APPENDIX E

NOISE

dBF

Noise Analysis Report

EXTERIOR NOISE ANALYSIS REPORT

ARLINGTON MIXED-USE

Riverside, CA

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Prepared for:
Albert A. Webb Associates
3788 McCray Street
Riverside, CA 92506

Prepared by:

dBF Associates, Inc.
3129 Tiger Run Court, Suite 202
Carlsbad, CA 92010
619-609-0712

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EXECUTIVE SUMMARY

This analysis evaluates noise associated with the implementation of the proposed Arlington Mixed-Use project. The project proposes development of 388 multi-family residences in 27 buildings, a 20,320-sf grocery pad, and a 5,000-sf retail pad. The project site is located at the northeast corner of Arlington Avenue and Streeter Avenue, in the Magnolia Center area of the City of Riverside, California (Figure 1).

Future exterior noise levels at outdoor useable areas of the residential portion of the project would be 65 dBA Ldn / CNEL or below, and would (presumably) be considered Normally Acceptable by the City. Future exterior noise levels at the commercial portion of the project would be up to 72 dBA Ldn / CNEL, and would be considered Conditionally Acceptable by the City.

Future exterior noise levels would exceed 60 dBA Ldn / CNEL at some building façades. Therefore, interior noise levels in habitable rooms could exceed the RMC Section 16.08.175 and CBC Section 1206.4 requirement of 45 dBA Ldn / CNEL in residences. To comply with this requirement, upgraded building façade elements (windows, doors, and/or exterior wall assemblies) with STC ratings of 35 or higher may be necessary. If the interior noise limit can be achieved only with the windows closed, the building design must include mechanical ventilation that meets CBC requirements. Implementation of these measures would ensure that interior noise levels would be 45 dBA Ldn / CNEL or below in residences, and the project would comply with the RMC Section 16.08.175 and CBC Section 1206.4 requirement. As a condition of approval, an interior noise analysis for the project would be required to demonstrate that interior noise levels would be 45 dBA CNEL or below. Transportation noise impacts affecting the project site would be less than significant.

Project operation would generate noise levels up to 35 dBA Leq at residential property lines. Operational noise levels would not exceed the RMC Section 7.25.010 limits of 55 / 45 dBA during daytime / nighttime hours. Project-generated operational noise impacts would be less than significant.

Project-generated traffic would result in increases of less than 1 dBA Ldn / CNEL along project roadways. As the increases in traffic noise would be less than 3 dBA, they would be not perceptible to the average person and less than significant.

Project construction would occur between 7:00 a.m. and 7:00 p.m. on weekdays or between 8:00 a.m. and 5:00 p.m. on Saturdays. Project construction would comply with RMC Section 7.35.020(G). Project construction noise impacts would be less than significant.

