

NOISE ASSESSMENT

**Passerelle Horse Ranch Creek
County of San Diego, CA
PDS2021-SPA-21-001**

Lead Agency:

**County of San Diego
Planning & Development Services
5510 Overland Avenue, Suite 110
San Diego, CA 92123**

Prepared by:

**Jeremy Loudon
Ldn Consulting, Inc.
42428 Chisolm Trail
Murrieta, CA 92562**

Prepared For:

**REC Consultants
2442 Second Avenue
San Diego, CA 92101**

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GLOSSARY OF COMMON TERMS

Sound Pressure Level (SPL): a ratio of one sound pressure to a reference pressure (L_{ref}) of 20 μ Pa. Because of the dynamic range of the human ear, the ratio is calculated logarithmically by $20 \log (L/L_{ref})$.

A-weighted Sound Pressure Level (dBA): Some frequencies of noise are more noticeable than others. To compensate for this fact, different sound frequencies are weighted more.

Minimum Sound Level (L_{min}): Minimum SPL or the lowest SPL measured over the time interval using the A-weighted network and slow time weighting.

Maximum Sound Level (L_{max}): Maximum SPL or the highest SPL measured over the time interval the A-weighted network and slow time weighting.

Equivalent sound level (L_{eq}): the true equivalent sound level measured over the run time. L_{eq} is the A-weighted steady sound level that contains the same total acoustical energy as the actual fluctuating sound level.

Day Night Sound Level (LDN): Representing the Day/Night sound level, this measurement is a 24 –hour average sound level where 10 dB is added to all the readings that occur between 10 pm and 7 am. This is primarily used in community noise regulations where there is a 10 dB “Penalty” for nighttime noise. Typically, LDN’s are measured using A weighting.

Community Noise Exposure Level (CNEL): The accumulated exposure to sound measured in a 24-hour sampling interval and artificially boosted during certain hours. For CNEL, samples taken between 7 pm and 10 pm are boosted by 5 dB; samples taken between 10 pm and 7 am are boosted by 10 dB.

Octave Band: An octave band is defined as a frequency band whose upper band-edge frequency is twice the lower band frequency.

Third-Octave Band: A third-octave band is defined as a frequency band whose upper band-edge frequency is 1.26 times the lower band frequency.

Response Time (F,S,I): The response time is a standardized exponential time weighting of the input signal according to fast (F), slow (S) or impulse (I) time response relationships. Time response can be described with a time constant. The time constants for fast, slow and impulse responses are 1.0 seconds, 0.125 seconds and 0.35 milliseconds, respectively.

EXECUTIVE SUMMARY

This noise study has been completed to determine the noise impacts associated with the development of the proposed project. The project known as “Passerelle Horse Ranch Creek” proposes the development of two multi-family condominium lots (Parcel 1 and Parcel 2). Parcel 1, located on Assessor’s Parcel Number (APN) 108-120-62, is comprised of 3.02 acres and Parcel 2, located on APN 108-120-61, is comprised of 8.94 acres and with an existing designation for professional office (PO-1 and PO-2) uses in the Specific Plan. According to the original EIR, no impacts were identified with the proposed mitigation measures and no additional impacts are identified with this site-specific study.

On-Site Traffic Noise Analysis

It was determined from the detailed analysis that the multi-family NSLU’s adjacent to the roadways will not comply with the County of San Diego 65 dBA CNEL exterior noise standard without mitigation measures. In order to reduce the future exterior noise levels to below the County threshold noise barriers are required along the western portion of the site. The noise affected outdoor areas of the proposed lots located closest to Interstate 15 and Horse Ranch Creek Road will require noise barriers eight (8) feet in height to be located on top of slope. It was determined from the detailed analysis that all NSLU’s will comply with the County of San Diego 65 dBA CNEL exterior noise standard with the additional mitigation measures. Additionally, the site was designated as professional office under the original EIR with no on or off-site impacts. No impacts are anticipated with the proposed residential land use with the proposed mitigation measures.

The County of San Diego as part of its noise guidelines also states, consistent with Title 24 of the California Code of Regulations (CCR), a project is required to perform an interior assessment on the portions of a project site where building façade noise levels are above the normally compatible noise level in order to ensure that acceptable interior noise levels can be achieved. Exterior noise levels at first and second floor building facades were found to be above the General Plan Noise Element Standard, of 60 dBA CNEL at single family and multifamily dwellings. Therefore, per the General Plan Noise Element, a noise protection easement is required for the entire site. The noise protection easement will require the implementation of building design and construction measures to ensure that interior noise levels do not exceed 45 CNEL.

An interior noise study is required for those units located in the noise easement to determine the mitigation required to achieve an interior noise level of 45 dBA CNEL. This report would finalize the noise requirements based upon precise grading plans and actual building design specifications. This is to ensure that interior noise levels for the proposed residential structures comply with the interior noise level requirement of 45 dBA pursuant to the County Noise Element. It should be noted; interior noise levels of 45 dBA CNEL can be obtained with conventional building

construction methods, for example by providing-mechanical ventilation (e.g., air conditioning) and/or providing upgraded windows at all affected residential units.

Off-Site Traffic Noise Analysis

The traffic analysis provided by Urban Systems Associates, Inc. indicates that future project related traffic generated by the proposed residential uses will be lower than that of the previously proposed professional office use. Per the previous entitlement of professional office use, the project was expected to have a project trip generation of 2,669 ADT. With the new land use of residential, the project trip generation has been reduced to 1,380 ADT, a reduction of 1,289 daily trips. Therefore, no direct or cumulative impacts are anticipated.

Construction Noise Analysis

The original EIR required a site-specific analysis to determine noise impacts associated with construction of the proposed project. Construction noise levels at an average distance of 150 feet would attenuate or be reduced 9.5 dBA. Given this and the spatial separation of the equipment, the noise levels are projected to comply with the County of San Diego's Noise Ordinance Section 36.409 standard of 75 dBA at all Project property lines and no significant impacts to noise would occur. Additionally, all equipment should be properly fitted with mufflers and all staging and maintenance should be conducted as far away from the existing residence as possible.

No blasting or rock crushing is anticipated during construction. Therefore, no impulsive noise sources are expected and the Project will comply with Section 36.410 of the County Noise Ordinance.

Based on the foregoing and the analysis set forth herein, the proposed project will not generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the County General Plan or applicable noise ordinance or applicable standards of other agencies.

Vibration Analysis

Since the project has been previously mass graded, project construction activities would be 50 to 100 feet from the property lines and would result in Peak Particle Velocity (PPV) levels below the criteria for vibration induced structural damage at adjacent structures. Therefore, project construction activities would not result in vibration induced structural damage to residential buildings near the construction areas.

There are no existing or proposed frequent activities on or near the proposed project site which would cause any significant vibration levels to existing buildings. The project site is adjacent to

roadways and near Interstate 15. Caltrans has done extensive research on vibration created along freeways/roadways and found that because vehicles are supported by suspension systems and pneumatic tires, these vehicles are not an efficient source of ground vibration (*Source: Transportation and Construction Vibration Guidance Manual, Caltrans 2013*). Therefore, no impacts from excessive groundborne vibration or groundborne noise levels are anticipated.

1.0 INTRODUCTION

1.1 Project Description

This noise study was completed to determine the noise impacts associated with the development of the proposed Campus Park Multifamily Project. The Campus Park Specific Plan (CPSP) project is located at the northeast intersection of Interstate 15 (I-15) and State Route 76 (SR-76) within the Fallbrook Community Planning Area. The plan area is approximately two miles long from its northern to southern boundary, and 3,000 feet across at its widest point. The proposed Project would be located on Assessor's Parcel Number (APN) 108-120-62 which is comprised of 3.02 acres and Parcel 2, located on APN 108-120-61, which is comprised of 8.94 acres. A general Project vicinity map is shown in Figure 1-A.

The CPSP project is a 416.1-acre planned community composed of multi-family and single-family residential neighborhoods, a neighborhood commercial town center, professional office uses, parks and recreational facilities, and preservation of open space areas and trails. A Specific Plan Amendment (SPA) and General Plan Amendment (GPA) were approved for the project on May 11, 2011, amending the previous Hewlett-Packard Campus Park Specific Plan of 1983 and the County of San Diego General Plan. The Environmental Impact Report (State Clearinghouse No. 2005011092), "Campus Park EIR", was certified by the County of San Diego Board of Supervisors on May 11, 2011 for the CPSP.

The Campus Park Multi-Family project seeks a new SPA to amend the CPSP to allow for the development of two multi-family condominium lots (Parcel 1 and Parcel 2). Parcel 1, located on Assessor's Parcel Number (APN) 108-120-62, is comprised of 3.02 acres and Parcel 2, located on APN 108-120-61, is comprised of 8.94 acres. A total of 81 units and 123 parking spaces would be provided on Parcel 1, and 224 units and 338 parking spaces would be provided on the larger Parcel 2. The approved CPSP and the location of the proposed SPA Project location is shown in Figure 1-B. A site development plan for each parcel is shown in Figure 1-C.

