0	25	50	0
4	E St	First St to Second St	4340	85	0	15	2.0	1.0	25	50	0
5	First St	E St to F St	4790	85	0	15	2.0	1.0	25	50	-5
6	Richards Blvd	Olive Dr to First St	16270	85	0	15	2.0	1.0	35	50	0
7											
8	Olive Dr	West of Richards Blvd	8290	85	0	15	2.0	1.0	30	50	0
9	Olive Dr	East of Richards Blvd	9860	85	0	15	2.0	1.0	30	50	0
10	Richards Blvd	I-80 WB ramp to Olive Dr	28070	85	0	15	2.0	1.0	35	50	0
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	29180	85	0	15	2.0	1.0	35	50	0
12	Cowell Blvd	Research Park Dr to Drew Ave	19630	85	0	15	2.0	1.0	35	50	0
13	Third St.	J St. to K St.	9840	85	0	15	2.0	1.0	35	50	0
14	K St.	Second St. to Third St.	12250	85	0	15	2.0	1.0	35	50	0
15	Third St.	K St. to L St.	11730	85	0	15	2.0	1.0	35	50	0
16	L St.	Second St. to Third St.	11560	85	0	15	2.0	1.0	35	50	0

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Predicted Levels

Project #: 2016-180

Description: Scenario 5 Cumulative No Project

Ldn/CNEL: Ldn

Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	First St	C St to D st	58.7	53.5	58.1	62.1
2	D St	First St to Second St	54.2	49.0	53.6	57.6
3	First St	D St to E St	59.3	54.1	58.7	62.7
4	E St	First St to Second St	55.0	49.8	54.4	58.4
5	First St	E St to F St	50.4	45.2	49.8	53.8
6	Richards Blvd	Olive Dr to First St	65.0	57.8	60.0	66.8
8	Olive Dr	West of Richards Blvd	60.1	53.8	57.9	62.8
9	Olive Dr	East of Richards Blvd	60.9	54.6	58.7	63.5
10	Richards Blvd	I-80 WB ramp to Olive Dr	67.3	60.2	62.4	69.1
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	67.5	60.3	62.5	69.3
12	Cowell Blvd	Research Park Dr to Drew Ave	65.8	58.6	60.8	67.6
13	Third St.	J St. to K St.	62.8	55.6	57.8	64.6
14	K St.	Second St. to Third St.	63.7	56.6	58.8	65.5
15	Third St.	K St. to L St.	63.5	56.4	58.6	65.3
16	L St.	Second St. to Third St.	63.5	56.3	58.5	65.3

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Noise Contour Output

Project #: 2016-180

Description: Scenario 5 Cumulative No Project

Ldn/CNEL: Ldn

Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	First St	C St to D st	7	15	32	69	148
2	D St	First St to Second St	3	7	16	35	75
3	First St	D St to E St	8	16	35	75	162
4	E St	First St to Second St	4	8	18	39	84
5	First St	E St to F St	2	4	9	19	42
6	Richards Blvd	Olive Dr to First St	14	30	65	141	304
8	Olive Dr	West of Richards Blvd	8	16	35	76	165
9	Olive Dr	East of Richards Blvd	9	18	40	86	185
10	Richards Blvd	I-80 WB ramp to Olive Dr	20	44	94	203	437
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	21	45	97	208	448
12	Cowell Blvd	Research Park Dr to Drew Ave	16	34	74	160	344
13	Third St.	J St. to K St.	10	22	47	101	217
14	K St.	Second St. to Third St.	12	25	54	117	251
15	Third St.	K St. to L St.	11	24	53	113	244
16	L St.	Second St. to Third St.	11	24	52	112	242

Appendix C
FHWA-RD-77-108 Highway Traffic Noise Prediction Model
Data Input Sheet