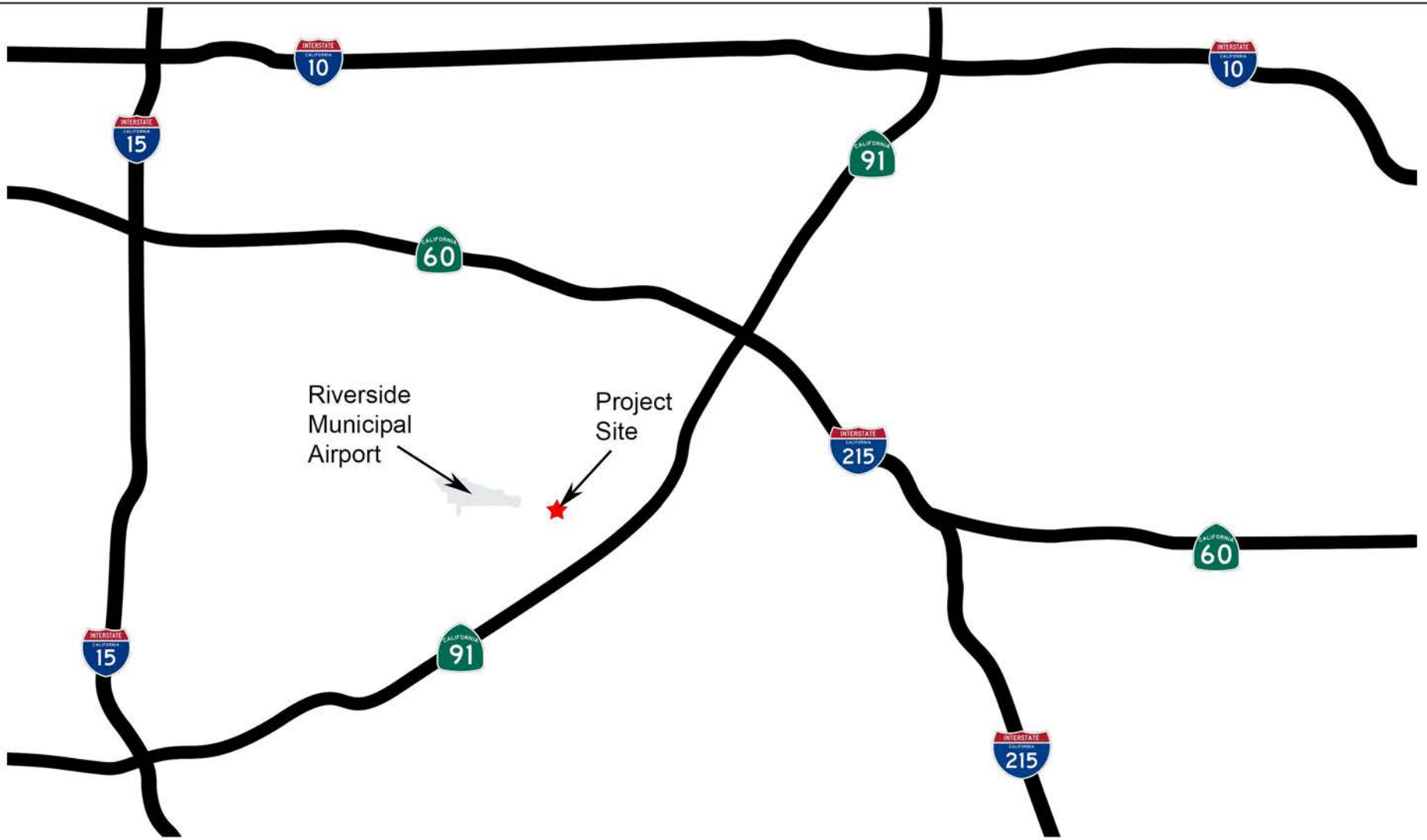

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FIGURE 1
Vicinity Map

1.0 ENVIRONMENTAL NOISE BACKGROUND

Noise is generally defined as loud, unpleasant, unexpected, or undesired sound typically associated with human activity and that interferes with or disrupts normal activities. The human environment is characterized by a certain consistent noise level which varies with each area. This is called ambient noise. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, perceived importance of the noise and its appropriateness in the setting, time of day and type of activity during which the noise occurs, and sensitivity of the individual.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Sound is generally characterized by several variables, including frequency and intensity. Frequency describes the sound's pitch and is measured in cycles per second, or hertz (Hz), whereas intensity describes the sound's loudness and is measured in decibels (dB). Decibels are measured using a logarithmic scale. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above about 120 dB begin to be felt inside the human ear as discomfort and eventually as pain at still higher levels. Studies have shown that the smallest perceptible change in sound level for a person with normal hearing sensitivity is approximately 3 dBA. A change of at least 5 dBA would be noticeable and would likely evoke a community reaction. A 10-dBA increase is subjectively heard as a doubling in loudness and would cause a community response [Caltrans 2013a]. Sound levels of typical noise sources and environments are provided in Table 2.

Because of the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. A simple rule is useful, however, in dealing with sound levels. If a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. Thus, for example, 60 dB + 60 dB = 63 dB, and 80 dB + 80 dB = 83 dB. The normal human ear can detect sounds that range in frequency from about 20 Hz to 20,000 Hz.

However, all sounds in this wide range of frequencies are not heard equally well by the human ear, which is most sensitive to frequencies in the range of 1,000 Hz to 4,000 Hz. This frequency dependence can be taken into account by applying a correction to each frequency range to approximate the human ear's sensitivity within each range. This is called A-weighting and is commonly used in measurements of community environmental noise. The A-weighted sound pressure level (abbreviated as dBA) is the sound level with the "A-weighting" frequency correction. In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve.

Table 1. Sound Levels of Typical Noise Sources and Noise Environments

Noise Source (at Given Distance)	Noise Environment	A-Weighted Sound Level	Human Judgment of Noise Loudness (Relative to Reference Loudness of 70 Decibels*)
Military Jet Takeoff with Afterburner (50 ft)	Carrier Flight Deck	140 Decibels	128 times as loud
Civil Defense Siren (100 ft)		130	64 times as loud
Commercial Jet Take-off (200 ft)		120	32 times as loud **Threshold of Pain**
Pile Driver (50 ft)	Rock Music Concert Inside Subway Station (New York)	110	16 times as loud
Ambulance Siren (100 ft) Newspaper Press (5 ft) Gas Lawn Mower (3 ft)		100	8 times as loud **Very Loud**
Food Blender (3 ft) Propeller Plane Flyover (1,000 ft) Diesel Truck (150 ft)	Boiler Room Printing Press Plant	90	4 times as loud
Garbage Disposal (3 ft)	Noisy Urban Daytime	80	2 times as loud
Passenger Car, 65 mph (25 ft) Living Room Stereo (15 ft) Vacuum Cleaner (10 ft)	Commercial Areas	70	Reference Loudness **Moderately Loud**
Normal Speech (5 ft) Air Conditioning Unit (100 ft)	Data Processing Center Department Store	60	1/2 as loud
Light Traffic (100 ft)	Large Business Office Quiet Urban Daytime	50	1/4 as loud
Bird Calls (distant)	Quiet Urban Nighttime	40	1/8 as loud **Quiet**
Soft Whisper (5 ft)	Library and Bedroom at Night Quiet Rural Nighttime	30	1/16 as loud
	Broadcast and Recording Studio	20	1/32 as loud Just Audible
		0	1/64 as loud Threshold of Hearing

Source: Compiled by dBF Associates, Inc.

Because community noise fluctuates over time, a single measure called the Equivalent Sound Level (Leq) is often used to describe the time-varying character of community noise. The Leq is the energy-averaged A-weighted sound level during a measured time interval, and is equal to the level of a continuous steady sound containing the same total acoustical energy over the averaging time period as the actual time-varying sound. Additionally, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the Lmax and Lmin indicators, which represent the root-mean-square maximum and minimum noise levels obtained during the measurement interval. The Lmin value obtained for a particular monitoring location is often called the "acoustic floor" for that location.

To describe the time-varying character of environmental noise, the statistical noise descriptors L10, L50, and L90 are commonly used. They are the noise levels equaled or exceeded during 10, 50, and 90 percent of a stated time, respectively. Sound levels associated with L10 typically describe transient or short-term events, whereas levels associated with L90 describe the steady-state (or most prevalent) noise conditions.

The Community Noise Equivalent Level (CNEL) is a descriptor representing a 24-hour, time-weighted, annual average noise level based on the "A-weighted" decibel. In the calculation process, noise occurring in the evening time period (7 p.m. to 10 p.m.) is penalized by adding 5 dB, while noise occurring in the nighttime period (10 p.m. to 7 a.m.) is penalized by adding 10 dB. These time periods and decibel increases are intended to reflect a typical person's increased sensitivity to noise during late-night and early morning hours. This descriptor is used by the State of California to evaluate land-use compatibility with regard to noise.

The Day-Night Average Sound Level (Ldn or DNL) is also an adjusted average A-weighted sound level for a 24-hour day, similar to CNEL. It is calculated by adding a 10-dB adjustment to sound levels during nighttime hours (10:00 p.m. to 7:00 a.m.); there is no adjustment applied to evening hours. DNL is considered to be reasonably equivalent to CNEL. This descriptor is used by the City of Riverside to evaluate land-use compatibility with regard to noise.

Sound Transmission Class (STC) is a single-number rating of the effectiveness of a material or construction assembly to impede the transmission of airborne sound.

1.1 Project Summary

Project Location

The project site is located within Section 33, Township 2 South and Range 5 West of the San Bernardino Baseline and Meridian, identified on the Riverside West, California USGS 7.5 Quadrangle Map.

Existing Conditions

The existing project site includes two existing commercial buildings located on the 17.43 net acre parcel that are associated with the former Sears Department Store and Automotive Service Center. The former department store was located in the central building, now a vacant structure. A smaller automotive service center structure is located on the western portion of the property. The balance of the remaining site property comprises asphalt-paved parking areas, driveways, and minor landscaping.