Figure 1-A: Project Vicinity Map



Source: (Google, 2021)

Figure 1-B: Proposed CPSP Modification Area

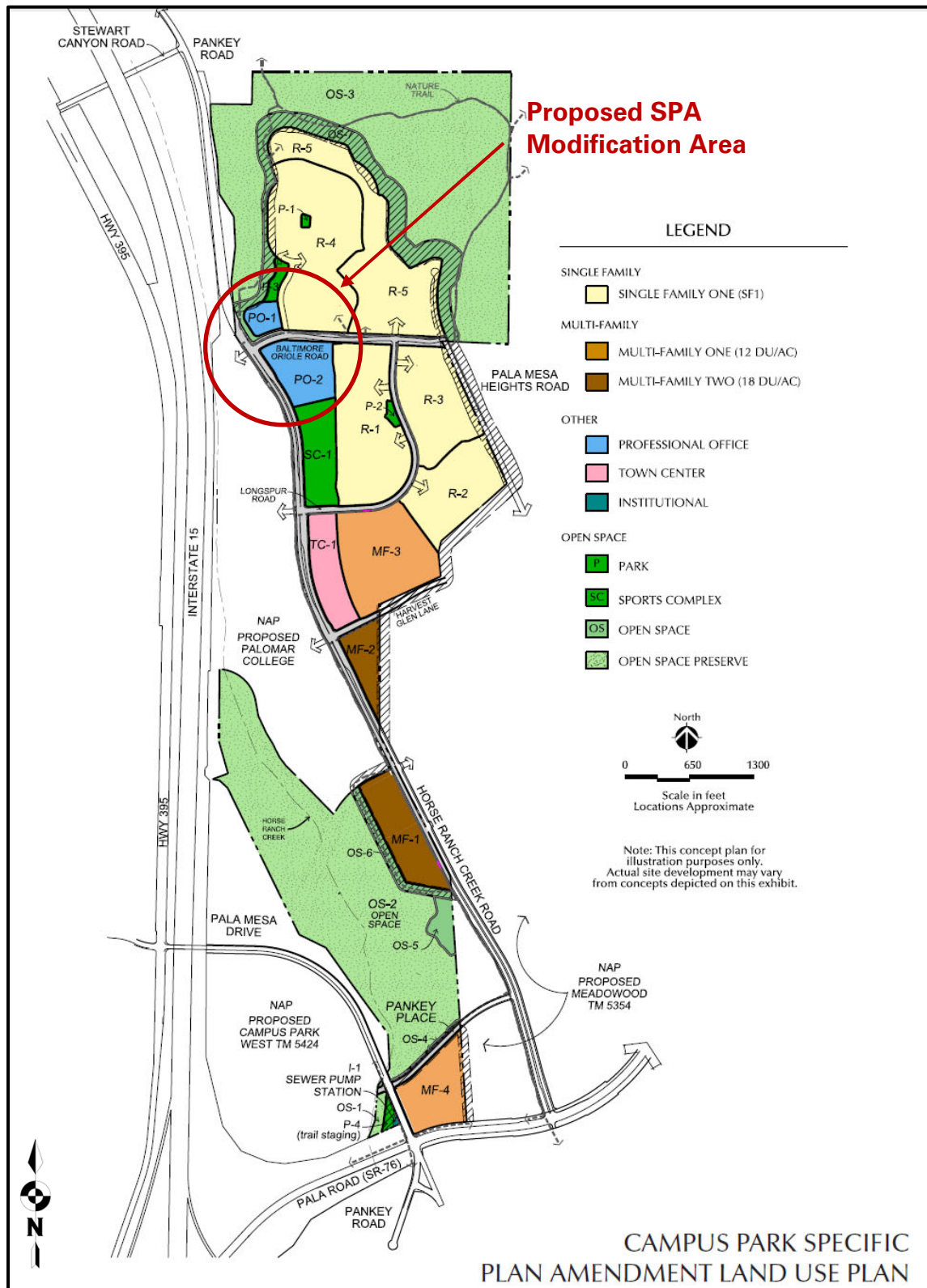
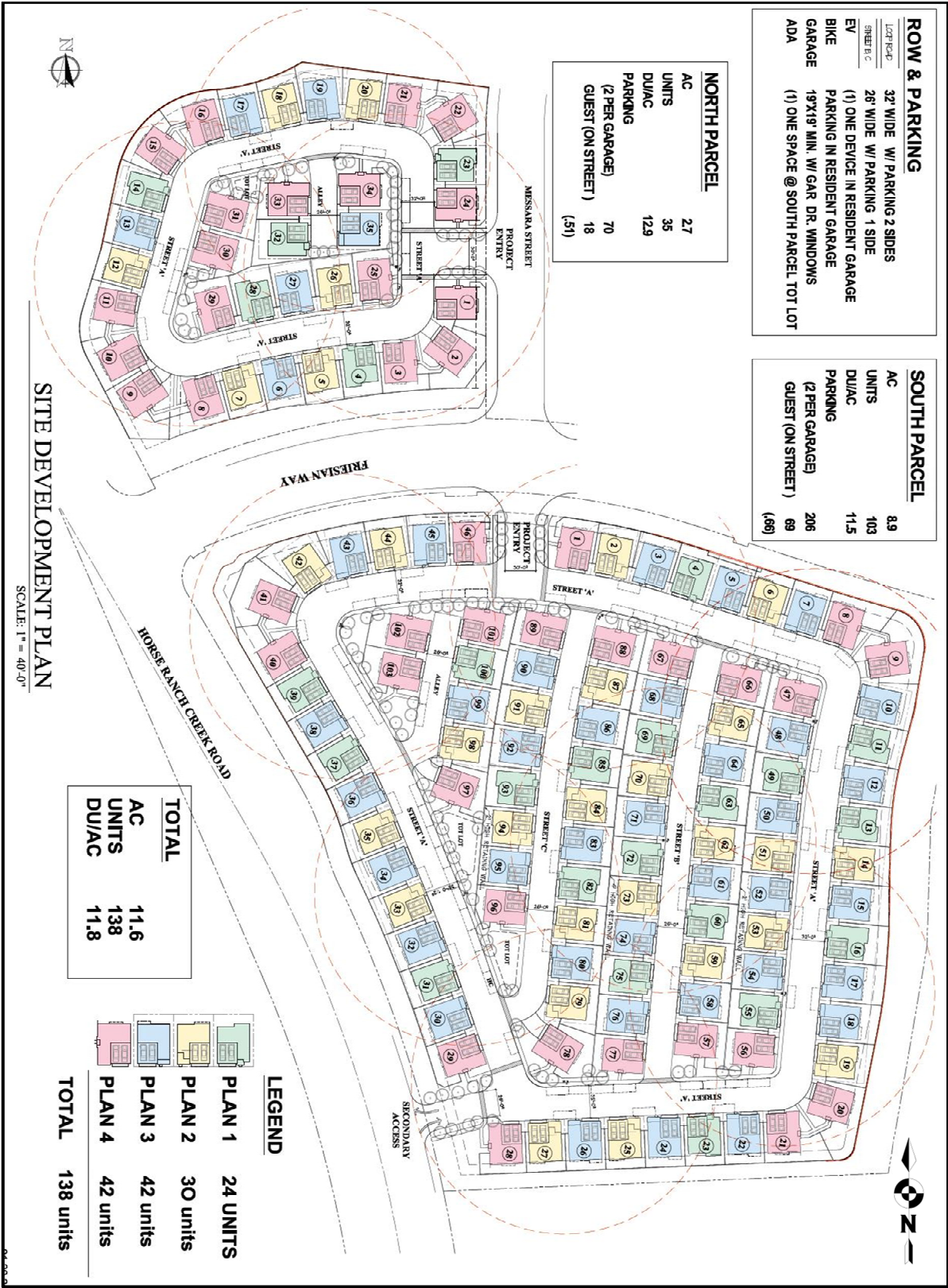


Figure 1-C: Proposed Project Site Layout



Source: Bucilla Group Architecture Inc., 2022

1.2 Environmental Settings & Existing Conditions

a) Settings & Locations

The Campus Park Multi-Family project is located directly east of I-15, approximately 0.1-mile, east of Horse Ranch Creek Road, and approximately 1.6 miles north of SR-76. Parcel 1 is bound to the west by Horse Ranch Creek Road, to the east by Jaeger Street and to the south by Friesian Way. An HOA recreational facility (P-3), common area open space (OS-7) and an open space preserve (OS-3) border Parcel 1 to the north. Single family residences (R-4 and R-5) border Parcel 1 to the east and northeast. R-4 and R-5 are further surrounded by common area open space and open space preserves. Parks (P-1 and P-6) are dispersed within R-4 and R-5. Further east, across I-15 are semi-rural residential land uses (SR-2). Friesian Way bisects Parcel 1 and Parcel 2.

Parcel 2 is bound to the north by Friesian Way and to the west by Horse Ranch Creek Road. To the east and southeast of Parcel 2 are single family residences (R-1, R-2 and R-3). The construction of these homes is complete or near completion. A parcel designated for a sports complex (SC-1) is located directly to the south, and further south of Parcel 2 is an area designated for a Town Center (TC-1). Multi-family residences (MF-1 and MF-2) to the southeast have been constructed as part of the existing development. Throughout R-1, R-2 and R-3 are designated park areas (P-2, P-5, P-7 and P-8). The Palomar College North Education Center is located further south of Parcel 2. The amendment from professional office uses to multi-family residential would be compatible with the existing Campus Park development.

The entire project area has been graded as part of the adjacent development and thus contain little to no vegetation. Parcel 1 is predominantly flat, with elevations ranging from 370-375 feet above mean sea level (FAMSL) in a northerly direction. Landscaped slopes on its southern and western sides slope down to 355 FAMSL. Parcel 2 is also predominantly flat, sloping gently upward from 360-370 FAMSL in a northeasterly direction, with landscaped slopes on the northeast sloping up to 395 FAMSL, and landscaped slopes sloping down to 355 FAMSL on the western and northwestern sides. Soils underlying the areas are Wyman loams, five to nine percent slopes. Figure 1-D shows an aerial image of the site showing the graded lots as labeled.

b) Existing Noise Conditions

The project is located east of Interstate 15 which currently is an 8-lane freeway with a posted speed limit of 70 miles per hour (MPH). Existing noise occurs mainly from traffic traveling along Interstate 15 as well as traffic along Horse Ranch Creek Road.