Project #: 2016-180
Description: Scenario 5 Cumulative + Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	ADT	Day %	Eve %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance	Offset (dB)
1	First St	C St to D st	10180	85	0	15	2.0	1.0	25	50	0
2	D St	First St to Second St	3630	85	0	15	2.0	1.0	25	50	0
3	First St	D St to E St	11620	85	0	15	2.0	1.0	25	50	0
4	E St	First St to Second St	4340	85	0	15	2.0	1.0	25	50	0
5	First St	E St to F St	4790	85	0	15	2.0	1.0	25	50	-5
6	Richards Blvd	Olive Dr to First St	16280	85	0	15	2.0	1.0	35	50	0
7											
8	Olive Dr	West of Richards Blvd	8330	85	0	15	2.0	1.0	30	50	0
9	Olive Dr	East of Richards Blvd	10140	85	0	15	2.0	1.0	30	50	0
10	Richards Blvd	I-80 WB ramp to Olive Dr	28290	85	0	15	2.0	1.0	35	50	0
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	29280	85	0	15	2.0	1.0	35	50	0
12	Cowell Blvd	Research Park Dr to Drew Ave	19690	85	0	15	2.0	1.0	35	50	0
13	Third St.	J St. to K St.	9940	85	0	15	2.0	1.0	35	50	0
14	K St.	Second St. to Third St.	12350	85	0	15	2.0	1.0	35	50	0
15	Third St.	K St. to L St.	11930	85	0	15	2.0	1.0	35	50	0
16	L St.	Second St. to Third St.	11890	85	0	15	2.0	1.0	35	50	0

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Predicted Levels

Project #: 2016-180
Description: Scenario 5 Cumulative + Project
Ldn/CNEL: Ldn
Hard/Soft: Soft

Segment	Roadway Name	Segment Description	Autos	Medium Trucks	Heavy Trucks	Total
1	First St	C St to D st	58.7	53.5	58.1	62.1
2	D St	First St to Second St	54.2	49.0	53.6	57.6
3	First St	D St to E St	59.3	54.1	58.7	62.7
4	E St	First St to Second St	55.0	49.8	54.4	58.4
5	First St	E St to F St	50.4	45.2	49.8	53.8
6	Richards Blvd	Olive Dr to First St	65.0	57.8	60.0	66.8
8	Olive Dr	West of Richards Blvd	60.1	53.8	58.0	62.8
9	Olive Dr	East of Richards Blvd	61.0	54.7	58.8	63.6
10	Richards Blvd	I-80 WB ramp to Olive Dr	67.4	60.2	62.4	69.2
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	67.5	60.4	62.5	69.3
12	Cowell Blvd	Research Park Dr to Drew Ave	65.8	58.6	60.8	67.6
13	Third St.	J St. to K St.	62.8	55.7	57.8	64.6
14	K St.	Second St. to Third St.	63.8	56.6	58.8	65.6
15	Third St.	K St. to L St.	63.6	56.5	58.6	65.4
16	L St.	Second St. to Third St.	63.6	56.4	58.6	65.4

Appendix C

FHWA-RD-77-108 Highway Traffic Noise Prediction Model

Noise Contour Output

Project #: 2016-180

Description: Scenario 5 Cumulative + Project

Ldn/CNEL: Ldn

Hard/Soft: Soft

			-------- Distances to Traffic Noise Contours --------				
Segment	Roadway Name	Segment Description	75	70	65	60	55
1	First St	C St to D st	7	15	32	69	148
2	D St	First St to Second St	3	7	16	35	75
3	First St	D St to E St	8	16	35	75	162
4	E St	First St to Second St	4	8	18	39	84
5	First St	E St to F St	2	4	9	19	42
6	Richards Blvd	Olive Dr to First St	14	30	65	141	304
8	Olive Dr	West of Richards Blvd	8	17	36	77	165
9	Olive Dr	East of Richards Blvd	9	19	41	87	188
10	Richards Blvd	I-80 WB ramp to Olive Dr	20	44	95	204	439
11	Richards Blvd	I-80 EB ramp to W Chiles Rd	21	45	97	209	450
12	Cowell Blvd	Research Park Dr to Drew Ave	16	35	74	160	345
13	Third St.	J St. to K St.	10	22	47	102	219
14	K St.	Second St. to Third St.	12	25	54	117	253
15	Third St.	K St. to L St.	11	25	53	115	247
16	L St.	Second St. to Third St.	11	25	53	114	246