The eastern portion of the site is composed of a surface parking area with ornamental trees and security lighting. The eastern boundary abuts existing residential development where a 6-foot block wall divides the site from the neighboring properties. Access from Streeter Avenue consists of two full-access driveways, leading to the existing Auto Center area, Sears building loading dock, and includes additional surface parking with ornamental trees and security lighting. The northern boundary abuts existing residential development, commercial offices, and a vacant parcel where a 6-foot block wall divides the site from neighboring properties.

Project Description

The project entails an approximately 17.43 gross acre and 17.37 net acre site (after dedication of 0.05 acres along Arlington Avenue for road right-of-way), located at the northeast corner of Arlington Avenue and Streeter Avenue. The project site consists of assessor parcel number (APN) 226-180-015-1; specifically located at 5261 Arlington Avenue. Project parcel throughout this document is based upon net acreage of 17.37 acres. The project also includes approximately 1.5 miles of offsite impacts.

Demolition

The proposed project would include the demolition of the existing vacant 192,139-sf former Sears buildings (Sears building and all appurtenances) and remove existing vegetation including trees. Sears Auto Center is a 13,713-sf structure. A protection fence with windscreen material would be installed around the site during demolition to obscure views of the site. The project would utilize crushed materials from the Project site as engineered fill material.

Project Attributes

The project proposes development of approximately 576,203 sf of residential and commercial-retail uses and provide several amenities including: onsite leasing office, tuck-under garages, carports, public dog park, outdoor resort style pool and spa, fitness area, clubhouse, shade structures with barbeques and tables, multi-use turf areas, outdoor gaming and play spaces. The project also proposes a variety of rooftop and carport solar panels with a fixed tilt of 10 degrees with no rotation, and an orientation of 90 degrees.

The residential portion of the project site would be surrounded by a 6-foot-high tubular steel fence, 6-foot-high block wall, or combination block wall / steel fence. The project includes details for walls and fences within the site and around the perimeter of the site as well as sign plans, fountain wall, dog park gates, vehicular gates, and access gates for residential access.

Construction

Grading of the site would be accomplished with scrapers, motor graders, water trucks, dozers, and compaction equipment. It is anticipated that building materials would be off-loaded and installed using small cranes, boom trucks, forklifts, rubber-tired loaders, rubber-tired backhoes, and other small- to medium-sized construction equipment as needed.

The project would also be required to trench approximately 1.5 miles offsite to connect to existing Riverside Public Utilities electric facilities. Trenching would occur within existing ROW and would include approximately 0.5 miles in Streeter Avenue from Arlington Avenue to Central Avenue; approximately 0.5 miles in Central Avenue from Streeter Avenue to Hillside Avenue; and approximately 0.5 miles in Hillside Avenue Central Avenue to Mountain View Avenue. It is anticipated that trenching may be as deep as 7 to 8 feet below ground. There is some existing conduit and vaults within this alignment, but in order to connect to existing facilities, the Project would be required to provide areas of new 6.5-inch conduit and approximately 10 electric vaults sized at 8 feet by 14 feet.

Construction is anticipated to take approximately 23 months and would be built in two phases with the first phase being the commercial parcel, and the second phase being the residential parcel. The earthwork is anticipated to balance with 28,000 cf of cut and 28,000 cf of fill.

2.0 REGULATORY FRAMEWORK

2.1 City of Riverside

The Noise Element of the Riverside General Plan [2018] does not provide Noise / Land Use Compatibility Criteria for multifamily residential land uses. It was assumed that the criteria for Infill Single Family Residential could be considered applicable; at this land use, noise levels up to 65 dBA Ldn / CNEL are considered Normally Acceptable, and noise levels up to 75 dBA Ldn / CNEL are considered Conditionally Acceptable.

Riverside Municipal Code (RMC) Section 16.08.175 specifies noise standards for new dwellings:

> Interior day-night average sound levels (Ldn) with windows closed, attributable to exterior sources shall not exceed an Ldn of forty-five decibels (dBA) in any habitable room.

RMC Section 7.25.010 specifies standards for operational noise sources. At the property line of residential land uses, the noise limit is 55 dBA during daytime hours of 7:00 a.m. to 10:00 p.m. and 45 dBA during nighttime hours of 10:00 p.m. to 7:00 a.m.

RMC Section 7.35.020(G) indicates that construction between 7:00 a.m. and 7:00 p.m. on weekdays or between 8:00 a.m. and 5:00 p.m. on Saturdays is exempt from noise limits.

2.2 State of California

2.2.1 Residential

California Building Code (CBC), Chapter 12: Interior Environment, Section 1206: Sound Transmission regulates noise levels in buildings with multiple habitable units [State of California 2019]. Relevant portions are reproduced below.

> 1206.4 Allowable interior noise levels. Interior noise levels attributable to exterior sources shall not exceed 45 dB in any habitable room. The noise metric shall be either the day-night average sound level (Ldn) or the community noise equivalent level (CNEL), consistent with the noise element of the local general plan.

3.0 ENVIRONMENTAL SETTING AND EXISTING CONDITIONS

Noise-sensitive land uses are locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Residences, schools, hospitals, guest lodging, libraries, and some passive recreation areas would each be considered noise-sensitive and may warrant unique measures for protection from intruding noise.

3.1 Existing Conditions

The project site is currently developed with two commercial buildings. Noise-sensitive land uses in the project area include the multi-family residences to the north and east. The primary existing noise source in the vicinity of the project is vehicular traffic on Arlington Avenue and Streeter Avenue; aircraft operations associated with Riverside Municipal Airport are a secondary source.

3.1.1 Vehicular Traffic

Arlington Avenue is adjacent to the project site on the south, with two eastbound & two westbound through lanes. Arlington Avenue carries an existing (year 2022) average daily traffic (ADT) volume of 29,250 vehicles between California Avenue and the Heritage Plaza driveway [Urban Crossroads 2022]. Its posted speed limit is 40 miles per hour (mph). The existing vehicle mix is approximately 2% medium trucks, 0.5% heavy trucks, 0.5% buses, and 1% motorcycles, based on observations made during the site visit.

Streeter Avenue is adjacent to the project site on the west, with two northbound & two southbound through lanes. Streeter Avenue carries an existing (year 2022) ADT volume of 18,650 vehicles between Granada Avenue and El Molino Avenue [Urban Crossroads 2022]. Its posted speed limit is 40 mph. The existing vehicle mix is approximately 3% medium trucks, based on observations made during the site visit.

3.1.2 Airport

The project site is exposed to Riverside Municipal Airport noise levels of approximately 55-62 dBA CNEL [Coffman Associates 2003] (Appendix A).