Figure 1-D: Parcel Identification



Source: Google Earth, 2020

1.3 Methodology and Equipment

a) Noise Modeling Software

The expected roadway noise levels from Interstate 15 and Horse Ranch Creek Road were projected using Caltrans Sound32 Traffic Noise Prediction Model. Sound32 is a peak hour based traffic noise prediction model. The results of this analysis are based on the California Vehicle Noise Emission Levels (CALVENO). The Sound 32 model was calibrated in accordance with the FHWA Highway Traffic Noise Prediction Manual (Report RD-77-108) and in accordance with Caltrans Technical Noise Supplement (TeNS) section N-5400. The critical model input parameters, which determine the projected vehicular traffic noise levels, include vehicle travel speeds, the percentages of automobiles, medium trucks and heavy trucks in the roadway volume, the site conditions ("hard" or "soft") and the peak hour traffic volume.

The peak hour traffic volumes range between 6-12% of the average daily traffic (ADT) and 10% is generally acceptable for noise modeling purposes. The required coordinate information necessary for the Sound32 traffic noise prediction model input was taken from the preliminary site plans provided by REC Consultants, Inc. dated December, 2020. To predict the future noise levels the preliminary site plans were used to identify the pad elevations, the roadway elevations, and the relationship between the noise source(s) and the NSLU areas. Traffic was consolidated into a single lane located along the centerline of each roadway. Longer roadway segments were subdivided into a series of adjoining segments for analysis. For this analysis, the roadway segments were extended a minimum of 500 feet beyond the observer locations.

A calibration factor was used for all receptors located behind a row of proposed buildings for all modeled areas. Typically, three decibels of attenuation is allowed for the first row of buildings when they block 40 to 65% of the line of sight to the noise source, and three to five decibels of attenuation is allowed when the buildings obstruct more than 65% of the line of sight (Source: CALTRANS Technical Noise Supplement Section N-5515). A conservative factor of 3 dBA was taken into account for the appropriate buildings on the proposed project site. No grade correction (according to Caltrans Policy TAN-02-01 dated January 17, 2002) were included as part of the traffic noise prediction model analysis.

To evaluate the potential noise impacts on the proposed development, outdoor observers were located in NSLU areas and placed five feet above the pad elevation and near the center of the rear yard a minimum of ten feet from the top/bottom of slope. All second floor observers were located fifteen feet above the proposed pad elevation at the anticipated building facades.

b) Noise Calculations and Factors

Noise is defined as unwanted or annoying sound which interferes with or disrupts normal activities. Exposure to high noise levels has been demonstrated to cause hearing loss. The individual human response to environmental noise is based on the sensitivity of that individual, the type of noise that occurs and when the noise occurs.

Sound is measured on a logarithmic scale consisting of sound pressure levels known as a decibel (dB). The sounds heard by humans typically do not consist of a single frequency but of a broadband of frequencies having different sound pressure levels. The method for evaluating all the frequencies of the sound is to apply an A-weighting to reflect how the human ear responds to the different sound levels at different frequencies. The A-weighted sound level adequately describes the instantaneous noise whereas the equivalent sound level depicted as L_{eq} represents a steady sound level containing the same total acoustical energy as the actual fluctuating sound level over a given time interval.

The Community Noise Equivalent Level (CNEL) is the 24 hour A-weighted average for sound, with corrections for evening and nighttime hours. The corrections require an addition of 5 decibels to sound levels in the evening hours between 7 p.m. and 10 p.m. and an addition of 10 decibels to sound levels at nighttime hours between 10 p.m. and 7 a.m. These additions are made to account for the increased sensitivity during the evening and nighttime hours when sound appears louder.

A vehicle's noise level is from a combination of the noise produced by the engine, exhaust and tires. The cumulative traffic noise levels along a roadway segment are based on three primary factors: the amount of traffic, the travel speed of the traffic, and the vehicle mix ratio or number of medium and heavy trucks. The intensity of traffic noise is increased by higher traffic volumes, greater speeds and increased number of trucks. Because mobile/traffic noise levels are calculated on a logarithmic scale, a doubling of the traffic noise or acoustical energy results in a noise level increase of 3 dBA. Therefore, the doubling of the traffic volume, without changing the vehicle speeds or mix ratio, results in a noise increase of 3 dBA. Mobile noise levels radiate in an almost oblique fashion from the source and drop off at a rate of 3 dBA for each doubling of distance under hard site conditions and at a rate of 4.5 dBA for soft site conditions. Hard site conditions consist of concrete, asphalt and hard pack dirt while soft site conditions exist in areas having slight grade changes, landscaped areas and vegetation.




The most effective noise reduction methods consist of controlling the noise at the source, blocking the noise transmission with barriers or relocating the receiver. Any or all of these methods may be required to reduce noise levels to an acceptable level.

2.0 NOISE SENSITIVE LAND USES (NSLU)

2.1 Guidelines for the Determination of Significance

The County's General Plan Chapter 8 Noise Element uses the Noise Compatibility Guidelines listed in Table N-1 of the General Plan Noise Element (provided below) to determine the compatibility of land use when evaluating proposed development projects. The Noise Compatibility Guidelines indicate ranges of compatibility and are intended to be flexible enough to apply to a range of projects and environments. For example, a commercial project would be evaluated differently than a residential project in a rural area or a mixed-use project in a more densely developed area of the County.

TABLE N-1: NOISE COMPATIBILITY GUIDELINES (CNEL)

Table N-1 Noise Compatibility Guidelines								
Land Use Category		Exterior Noise Level (CNEL)						
			55	60	65	70	75	80
A	Residential—single family residences, mobile homes, senior housing, convalescent homes							
B	Residential—multi-family residences, mixed-use (commercial/residential)							
C	Transient lodging—motels, hotels, resorts							
D*	Schools, churches, hospitals, nursing homes, child care facilities							
E*	Passive recreational parks, nature preserves, contemplative spaces, cemeteries							
F*	Active parks, golf courses, athletic fields, outdoor spectator sports, water recreation							
G*	Office/professional, government, medical/dental, commercial, retail, laboratories							
H*	Industrial, manufacturing, utilities, agriculture, mining, stables, ranching, warehouse, maintenance/repair							
	ACCEPTABLE—Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal construction, without any special noise insulation requirements.							
	CONDITIONALLY ACCEPTABLE—New construction or development should be undertaken only after a detailed noise analysis is conducted to determine if noise reduction measures are necessary to achieve acceptable levels for land use. Criteria for determining exterior and interior noise levels are listed in Table N-2, Noise Standards. If a project cannot mitigate noise to a level deemed Acceptable, the appropriate county decision-maker must determine that mitigation has been provided to the greatest extent practicable or that extraordinary circumstances exist.							
	UNACCEPTABLE—New construction or development shall not be undertaken.							

* Denotes facilities used for part of the day; therefore, an hourly standard would be used rather than CNEL (refer to Table N-2).

Note: For projects located within an Airport Influence Area of an adopted Airport Land Use Compatibility Plan (ALUCP), additional Noise Compatibility Criteria restrictions may apply as specified in the ALUCP.

A land use located in an area identified as “acceptable” indicates that standard construction methods would attenuate exterior noise to an acceptable indoor noise level and that people can carry out outdoor activities with minimal noise interference. Land uses that fall into the “conditionally acceptable” noise environment should have an acoustical study that considers the type of noise source, the sensitivity of the noise receptor, and the degree to which the noise source may interfere with sleep, speech, or other activities characteristic of the land use. For land uses indicated as “conditionally acceptable,” structures must be able to attenuate the exterior noise to the indoor noise level as indicated in the Noise Standards listed in Table N-2 of the General Plan Noise Element (provided below). For land uses where the exterior noise levels fall within the “unacceptable” range, new construction generally should not be undertaken.

TABLE N-2: NOISE STANDARDS

Table N-2	Noise Standards ^{Note}
1.	The exterior noise level (as defined in Item 3) standard for Category A shall be 60 CNEL, and the interior noise level standard for indoor habitable rooms shall be 45 CNEL.
2.	The exterior noise level standard for Categories B and C shall be 65 CNEL, and the interior noise level standard for indoor habitable rooms shall be 45 CNEL.
3.	The exterior noise level standard for Categories D and G shall be 65 CNEL and the interior noise level standard shall be 50 dBA L _{eq} (one hour average).
4.	For single-family detached dwelling units, “exterior noise level” is defined as the noise level measured at an outdoor living area which adjoins and is on the same lot as the dwelling, and which contains at least the following minimum net lot area: (i) for lots less than 4,000 square feet in area, the exterior area shall include 400 square feet, (ii) for lots between 4,000 square feet to 10 acres in area, the exterior area shall include 10 percent of the lot area; (iii) for lots over 10 acres in area, the exterior area shall include 1 acre.
5.	For all other residential land uses, “exterior noise level” is defined as noise measured at exterior areas which are provided for private or group usable open space purposes. “Private Usable Open Space” is defined as usable open space intended for use of occupants of one dwelling unit, normally including yards, decks, and balconies. When the noise limit for Private Usable Open Space cannot be met, then a Group Usable Open Space that meets the exterior noise level standard shall be provided. “Group Usable Open Space” is defined as usable open space intended for common use by occupants of a development, either privately owned and maintained or dedicated to a public agency, normally including swimming pools, recreation courts, patios, open landscaped areas, and greenbelts with pedestrian walkways and equestrian and bicycle trails, but not including off-street parking and loading areas or driveways.
6.	For non-residential noise sensitive land uses, exterior noise level is defined as noise measured at the exterior area provided for public use.
7.	For noise sensitive land uses where people normally do not sleep at night, the exterior and interior noise standard may be measured using either CNEL or the one-hour average noise level determined at the loudest hour during the period when the facility is normally occupied.
8.	The exterior noise standard does not apply for land uses where no exterior use area is proposed or necessary, such as a library.
9.	For Categories E and F the exterior noise level standard shall not exceed the limit defined as “Acceptable” in Table N-1 or an equivalent one-hour noise standard.