3.2 Ambient Sound Level Measurements

Ambient sound level measurements were conducted to estimate the existing acoustical environment on the project site. A RION Model NL-31 American National Standards Institute (ANSI) Type 1 Integrating Sound Level Meter (SLM) was used as the data-collection device. The meter was mounted on a tripod roughly 5 feet above ground to simulate the average height of the human ear. The microphone was fitted with a windscreen. The sound level meter was calibrated before the measurement period. Simultaneous traffic counts were conducted during the measurement periods. The measurement results are summarized in Table 2 and correspond to the locations depicted on Figure 2.

Table 2. Sound Level Measurements (dBA)

Measurement Location		Date / Time	Leq	Lmin	Lmax	L10	L50	L90	Traffic
ML1	60' from Arlington Avenue CL	2022-09-28 12:20 – 12:30	68.5	52.2	79.6	72.4	65.8	57.9	236 / 5 / 1 / 1 / 3
ML2	45' from Streeter Avenue CL	2022-09-28 12:35 – 12:45	69.0	45.4	78.8	72.6	67.3	55.8	223 / 7 / 0 / 0 / 0
ML3	Northeast project site corner	2022-09-28 12:55 – 13:15	51.5	41.2	72.9	53.1	67.3	44.2	Not counted

Note: Traffic reported in cars / medium trucks / heavy trucks / buses / motorcycles.

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FIGURE 2
Sound Level Measurement Locations

4.0 POTENTIAL NOISE IMPACTS

4.1 Vehicular Traffic Noise

The Federal Highway Administration (FHWA) Traffic Noise Model (TNM) version 2.5 was used to estimate traffic noise levels. The modeling effort considered the peak-hour traffic volume, average estimated vehicle speed, and estimated vehicle mix, i.e., percentage of cars, medium trucks, heavy trucks, buses, and motorcycles. The peak hour traffic noise level was considered equivalent to the Ldn / CNEL [24 CFR §51.106]. The model was calibrated using actual traffic counts and sound level measurements. Modeled sound levels were within 1 dBA of measured sound levels; accordingly, no adjustment was made to future modeled levels. Future vehicular traffic calculations are summarized in Appendix B.

Sound levels caused by line sources (i.e., variable or moving sound sources such as traffic) generally decrease at a rate of 3 to 4.5 dBA when the distance from the road is doubled, depending on the ground surface hardness between the source and the receiving property [Caltrans 2013a]. The model assumed "pavement" propagation conditions, which corresponds to a drop-off rate of approximately 3 dBA per doubling of distance. The actual sound level at any receptor location is dependent upon such factors as the source-to-receptor distance and the presence of intervening structures (walls and buildings), barriers, and topography. The noise attenuating effects of changes in elevation, topography, and intervening structures were not included in the model. Therefore, the modeling effort is considered a worst-case representation of the roadway noise.

4.1.1 Traffic Noise Affecting the Project Site

The future noise environment would continue to be a result of vehicular traffic on Arlington Avenue and Streeter Avenue, and aircraft activity associated with Riverside Municipal Airport.

Arlington Avenue is projected to carry a future (Horizon Year 2045 With Project) ADT volume of 37,500 vehicles between California Avenue and the Heritage Plaza driveway [Urban Crossroads 2022]. The existing speed limit of 40 mph and traffic mix of 2% medium trucks, 0.5% heavy trucks, 0.5% buses, and 1% motorcycles were assumed to remain constant in the future.

Streeter Avenue is projected to carry a future (Horizon Year 2045 With Project) ADT volume of 23,550 vehicles between Granada Avenue and El Molino Avenue [Urban Crossroads 2022]. The speed limit of 40 mph and traffic mix of 3% medium trucks were assumed to remain constant in the future.

Future exterior roadway noise levels at the proposed residential buildings would range from below 60 dBA Ldn / CNEL at the northeast façades to approximately 70 dBA Ldn / CNEL at the west façades.

Future exterior roadway noise levels at the proposed commercial buildings would range from below 60 dBA Ldn / CNEL at the north façades to approximately 72 dBA Ldn / CNEL at the south retail façade.

4.1.2 Airport

The project site is exposed to existing (year 2003) Riverside Municipal Airport noise levels of approximately 55-62 dBA CNEL [Coffman Associates 2003]. Future (year 2026) projections show noise level contours of 65 dBA CNEL and higher; no projections are available for the project site area [Coffman Associates 2010] (Appendix A). Also, the existing (year 2006) noise contours in this document are much smaller than those shown in the 2003 document. Therefore, it was assumed that the airport noise levels at the project site would not increase in the future.

4.1.3 Composite

Future exterior composite (roadway + airport) noise levels at the proposed residential buildings would range from below 60 dBA Ldn / CNEL at the northeast façades to approximately 70 dBA Ldn / CNEL at the west façades, as shown on Figure 3.

The residential component of the project has the following outdoor use areas: the pool, the pedestrian promenade, and the dog park. Future exterior composite noise levels would be 65 dBA Ldn / CNEL or less at all of these areas, and would be considered Normally Acceptable at Infill Single Family Residential land uses.

Future exterior composite noise levels at the proposed commercial buildings would range from approximately 61 dBA Ldn / CNEL at the north façades to approximately 72 dBA Ldn / CNEL at the south retail façade.

The commercial component of the project has an outdoor dining / flex space area on the west side of the retail pad. Future exterior composite noise level at this space would be approximately 68 dBA Ldn / CNEL, and would be considered Conditionally Acceptable.

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FIGURE 3
Future Exterior Composite Noise Levels (Ldn / CNEL)

4.1.4 Interior Noise

Because future exterior noise levels would exceed 60 dBA Ldn / CNEL at some residential building façades, interior noise levels in habitable rooms could exceed the RMC Section 16.08.175 and CBC Section 1206.4 requirement of 45 dBA Ldn / CNEL in residences.

To comply with this requirement, upgraded building façade elements (windows, doors, and/or exterior wall assemblies) with Sound Transmission Class (STC) ratings of 35 or higher may be necessary however, these ratings cannot be determined without substantially-complete building plans.

If the interior noise limit can be achieved only with the windows closed, the building design must include mechanical ventilation that meets CBC requirements.

Implementation of these measures would ensure that interior noise levels would be 45 dBA Ldn / CNEL or below in residences, and the project would comply with the RMC Section 16.08.175 and CBC Section 1206.4 requirement.

The project would result in a less than significant interior noise impact with project features incorporated in accordance with the interior noise analysis.

4.2 Operational (Non-Construction) Noise

4.2.1 Mechanical Equipment

It is anticipated that there would be one rooftop HVAC unit per residence, and three units on the clubhouse / fitness / leasing building. The unit sizes are not currently specified; however, it was assumed that 3-ton units would be used. A typical 3-ton HVAC condenser produces a sound power level of approximately 77 dBA [Carrier]. It was assumed that the units could operate continuously.

It is anticipated that there would be four 12.5-ton HVAC units on the grocery rooftop, and two 10-ton units on the retail rooftop. These units are expected to produce a sound power level of 88-90 dBA [Lennox 2017]. It was assumed that the closest unit would be at least 50 feet from the north property line, the units would be shielded with a solid parapet wall at least as tall as the units, and the units would not be operational during nighttime hours of 10:00 p.m. to 7:00 a.m.

The Datakustik Cadna/A industrial noise prediction model was used to estimate operational noise levels. The residential mechanical equipment would produce noise levels up to approximately 35 dBA at the project property lines. The commercial mechanical equipment would produce noise levels up to approximately 50 dBA at the project residential property line to the north and the project property line to the east. As the noise levels would be lower than the allowable levels of 55 dBA during daytime hours and 45 dBA during nighttime hours, project mechanical noise impacts would be less than significant.

4.2.2 Traffic

On Arlington Avenue, the project would add an ADT volume of up to 1,700 vehicles to the existing volume of 29,250 vehicles. On Streeter Avenue, the project would add an ADT volume of up to 1,500 vehicles to the existing volume of 18,650 vehicles. These increases in traffic would result in increases of less than 1 dBA Ldn / CNEL. As the increases in traffic noise would be less than 3 dBA, they would be not perceptible to the average person and less than significant.

4.3 Construction Noise

The primary noise source from project construction would be from site preparation. Grading could require the use of heavy equipment such as bulldozers, loaders, and scrapers. No blasting would be necessary. Haul trucks could be used to import or export fill to or from the project site.

Construction of the project would generate a short-term temporary increase in noise in the project area. The increase in noise level would be primarily experienced close to the noise source. The magnitude of the impact would depend on the type of construction activity, noise level generated by various pieces of construction equipment, duration of the construction phase, acoustical shielding and distance between the noise source and receiver.

Construction activity and delivery of construction materials and equipment would be limited to between 7:00 a.m. and 7:00 p.m. on weekdays, or between 8:00 a.m. and 5:00 p.m. on Saturdays, except on holidays.

This project would implement conventional construction techniques and equipment. Standard equipment such as scrapers, graders, backhoes, loaders, tractors, cranes, and miscellaneous trucks would be used for construction of most project facilities. Sound levels of typical construction equipment range from approximately 65–95 dBA at 50 feet from the source (U.S. Environmental Protection Agency [U.S. EPA] 1971). Worst-case noise levels are typically associated with grading. Noise sources associated with grading of the proposed project, and associated noise levels, are shown in Table 3.

Table 3. Grading Noise Source Levels

Noise Source	Noise Level	Number
Bulldozer	80 dBA at 10 meters	1
Backhoe	69 dBA at 10 meters	1
Water Truck	81 dBA at 10 meters	1
Roller	73 dBA at 10 meters	1

Source: DEFRA 2005

The Datakustik Cadna/A industrial noise prediction model was used to estimate construction noise levels. It was assumed that up to four pieces of equipment at any given time would operate continuously within the grading area boundary. No correction was applied for downtime associated with equipment maintenance, breaks, or similar situations. No noise reduction related to ground effects, atmospheric absorption, or intervening topography was included in the model.

The closest occupied residential properties are adjacent to the project site on the north and east. Without noise abatement, under the assumptions detailed above, project construction activity would produce noise levels ranging up to approximately 73 dBA Leq at the property lines of the residences.

Construction would occur between 7:00 a.m. and 7:00 p.m. on weekdays or between 8:00 a.m. and 5:00 p.m. on Saturdays. Therefore, per RMC Section 7.35.020(G), project construction is exempt from noise limits. Project construction noise impacts would be less than significant.

5.0 RECOMMENDATIONS

5.1 Vehicular Traffic Noise

To comply with the RMC Section 16.08.175 and CBC Section 1206.4 requirement of 45 dBA Ldn / CNEL in residences, as a condition of approval, the STC ratings of building façade elements will be determined upon a review of substantially-complete building plans. Mechanical ventilation will be required as necessary. As such, interior noise levels would be 45 dBA Ldn / CNEL or below in residences, and the project would comply with the RMC Section 16.08.175 and CBC Section 1206.4 requirement.

No recommendations, mitigation, or project features are required.

5.2 Operational (Non-Construction) Noise

No recommendations, mitigation, or project features are required.

5.3 Construction Noise

No recommendations, mitigation, or project features are required.

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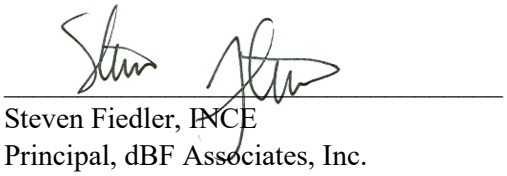
7.0 LIST OF PREPARERS