Note: Exterior Noise Level compatibility guidelines for Land Use Categories A-H are identified in Table N-1, Noise Compatibility Guidelines.

2.2 Potential Noise Impacts

a) Potential Build Out Noise Conditions

The Buildout scenario for Interstate 15 includes the future year 2030 traffic volume forecasts provided by the Project's Traffic Impact Analysis prepared by LOS Engineering (February 2009). The Buildout scenario for Horse Ranch Creek Road includes the future year 2035 traffic volume forecasts provided by Urban Systems Associates, Inc., received March 2021. The future traffic along Interstate 15 is estimated to be 251,020 ADT in the Buildout conditions. The future traffic along Horse Ranch Creek Road is estimated to be 9,080 ADT in the Buildout conditions. The future roadway parameters and inputs utilized in this analysis are provided in Table 2-1.

The future traffic noise model utilizes previously accepted vehicle mixes provided in the noise analysis completed by Pacific Noise Control on October 12, 2005 of 96% Autos, 2% Medium Trucks and 2% Heavy Trucks for all internal project roads and 90% Autos, 3% Medium Trucks and 7% Heavy Trucks for Interstate 15. Horse Ranch Creek Road will have roadway classifications of light collector and boulevard. Estimated traffic speeds of 45 mph for light collectors was used based on the County of San Diego Department of Public Works Public Road Standards. A traffic speed of 65 mph was used for Interstate 15. To assess the peak hour traffic noise conditions, 10% of the ADT was utilized and a conservative vehicle mix was also utilized to predict the worst case noise levels.

Table 2-1: Buildout Traffic Parameters

Roadway	Average Daily Traffic (ADT)	Peak Hour Volume ¹	Modeled Speeds (MPH)	Vehicle Mix % ²		
				Auto	Medium Trucks	Heavy Trucks
Interstate 15	251,020	25,102	70	90	3	7
Horse Ranch Creek Rd	9,080	908	45	96	2	2
¹ 10% of the ADT.						
² Conservative vehicle mix.						

b) Potential Noise Impact Identification

Noise contours are lines that when drawn from a noise source indicate a continuous or equivalent level of noise exposure. Noise contour lines are generally used as a planning tool to assess potential impacts and the need for additional analysis. The noise contour lines that may affect the project site were developed for the unshielded future Buildout conditions. No barriers or structures were included as part of the noise contour analysis. The Sound32 traffic noise

prediction model was used to calculate the noise contours perpendicular. Only the natural topography and proposed pad edges, which are elevated above the travel lanes, were incorporated in the contour model to determine the future noise levels at the proposed project site. Second floor areas were also modeled using hard site conditions based upon Caltrans Protocol. The model input parameters and results for the first and second noise contours are provided in **Attachment A**. Figure 2-A provides the location of the future first and second floor 75 and 65 dBA CNEL noise contours.

The noise contours provided in Figure 2-A show that the 75 dBA CNEL contours are all located within the right-of-way (ROW). The worst-case first floor 65 dBA CNEL contour due to the changes in elevations and top-of-slopes extends approximately 1,000 to 1,200-feet from Interstate 15. The second floor 65 dBA CNEL contour cover the entire site. The contours show that noise sensitive land use (NSLU) areas will exceed the County of San Diego 65 dBA CNEL exterior noise standard. The noise contours represents the unmitigated noise condition with no shielding from topography or structures to determine if further analysis is required. Based on these findings, additional detailed exterior noise analysis is provided below to determine the noise impacts and needed mitigation measures.

Additionally, the 60 dBA CNEL contour is located beyond the project limits, therefore, per the General Plan Noise Element, a noise protection easement is required for the entire site and an interior noise study is required for all units located in the noise easement, to determine the mitigation required to achieve an interior noise level of 45 dBA CNEL. The noise protection easement will be placed over the entire site and this information will be added on the plot plan and be a condition of approval for noise.

c) Detailed Analysis and Mitigation Measures

The Buildout analysis was modeled assuming future year traffic parameters as shown previously in Table 2-3. It was determined from the detailed analysis that the multi-family NSLU located along the roadways will not comply with the County of San Diego 65 dBA CNEL multi-family exterior noise standard without mitigation measures. Modeled observer locations for a sample of the potentially affected NSLU's are presented in Figure 2-B.

Figure 2-A: Future Noise Contour Locations

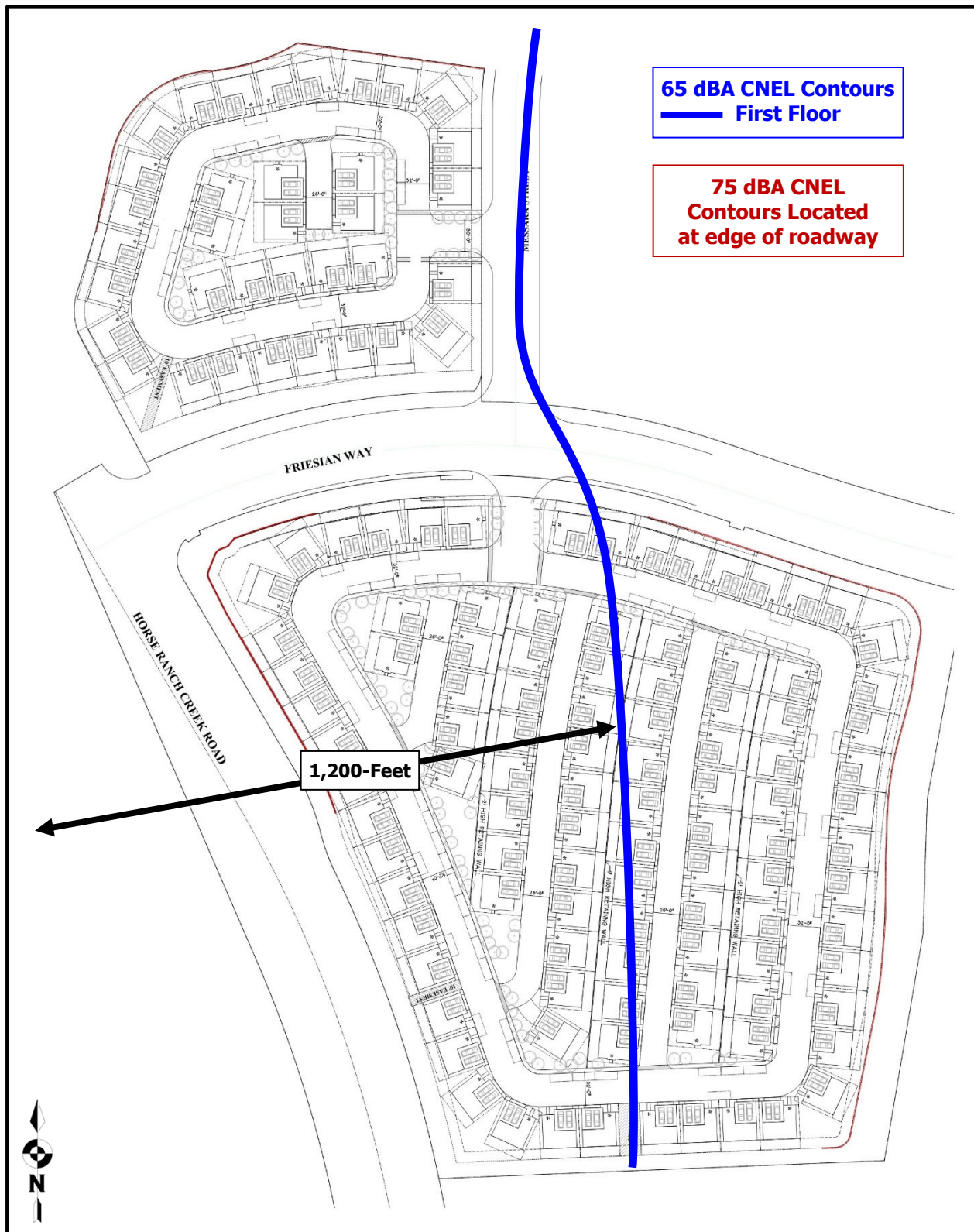
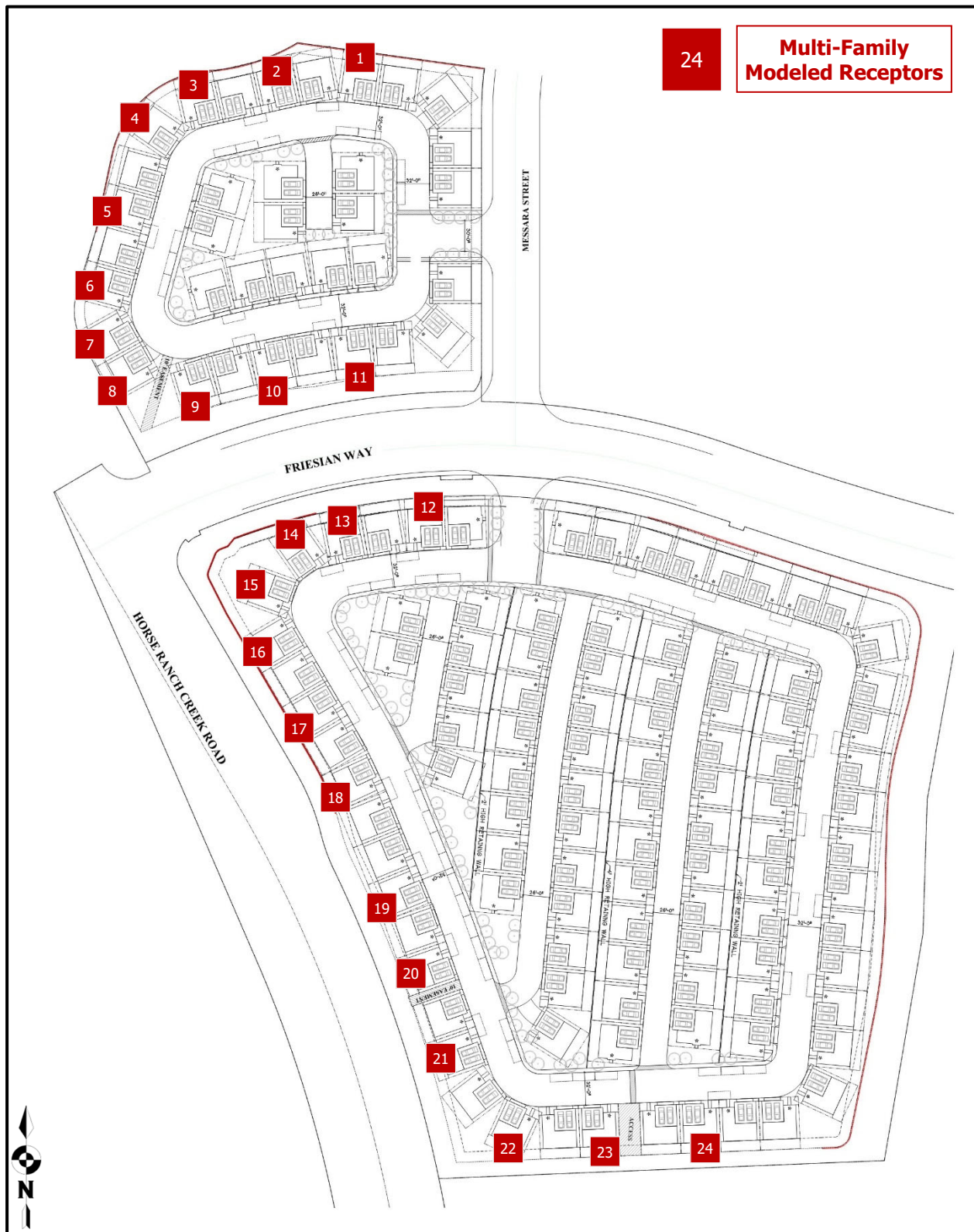