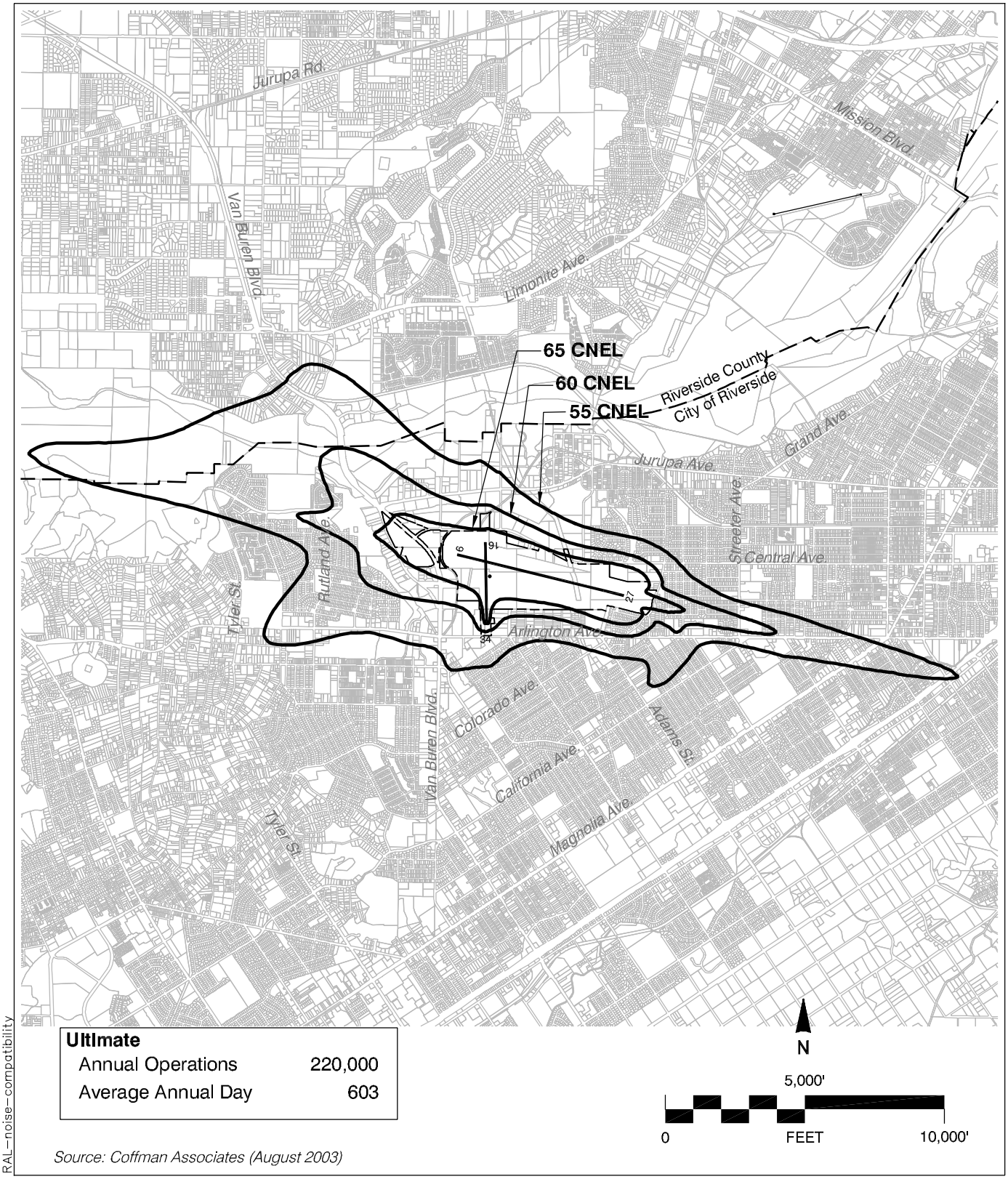


Steven Fiedler, INCE
Principal, dBF Associates, Inc.

APPENDICES

APPENDIX A

RIVERSIDE MUNICIPAL AIRPORT NOISE CONTOURS



Source: Coffman Associates (August 2003)

RAL–noise–compatibility

Map RI-3

Noise Compatibility Contours

Riverside Municipal Airport

05MP11-C3-10/17/08

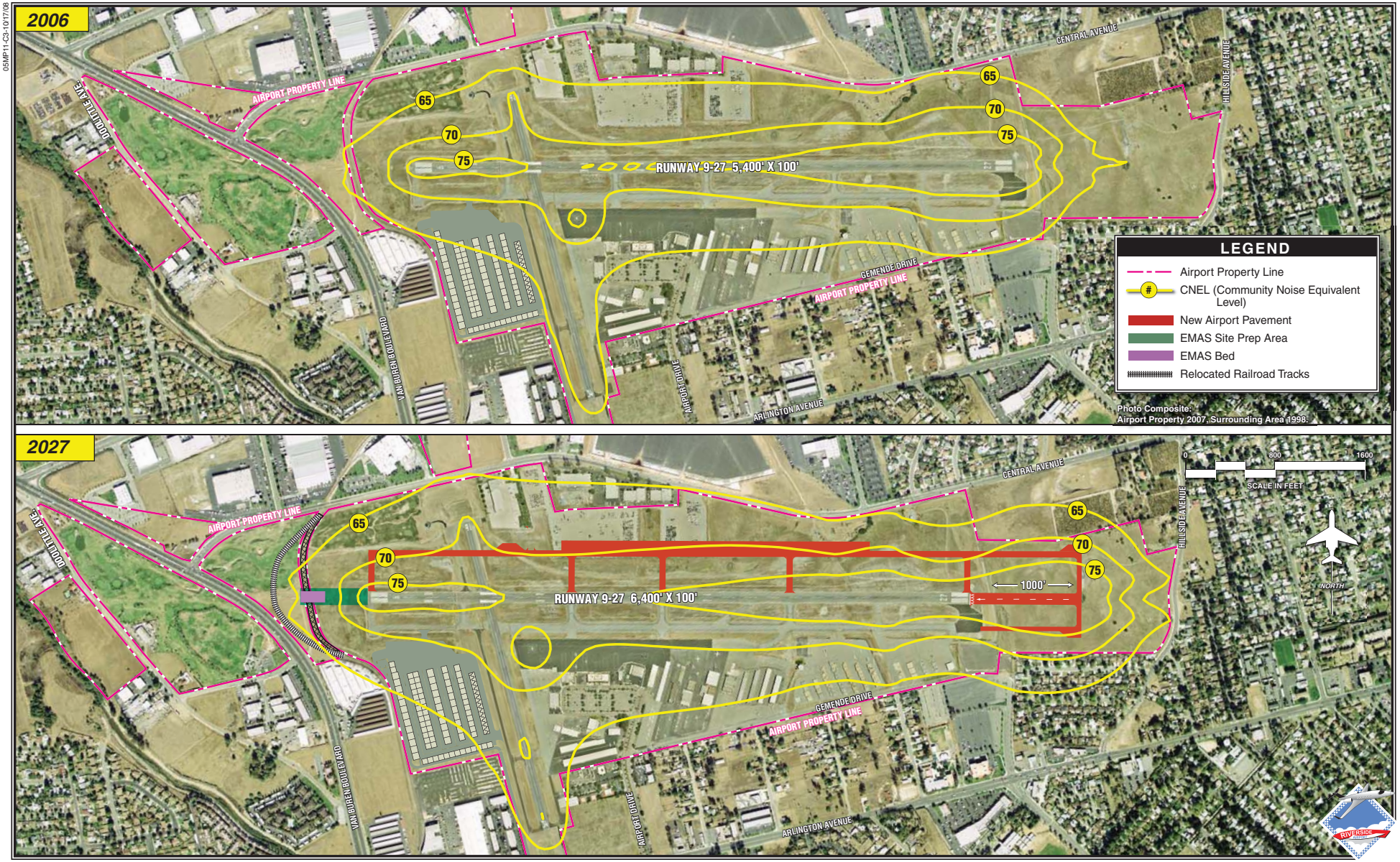


Exhibit C3
EXISTING AND FUTURE
NOISE EXPOSURE CONTOURS

APPENDIX B

ROADWAY TRAFFIC CALCULATIONS

dBF Associates, Inc. 14 March 2023
SPF TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: Arlington Mixed-Use
RUN: Measured

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
Arlington EB1	12.0	point1	1	-1,000.0	-14.0	0.00				Average	
		point45	45	-25.0	-14.0	0.00				Average	
		point46	46	-13.0	-14.0	0.00				Average	
		point47	47	13.0	-14.0	0.00				Average	
		point48	48	25.0	-14.0	0.00				Average	
		point2	2	2,000.0	-14.0	0.00					
Arlington EB2	12.0	point3	3	-1,000.0	-26.0	0.00				Average	
		point41	41	-25.0	-26.0	0.00				Average	
		point42	42	-13.0	-26.0	0.00				Average	
		point43	43	13.0	-26.0	0.00				Average	
		point44	44	25.0	-26.0	0.00				Average	
		point4	4	2,000.0	-26.0	0.00					
Arlington WB1	12.0	point5	5	2,000.0	14.0	0.00				Average	
		point6	6	25.0	14.0	0.00				Average	
		point7	7	13.0	14.0	0.00				Average	
		point8	8	-13.0	14.0	0.00				Average	
		point9	9	-25.0	14.0	0.00				Average	
		point10	10	-1,000.0	14.0	0.00					
Arlington WB2	12.0	point11	11	2,000.0	26.0	0.00				Average	
		point12	12	25.0	26.0	0.00				Average	
		point13	13	13.0	26.0	0.00				Average	
		point14	14	-13.0	26.0	0.00				Average	
		point15	15	-25.0	26.0	0.00				Average	
		point16	16	-1,000.0	26.0	0.00					
Streeter NB1	12.0	point17	17	13.0	-1,000.0	0.00				Average	

		point18	18	13.0	-26.0	0.00				Average	
		point19	19	13.0	-14.0	0.00				Average	
		point20	20	13.0	14.0	0.00				Average	
		point21	21	13.0	26.0	0.00				Average	
		point22	22	13.0	2,000.0	0.00					
Streeter NB2	12.0	point23	23	25.0	-1,000.0	0.00				Average	
		point24	24	25.0	-26.0	0.00				Average	
		point25	25	25.0	-14.0	0.00				Average	
		point26	26	25.0	14.0	0.00				Average	
		point27	27	25.0	26.0	0.00				Average	
		point28	28	25.0	2,000.0	0.00					
Streeter SB1	12.0	point29	29	-13.0	2,000.0	0.00				Average	
		point30	30	-13.0	26.0	0.00				Average	
		point31	31	-13.0	14.0	0.00				Average	
		point32	32	-13.0	-14.0	0.00				Average	
		point33	33	-13.0	-26.0	0.00				Average	
		point34	34	-13.0	-1,000.0	0.00					
Streeter SB2	12.0	point35	35	-25.0	2,000.0	0.00				Average	
		point36	36	-25.0	26.0	0.00				Average	
		point37	37	-25.0	14.0	0.00				Average	
		point38	38	-25.0	-14.0	0.00				Average	
		point39	39	-25.0	-26.0	0.00				Average	
		point40	40	-25.0	-1,000.0	0.00					

dBF Associates, Inc. **14 March 2023**
SPF **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **Arlington Mixed-Use**
RUN: **Measured**

Roadway	Points											
Name	Name	No.	Segment									
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Arlington EB1	point1	1	312	40	12	40	3	40	0	0	6	40
	point45	45	312	40	12	40	3	40	0	0	6	40
	point46	46	312	40	12	40	3	40	0	0	6	40
	point47	47	312	40	12	40	3	40	0	0	6	40
	point48	48	312	40	12	40	3	40	0	0	6	40
	point2	2										
Arlington EB2	point3	3	312	40	12	40	3	40	0	0	6	40
	point41	41	125	30	0	0	25	30	0	0	0	0
	point42	42	125	30	0	0	25	30	0	0	0	0
	point43	43	125	30	0	0	25	30	0	0	0	0
	point44	44	125	30	0	0	25	30	0	0	0	0
	point4	4										
Arlington WB1	point5	5	396	40	3	40	0	0	3	40	3	40
	point6	6	396	40	3	40	0	0	3	40	3	40
	point7	7	396	40	3	40	0	0	3	40	3	40
	point8	8	396	40	3	40	0	0	3	40	3	40
	point9	9	396	40	3	40	0	0	3	40	3	40
	point10	10										
Arlington WB2	point11	11	396	40	3	40	0	0	3	40	3	40
	point12	12	396	40	3	40	0	0	3	40	3	40
	point13	13	396	40	3	40	0	0	3	40	3	40
	point14	14	396	40	3	40	0	0	3	40	3	40
	point15	15	396	40	3	40	0	0	3	40	3	40

	point16	16										
Streeter NB1	point17	17	306	40	12	40	0	0	0	0	0	0
	point18	18	306	40	12	40	0	0	0	0	0	0
	point19	19	306	40	12	40	0	0	0	0	0	0
	point20	20	306	40	12	40	0	0	0	0	0	0
	point21	21	306	40	12	40	0	0	0	0	0	0
	point22	22										
Streeter NB2	point23	23	306	40	12	40	0	0	0	0	0	0
	point24	24	306	40	12	40	0	0	0	0	0	0
	point25	25	306	40	12	40	0	0	0	0	0	0
	point26	26	306	40	12	40	0	0	0	0	0	0
	point27	27	306	40	12	40	0	0	0	0	0	0
	point28	28										
Streeter SB1	point29	29	363	40	9	40	0	0	0	0	0	0
	point30	30	363	40	9	40	0	0	0	0	0	0
	point31	31	363	40	9	40	0	0	0	0	0	0
	point32	32	363	40	9	40	0	0	0	0	0	0
	point33	33	363	40	9	40	0	0	0	0	0	0
	point34	34										
Streeter SB2	point35	35	363	40	9	40	0	0	0	0	0	0
	point36	36	363	40	9	40	0	0	0	0	0	0
	point37	37	363	40	9	40	0	0	0	0	0	0
	point38	38	363	40	9	40	0	0	0	0	0	0
	point39	39	363	40	9	40	0	0	0	0	0	0
	point40	40										

dBF Associates, Inc. 14 March 2023
SPF TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: Arlington Mixed-Use
RUN: Measured