Figure 2-B: Modeled NSLU Receptor Locations



The results of the specific noise modeling for the site are provided in Table 2-2 for both the unmitigated and mitigated scenarios. The noise affected outdoor areas of the proposed lots located closest to Interstate 15 and Horse Ranch Creek Road will require noise barriers in height eight (8) feet to be located on top of slope. Although the proposed barrier would not extend to Receptor 1, it would provide shielding to the roadways and mitigate noise levels to below 65 dBA CNEL. The S32 models input and output files for the future conditions are provided in ***Attachment B***.

Exhibit 2-C below shows the mitigation locations and barrier heights required to bring noise levels at the multi-family units adjacent to the roadways to the County of San Diego 65 dBA CNEL exterior noise level standards for the proposed outdoor areas. The barriers must be constructed of a non-gapping material consisting of masonry, ½ inch thick glass, earthen berm or any combination of these materials.

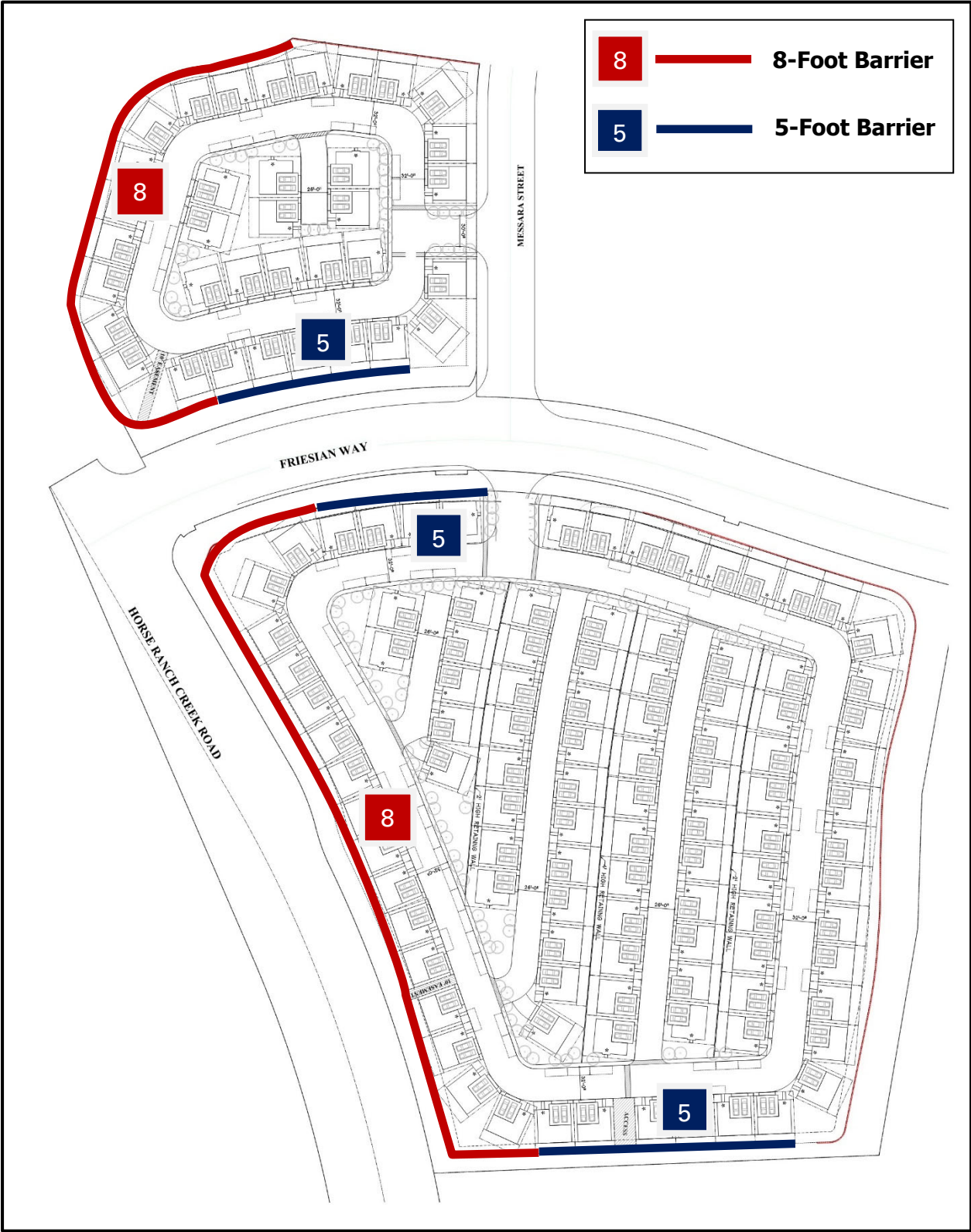
With the incorporation of the mitigation measures, the first floor building facades of the multi-family dwellings will comply with the General Plan Noise Element Standard, of 65 dBA CNEL. Also included in Table 2-2 above are the resultant second floor building façade noise levels. Exterior noise levels at the building facades were found to be above the General Plan Noise Element Standard, of 60 dBA CNEL for both the first and second floor areas. As was shown in Figure 2-A above, all proposed sensitive uses could exceed the 60 dBA CNEL threshold at the building façade and may need interior mitigation.

Therefore, an interior noise assessment is required to mitigate the exterior noise levels to an interior level of 45 dBA CNEL. This report should be conducted prior to the issuance of building permits and would finalize the noise requirements based upon precise grading plans and actual building design specifications. This is to ensure that interior noise levels for the proposed residential structures comply with the interior noise level requirement of 45 dBA pursuant to the County Noise Element. It should be noted; interior noise levels of 45 dBA CNEL can be obtained with conventional building construction methods by providing a window condition requiring a means of mechanical ventilation (e.g., air conditioning) and providing upgraded windows at all affected lots.

Table 2-2: Future Exterior Noise Levels

Modeled Receptor Number	Receptor Location (Lot #)	Receptor Elevation (Feet) ¹	Unmitigated Outdoor Noise Level (dBA CNEL) ²	Barrier Height (Feet) ³	Mitigated Outdoor Noise Levels (dBA CNEL) ⁴	Second Floor Façade Noise Levels (dBA CNEL) ⁴
1	20	375	67	0	65	70
2	18	374	68	8	65	70
3	16	373	68	8	65	71
4	15	373	69	8	65	72
5	13	372	70	8	65	73
6	11	371	70	8	65	74
7	10	371	70	8	65	74
8	9	371	70	8	65	74
9	8	371	69	8	65	72
10	6	372	65	5	63	67
11	4	373	64	5	63	67
12	45	371	63	5	62	66
13	43	368	63	5	62	67
14	42	366	67	8	65	71
15	41	365	69	8	65	73
16	40	364	69	8	65	73
17	38	364	69	8	65	73
18	36	366	68	8	65	72
19	33	367	68	8	64	72
20	31	365	68	8	65	72
21	29	364	68	8	64	72
22	28	363	66	8	65	70
23	26	366	65	5	65	70
24	24	369	65	5	64	69
¹ Receptor Elevation is 5-feet above the Pad Elevation for ground level and 15-feet above pad for second floor. ² Exterior Mitigation required per County Guidelines if BOLD ³ Barrier Height is in addition to the proposed berm. ⁴ Interior Noise Study required per County Guidelines if BOLD						

Figure 2-C: Exterior Noise Mitigation Measures



2.3 Off-site Noise Impacts

The traffic analysis provided by Urban Systems Associates, Inc. indicates that future project related traffic generated by the proposed residential uses will be lower than that of the previously proposed professional office use. Per the previous entitlement of professional office use, the project was expected to have a project trip generation of 2,669 ADT. With the new land use of residential, the project trip generation has been reduced to 1,380 ADT, a reduction of 1,289 daily trip. Therefore, no direct or cumulative impacts are anticipated.

2.4 Conclusions

It was determined from the detailed analysis that the multi-family NSLU's adjacent to the roadways will not comply with the County of San Diego 65 dBA CNEL exterior noise standard without mitigation measures. In order to reduce the future exterior noise levels to below the County threshold noise barriers are required along the western portion of the site. The noise affected outdoor areas of the proposed lots located closest to Interstate 15 and Horse Ranch Creek Road will require noise barriers eight (8) feet in height to be located on top of slope. It was determined from the detailed analysis that all NSLU's will comply with the County of San Diego 65 dBA CNEL exterior noise standard with the additional mitigation measures. Additionally, the site was designated as professional office under the original EIR with no on or off-site impacts. No impacts are anticipated with the proposed residential land use with the proposed mitigation measures.

The County of San Diego as part of its noise guidelines also states, consistent with Title 24 of the California Code of Regulations (CCR), a project is required to perform an interior assessment on the portions of a project site where building façade noise levels are above the normally compatible noise level in order to ensure that acceptable interior noise levels can be achieved. Exterior noise levels at first and second floor building facades were found to be above the General Plan Noise Element Standard, of 60 dBA CNEL at single family and multifamily dwellings. Therefore, per the General Plan Noise Element, a noise protection easement is required for the entire site. The noise protection easement will require the implementation of building design and construction measures to ensure that interior noise levels do not exceed 45 CNEL.

An interior noise study is required for those units located in the noise easement to determine the mitigation required to achieve an interior noise level of 45 dBA CNEL. This report would finalize the noise requirements based upon precise grading plans and actual building design specifications. This is to ensure that interior noise levels for the proposed residential structures comply with the interior noise level requirement of 45 dBA pursuant to the County Noise Element. It should be noted; interior noise levels of 45 dBA CNEL can be obtained with conventional building construction methods, for example by providing-mechanical ventilation (e.g., air conditioning) and/or providing upgraded windows at all affected residential units.

The traffic analysis provided by Urban Systems Associates, Inc. indicates that future project related traffic generated by the proposed residential uses will be lower than that of the previously proposed professional office use. Per the previous entitlement of professional office use, the project was expected to have a project trip generation of 2,669 ADT. With the new land use of residential, the project trip generation has been reduced to 1,380 ADT, a reduction of 1,289 daily trip. Therefore, no direct or cumulative impacts are anticipated.

3.0 PROJECT-GENERATED AIRBORNE NOISE

3.1 Guidelines for the Determination of Significance

According to Section 36.404 of the County Noise Ordinance, it shall be unlawful for any person to cause or allow the creation of any noise to the extent that the one-hour average sound level, at any point on or beyond the boundaries of the property exceeds the applicable limits on Table 3-1. An impact would occur and mitigation would be needed if the project will generate airborne noise which, together with noise from all sources, will be in excess of either of the following:

Table 3-1: San Diego County Code Section 36.404

SOUND LEVEL LIMITS IN DECIBELS (dBA)

ZONE		APPLICABLE LIMIT ONE-HOUR AVERAGE SOUND LEVEL (DECIBELS)
R-S, R-D, R-R, R-MH, A-70, A-72, S-80, S-81, S-87, S-88, S-90, S-92, R-V, and R-U Use Regulations with a density of less than 11 dwelling units per acre.	7 a.m. to 10 p.m.	50
	10 p.m. to 7 a.m.	45
R-RO, R-C, R-M, C-30, S-86, R-V, R-U and V5. Use Regulations with a density of 11 or more dwelling units per acre.	7 a.m. to 10 p.m.	55
	10 p.m. to 7 a.m.	50
S-94, V4, and all other commercial zones.	7 a.m. to 10 p.m.	60
	10 p.m. to 7 a.m.	55
V1, V2	7 a.m. to 7 p.m.	60
V1, V2	7 p.m. to 10 p.m.	55
V1	10 p.m. to 7 a.m.	55
V2	10 p.m. to 7 a.m.	50
V3	7 a.m. to 10 p.m.	70
	10 p.m. to 7 a.m.	65
M-50, M-52, M-54	Anytime	70
S-82, M-58, and all other industrial zones.	Anytime	75

(a) If the measured ambient level exceeds the applicable limit noted above, the allowable one hour average sound level shall be the ambient noise level, plus three decibels. The ambient noise level shall be measured when the alleged noise violation source is not operating.

(b) The sound level limit at a location on a boundary between two zones is the arithmetic mean of the respective limits for the two zones; provided however, that the one-hour average sound level limit applicable to extractive industries, including but not limited to borrow pits and mines, shall be 75 decibels at the property line regardless of the zone which the extractive industry is actually located.

The site is subject to the General Plan Village Regional Category, Village Residential 2 (VR-2) Land Use Designation, and Rural Residential (RR) Zoning Regulation. The surrounding properties are zoned RR (Rural Residential). According to Section 36.404 of the County of San Diego Noise Ordinance, all areas zoned RR have a most restrictive property line standard of 50 dBA Leq for the daytime hours of 7 a.m. to 10 p.m. and 45 dBA Leq for the nighttime hours of 10 p.m. to 7 a.m. Onsite noise generation due to the proposed residential development project would primarily consist of normal residential activities and mechanical heating ventilation and air conditioning (HVAC) equipment.

Construction Noise: Noise generated by construction activities related to the project will exceed the standards listed in San Diego County Code Sections as follows.

Section 36.408: Hours of Operation of Construction Equipment

Except for emergency work, it shall be unlawful for any person to operate or cause to be operated, construction equipment:

- a. Between 7 p.m. and 7 a.m.
- b. On a Sunday or a holiday. For purposes of this section, a holiday means January 1st, the last Monday in May, July 4th, the first Monday in September, December 25th and any day appointed by the President as a special national holiday or the Governor of the State as a special State holiday. A person may, however, operate construction equipment on a Sunday or holiday between the hours of 10 a.m. and 5 p.m. at the person's residence or for the purpose of constructing a residence for himself or herself, provided that the operation of construction equipment is not carried out for financial consideration or other consideration of any kind and does not violate the limitations in sections 36.409 and 36.410.

Section 36.409: Sound Level Limitations on Construction Equipment

Except for emergency work, it shall be unlawful for any person to operate construction equipment or cause construction equipment to be operated, that exceeds an average sound level of 75 decibels for an eight-hour period, between 7 a.m. and 7 p.m., when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received.

Section 36.410: Sound Level Limitations on Impulsive Noise

In addition to the general limitations on sound levels in section 36.404 and the limitations on construction equipment in section 36.409, the following additional sound level limitations shall apply:

- (a) Except for emergency work or work on a public road project, no person shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in Table 36.410A (provided below), when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period, as described in subsection (c) below. The maximum sound level depends on the use being made of the occupied property. The uses in Table 36.410A are as described in the County Zoning Ordinance.

TABLE 36.410A: MAXIMUM SOUND LEVEL (IMPULSIVE) MEASURED AT OCCUPIED PROPERTY IN DECIBELS (dBA)

OCCUPIED PROPERTY USE	DECIBELS (dBA)
Residential, village zoning or civic use	82
Agricultural, commercial or industrial use	85

- (b) Except for emergency work, no person working on a public road project shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in Table 36.410B, when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period, as described in subsection (c) below. The maximum sound level depends on the use being made of the occupied property. The uses in Table 36.410B are as described in the County Zoning Ordinance.

TABLE 36.410B: MAXIMUM SOUND LEVEL (IMPULSIVE) MEASURED AT OCCUPIED PROPERTY IN DECIBELS (dBA) FOR PUBLIC ROAD PROJECTS

OCCUPIED PROPERTY USE	dB(A)
Residential, village zoning or civic use	85
Agricultural, commercial or industrial use	90

- (c) The minimum measurement period for any measurements conducted under this section shall be one hour. During the measurement period a measurement shall be conducted every minute from a fixed location on an occupied property. The measurements shall measure the maximum sound level during each minute of the measurement period. If the sound level caused by construction equipment or the producer of the impulsive noise exceeds the maximum sound level for any portion of any minute, it will be deemed that the maximum sound level was exceeded during that minute.