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			ft	ft	ft	ft	dBA	dBA	dB	dB	
ML1	1	1	600.0	60.0	0.00	5.00	68.50	66	10.0	8.0	Y
ML2	3	1	45.0	900.0	0.00	5.00	69.00	66	10.0	8.0	Y

dBF Associates, Inc. 14 March 2023
SPF TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Arlington Mixed-Use
RUN: Measured
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h		Increase over existing		Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc					
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
ML1	1	1	68.5	67.8	66	-0.7	10	Snd Lvl	67.8	0.0	8	-8.0
ML2	3	1	69.0	69.0	66	0.0	10	Snd Lvl	69.0	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB
All Selected	2	0.0	0.0	0.0
All Impacted	2	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

dBF Associates, Inc.				**27 July 2023**								
SPF				**TNM 2.5**								
INPUT: TRAFFIC FOR LAeq1h Volumes												
PROJECT/CONTRACT:	**Arlington Mixed-Use**											
RUN:	**Measured**											
Roadway	**Points**											
Name	**Name**	**No.**	**Segment**									
			Autos		**MTrucks**		**HTrucks**		**Buses**		**Motorcycles**	
			V	**S**	**V**	**S**	**V**	**S**	**V**	**S**	**V**	**S**
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
Arlington EB1	point1	1	900	40	19	40	5	40	5	40	9	40
	point45	45	900	40	19	40	5	40	5	40	9	40
	point46	46	900	40	19	40	5	40	5	40	9	40
	point47	47	900	40	19	40	5	40	5	40	9	40
	point48	48	900	40	19	40	5	40	5	40	9	40
	point2	2										
Arlington EB2	point3	3	900	40	19	40	5	40	5	40	9	40
	point41	41	900	40	19	40	5	40	5	40	9	40
	point42	42	900	40	19	40	5	40	5	40	9	40
	point43	43	900	40	19	40	5	40	5	40	9	40
	point44	44	900	40	19	40	5	40	5	40	9	40
	point4	4										
Arlington WB1	point5	5	900	40	19	40	5	40	5	40	9	40
	point6	6	900	40	19	40	5	40	5	40	9	40
	point7	7	900	40	19	40	5	40	5	40	9	40
	point8	8	900	40	19	40	5	40	5	40	9	40
	point9	9	900	40	19	40	5	40	5	40	9	40
	point10	10										
Arlington WB2	point11	11	900	40	19	40	5	40	5	40	9	40
	point12	12	900	40	19	40	5	40	5	40	9	40
	point13	13	900	40	19	40	5	40	5	40	9	40
	point14	14	900	40	19	40	5	40	5	40	9	40
	point15	15	900	40	19	40	5	40	5	40	9	40

	point16	16										
Streeter NB1	point17	17	581	40	18	40	0	0	0	0	0	0
	point18	18	581	40	18	40	0	0	0	0	0	0
	point19	19	581	40	18	40	0	0	0	0	0	0
	point20	20	581	40	18	40	0	0	0	0	0	0
	point21	21	581	40	18	40	0	0	0	0	0	0
	point22	22										
Streeter NB2	point23	23	581	40	18	40	0	0	0	0	0	0
	point24	24	581	40	18	40	0	0	0	0	0	0
	point25	25	581	40	18	40	0	0	0	0	0	0
	point26	26	581	40	18	40	0	0	0	0	0	0
	point27	27	581	40	18	40	0	0	0	0	0	0
	point28	28										
Streeter SB1	point29	29	581	40	18	40	0	0	0	0	0	0
	point30	30	581	40	18	40	0	0	0	0	0	0
	point31	31	581	40	18	40	0	0	0	0	0	0
	point32	32	581	40	18	40	0	0	0	0	0	0
	point33	33	581	40	18	40	0	0	0	0	0	0
	point34	34										
Streeter SB2	point35	35	581	40	18	40	0	0	0	0	0	0
	point36	36	581	40	18	40	0	0	0	0	0	0
	point37	37	581	40	18	40	0	0	0	0	0	0
	point38	38	581	40	18	40	0	0	0	0	0	0
	point39	39	581	40	18	40	0	0	0	0	0	0
	point40	40										

dBF Associates, Inc.						**29 September 2023**					
SPF						**TNM 2.5**					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	**Arlington Mixed-Use**										
RUN:	**Future**										
Receiver											
Name	**No.**	**#DUs**	**Coordinates (ground)**			**Height**	**Input Sound Levels and Criteria**				**Active**
			X	**Y**	**Z**	**above**	**Existing**	**Impact Criteria**		**NR**	**in**
						Ground	**LAeq1h**	**LAeq1h**	**Sub'l**	**Goal**	**Calc.**
			ft	ft	ft	ft	dBA	dBA	dB	dB	
South facades east	1	1	300.0	330.0	0.00	5.00	0.00	66	10.0	8.0	Y
West facades closest	3	1	65.0	500.0	0.00	5.00	0.00	66	10.0	8.0	Y
West facades further	4	1	215.0	700.0	0.00	5.00	0.00	66	10.0	8.0	Y
West facades furthest	5	1	380.0	800.0	0.00	5.00	0.00	66	10.0	8.0	Y
Grocery south	7	1	475.0	105.0	0.00	5.00	0.00	66	10.0	8.0	Y
Retail south	8	1	775.0	65.0	0.00	5.00	0.00	66	10.0	8.0	Y

dBF Associates, Inc. 29 September 2023
SPF TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Arlington Mixed-Use
RUN: Future
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h		Increase over existing		Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc					
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
South facades east	1	1	0.0	65.5	66	65.5	10	----	65.5	0.0	8	-8.0
West facades closest	3	1	0.0	69.7	66	69.7	10	Snd Lvl	69.7	0.0	8	-8.0
West facades further	4	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
West facades furthest	5	1	0.0	62.1	66	62.1	10	----	62.1	0.0	8	-8.0
Grocery south	7	1	0.0	69.5	66	69.5	10	Snd Lvl	69.5	0.0	8	-8.0
Retail south	8	1	0.0	71.6	66	71.6	10	Snd Lvl	71.6	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB
All Selected	6	0.0	0.0	0.0
All Impacted	3	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0