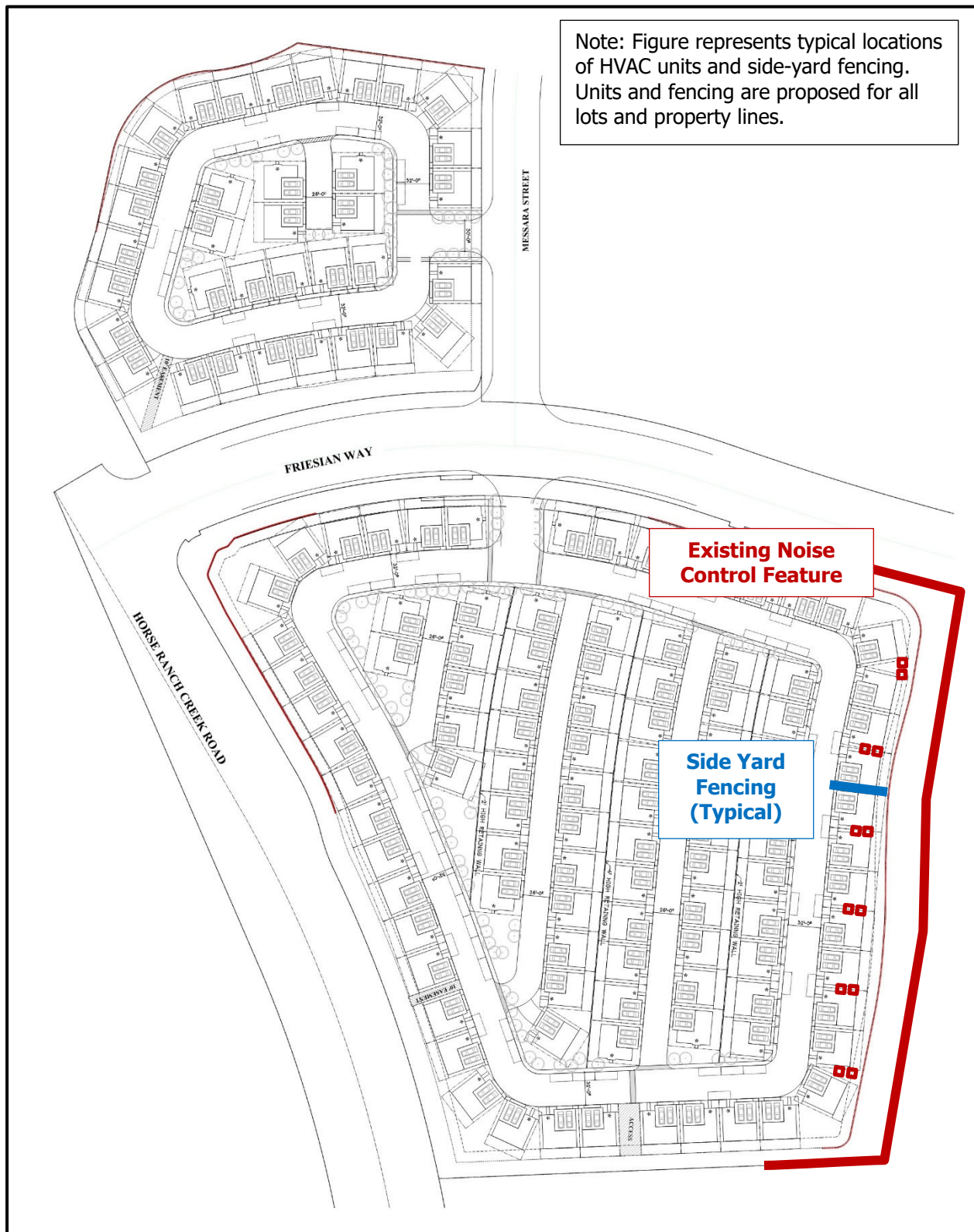
3.2 Potential Operational Noise Impacts (Non-Construction Noise)

Fixed or point sources radiate outward uniformly as sound travels away from the source. Their sound levels attenuate or drop off at a rate of 6 dBA for each doubling of distance. For example, a noise level of 75 dBA measured at 3 feet from the noise source to the receptor would be reduced to 69 dBA at 6 feet from the source to the receptor and 63 dBA at a distance of 12 feet.

Ground mechanical ventilation units (HVAC) will be installed at the proposed residential units. The project anticipates installing Carrier CA15NA (Series, 24-A) or equivalent HVAC units with a reference noise level of 71 dBA at 3-feet (Source: Carrier). The manufacturer's specifications and noise levels are provided in **Attachment C**. The HVAC units will cycle on and off throughout the day. Typically, HVAC units run for approximately 20 minutes each operating cycle to provide the necessary heating or cooling. It is anticipated that the HVAC units will operate twice in any given hour or run for 40 minutes in any given hour. Noise levels drop 3 decibels each time the duration of the source is reduced in half. Therefore, hourly HVAC noise level over a 40 minute period would be reduced approximately 2 decibels to 69 dBA based on operational time. To predict the property line noise level, a reference noise level of 69 dBA at 3-feet was used to represent the HVAC units.

The HVAC units are located a minimum of 50 feet from the property lines and are shielded by the proposed homes, solid side yard fences and existing noise barriers located at the top of slope at the existing homes as shown in Figure 3-A. 6-foot solid fencing would be required as a noise design feature. The solid fencing will be vinyl, $\frac{3}{4}$ -inch or thicker consisting of solid panels on minimum 4x4-inch posts with no cracks or gaps through or below and all seams or cracks will be filled or caulked. The typical locations of the proposed HVAC units are also shown in Figure 3-A. Two HVAC units maybe located near each other with a side yard fence separating them and would create the worst case cumulative noise level. The remainder of the units are separated by at least 30 feet and have a 6-foot side yard fence shielding them. This separation of 30 feet would result in a 20 dBA difference between two separate HVAC units and would not cumulatively increase the noise levels. Therefore, the worst case combined noise from the HVAC would occur from two units.

Figure 3-A: Locations of the proposed HVAC Units



Utilizing a 6 dBA decrease per doubling of distance, noise levels at the nearest property line as described above were calculated for the HVAC. The noise levels associated with the HVAC will be limited with the existing noise barriers and proposed 6-foot side yard fencing that will shield them both visually and acoustically. The HVAC units are located a minimum of 50 feet from the nearest property lines. To determine the noise level reductions from the perimeter fencing, the Fresnel Barrier Reduction Calculations based on distance, source height, receiver elevation and the top of barrier were modeled. The adjacent receptor was located 5 feet behind the perimeter fencing. The noise level reductions due to distance and the fencing for the nearest property line is provided in Table 3-2 below. The Fresnel barrier reduction calculations for the fencing are provided in **Attachment D** of this report.

Table 3-2: Project HVAC Noise Levels (Nearest Property Line)

Noise Source	Reference Distance (Feet)	Noise Level (dBA)	Noise Reduction due to distance (dBA)	Noise Reduction from Fencing (dBA)	Resultant Noise Level @ Property Line (dBA)
AC Unit 1	3	69	-24.4	-16	28.6
AC Unit 2	3	69	-24.4	-16	28.6
CUMULATIVE PROPERTY LINE NOISE LEVEL					32

No impacts are anticipated at the property lines with the incorporation of the proposed 6-foot side yard fencing as shown above in Figure 3-A. All other property lines are located further from the proposed HVAC units and the resulting noise levels would also be below the 45 dBA threshold.

3.3 Potential General Construction Noise Impacts

Construction noise represents a short-term impact on the ambient noise levels. Noise generated by construction equipment includes haul trucks, water trucks, graders, dozers, loaders and scrapers can reach relatively high levels. Grading activities typically represent one of the highest potential sources for noise impacts. The most effective method of controlling construction noise is through local control of construction hours and by limiting the hours of construction to normal weekday working hours.

The U.S. Environmental Protection Agency (U.S. EPA) has compiled data regarding the noise generating characteristics of specific types of construction equipment. Noise levels generated by heavy construction equipment can range from 60 dBA to in excess of 100 dBA when measured at 50 feet. However, these noise levels diminish rapidly with distance from the construction site at a rate of 6 dBA per doubling of distance. For example, a noise level of 75 dBA measured at

50 feet from the noise source to the receptor would be reduced to 69 dBA at 100 feet from the source to the receptor and reduced to 63 dBA at 200 feet from the source.

The County's Noise Ordinance states that when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received. The properties surrounding the Project site are mostly occupied.

The proposed project site has been previously mass graded by the master development; therefore, the expected grading activities would be limited. According to the project applicant, the equipment needed for the development will consist of up to one bulldozer, a front loader, a crawler type excavator, a compactor, a grader, a rubber tire backhoe and a water truck. As minor grading is completed, underground trenching would take an additional nine months. After the grading and utility construction phases, the Project would pave the internal roadways.

The list of equipment and the associated noise levels utilized in this analysis are shown in Table 3-3. The grading equipment will be spread out over the project site from distances near the occupied property lines to distances of 200 feet or more away. Based upon the site plan, on average, the grading operations will occur 120 feet from the property lines. This means that the average distance from all the equipment to the nearest property line is 120 feet. As can be seen in Table 3-3, at an average distance of 120 feet from the construction activities to the nearest property line would result in a noise attenuation of -7.6 dBA without shielding. Additionally, the amount of time equipment is operating during a normal work day, referred to as duty-cycle, was assumed to be 8 hours.

Table 3-3: Construction Noise Levels

Construction Equipment	Quantity	Source Level @ 50-Foot (dBA Leq)¹	Duty Cycle (Hours/Day)	Cumulative Noise Level @ 50-Foot (dBA Leq-8)
Dozer	1	74	8	74.0
Excavator	1	72	8	72.0
Compactor	1	74	8	74.0
Grader	1	73	8	73.0
Backhoe	1	72	8	72.0
Water Truck	1	70	8	70.0
Cumulative Levels @ 50 Feet				80.5
Average Distance to Property Line (Feet)				120
Noise Reduction Due to Distance				-7.6
NEAREST PROPERTY LINE NOISE LEVEL				72.9
¹ Source: Empirical Data				

Given this, the noise levels will comply with the 75 dBA Leq average standard over 8 hours at the property lines. Therefore, no impacts are anticipated and no mitigation is required during construction of the proposed Project. Additionally, all equipment should be properly fitted with mufflers and all staging and maintenance should be conducted as far away from the existing residence as possible. Additionally, the original EIR required a site-specific analysis to determine noise impacts associated with construction of the proposed project.

3.4 Potential Impulsive Noise Impacts

No blasting or rock crushing is anticipated during construction. Therefore, no impulsive noise sources are expected and the Project will comply with Section 36.410 of the County Noise Ordinance.

3.5 Conclusions

Onsite operational noise would consist of mechanical equipment (HVAC) and normal residential activities. Based on the distance separation from existing sensitive land use, the HVAC and residential activities are anticipated to comply with the County's Noise Ordinance 36.404. Therefore, no impacts will occur and no mitigation is needed for the project operations to comply with the County's standards and no impacts are anticipated and no mitigation is required.

Construction noise levels at an average distance of 120 feet would attenuate or be reduced 7.6 dBA. Given this and the spatial separation of the equipment, the noise levels are projected to comply with the County of San Diego's Noise Ordinance Section 36.409 standard of 75 dBA at all Project property lines and no significant impacts to noise would occur. Additionally, all equipment should be properly fitted with mufflers and all staging and maintenance should be conducted as far away from the existing residence as possible.

No blasting or rock crushing is anticipated during construction. Therefore, no impulsive noise sources are expected and the Project will comply with Section 36.410 of the County Noise Ordinance.

4.0 GROUND-BORNE VIBRATION AND NOISE IMPACTS

4.1 Guidelines for the Determination of Significance

Project implementation will expose uses to ground-borne vibration or noise levels equal to or in excess of the levels listed in Table 4 of the County of San Diego Guidelines for the Determination of Significance. For simplicity, the pertaining Table 4 is shown below.

Table 4
Guideline for Determining the Significance of
Ground-borne Vibration and Noise Impacts

Land Use Category	Ground-Borne Vibration Impact Levels (inches/sec rms)		Ground-Borne Noise Impact Levels (dB re 20 micro Pascals)	
	Frequent Events ¹	Occasional or Infrequent Events ²	Frequent Events ¹	Occasional or Infrequent Events ²
Category 1: Buildings where low ambient vibration is essential for interior operations. (research & manufacturing facilities with special vibration constraints)	0.0018 ³	0.0018 ³	Not applicable ⁶	Not applicable ⁵
Category 2: Residences and buildings where people normally sleep. (hotels, hospitals, residences, & other sleeping facilities)	0.0040	0.010	35 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use. (schools, churches, libraries, other institutions, & quiet offices)	0.0056	0.014	40 dBA	48 dBA

Source: U.S Department of Transportation, Federal Transit Administration, "Transit Noise and Vibration Impact Assessment," May 2006.

Notes to Table 4:

1. "Frequent Events" is defined as more than 70 vibration events per day. Most rapid transit projects fall into this category.
2. "Occasional or Infrequent Events" are defined as fewer than 70 vibration events per day. This combined category includes most commuter rail systems.
3. This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration sensitive manufacturing or research will require detailed evaluation to define acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.
4. Vibration-sensitive equipment is not sensitive to ground-borne noise.
5. There are some buildings, such as concert halls, TV and recording studios, and theaters that can be very sensitive to vibration and noise but do not fit into any of the three categories. Table 5 gives criteria for acceptable levels of ground-borne vibration and noise for these various types of special uses.
6. For Categories 2 and 3 with occupied facilities, isolated events such as blasting are significant when the peak particle velocity (PPV) exceeds one inch per second. Non-transportation vibration sources such as impact pile drivers or hydraulic breakers are significant when their PPV exceeds 0.1 inch per second. More specific criteria for structures and potential annoyance were developed by Caltrans (2004) and will be used to evaluate these continuous or transient sources in San Diego County.

4.2 Potential Impacts & Conclusions

Construction Vibration Findings

The nearest vibration-sensitive uses are the residences located adjacent to the eastern property line. Table 4-1 lists the average vibration levels that would be experienced at the nearest vibration sensitive land uses from the temporary construction activities.

Table 4-1: Vibration Levels from Construction Activities (Adjacent Residential)

Equipment	Approximate Velocity Level at 25 Feet (VdB)	Approximate RMS Velocity at 25 Feet (in/sec)	Approximate Velocity Level at 50 Feet (VdB)	Approximate RMS Velocity at 50 Feet (in/sec)
Small bulldozer	58	0.003	49.0	0.0011
Jackhammer	79	0.035	70.0	0.0124
Loaded trucks	86	0.076	77.0	0.0269
Large bulldozer	87	0.089	78.0	0.0315
FTA Criteria			80	0.2
Significant Impact?			No	No
¹ PPV at Distance D = PPVref x (25/D) ^{1.5}				

The guidance provided by the FTA has determined vibration levels that would cause annoyance to a substantial number of people and potential damage to building structures. The FTA criterion for vibration induced structural damage is 0.20 in/sec for the peak particle velocity (PPV). Since the project has been previously mass graded, project construction activities would be 50 to 100 feet from the property lines and would result in PPV levels below the criteria for vibration induced structural damage at adjacent structures. Therefore, project construction activities would not result in vibration induced structural damage to residential buildings near the construction areas. The FTA criterion for infrequent vibration induced annoyance is 80 Vibration Velocity (VdB) for residential uses. Construction activities would generate levels of vibration that would not exceed this criteria for nuisance for nearby residential uses. Therefore, vibration impacts would be less than significant.

Operational Vibration Findings

There are no existing or proposed frequent activities on or near the proposed project site which would cause any significant vibration levels to existing buildings. The proposed project site has been previously mass graded by the master development; therefore, the expected grading activities would be limited and no significant construction vibration is anticipated at the nearest residences. The project site is adjacent to roadways and near Interstate 15. Caltrans has done extensive research on vibration created along freeways/roadways and found that because vehicles are supported by suspension systems and pneumatic tires, these vehicles are not an efficient source of ground vibration (*Source: Transportation and Construction Vibration Guidance Manual, Caltrans 2013*).

5.0 SUMMARY OF PROJECT IMPACTS, MITIGATION & CONCLUSIONS

Project design features (PDFs) have been included in this Project. The applicant has agreed to implement all PDFs and will be included as part of the Project's Conditions of Approval. The following PDFs applied in this analysis with the purpose of reducing noise include:

1. Installation of a six-foot high solid perimeter and side yard fencing
2. Provide a noise protection easement over the entire site to require the implementation of building design and construction measures to ensure that interior noise levels do not exceed 45 CNEL.

On-Site Traffic Noise Analysis

It was determined from the detailed analysis that the multi-family NSLU's adjacent to the roadways will not comply with the County of San Diego 65 dBA CNEL exterior noise standard without mitigation measures. In order to reduce the future exterior noise levels to below the County threshold noise barriers are required along the western portion of the site. The noise affected outdoor areas of the proposed lots located closest to Interstate 15 and Horse Ranch Creek Road will require noise barriers eight (8) feet in height to be located on top of slope. It was determined from the detailed analysis that all NSLU's will comply with the County of San Diego 65 dBA CNEL exterior noise standard with the additional mitigation measures. Additionally, the site was designated as professional office under the original EIR with no on or off-site impacts. No impacts are anticipated with the proposed residential land use with the proposed mitigation measures.

The County of San Diego as part of its noise guidelines also states, consistent with Title 24 of the California Code of Regulations (CCR), a project is required to perform an interior assessment on the portions of a project site where building façade noise levels are above the normally compatible noise level in order to ensure that acceptable interior noise levels can be achieved. Exterior noise levels at first and second floor building facades were found to be above the General Plan Noise Element Standard, of 60 dBA CNEL at single family and multifamily dwellings. Therefore, per the General Plan Noise Element, a noise protection easement is required for the entire site. The noise protection easement will require the implementation of building design and construction measures to ensure that interior noise levels do not exceed 45 CNEL.

An interior noise study is required for those units located in the noise easement to determine the mitigation required to achieve an interior noise level of 45 dBA CNEL. This report would finalize the noise requirements based upon precise grading plans and actual building design specifications. This is to ensure that interior noise levels for the proposed residential structures comply with the interior noise level requirement of 45 dBA pursuant to the County Noise

Element. It should be noted; interior noise levels of 45 dBA CNEL can be obtained with conventional building construction methods, for example by providing-mechanical ventilation (e.g., air conditioning) and/or providing upgraded windows at all affected residential units.

Off-Site Traffic Noise Analysis

The project does not create a direct impact of more than 3 dBA CNEL on any roadway segment. Therefore, the proposed project's direct contributions to off-site roadway noise increases will not cause any significant impacts to any existing noise sensitive land uses. Cumulative off-site roadway noise increases would not result in significant impacts to existing noise sensitive land uses. Therefore, no offsite Project related traffic noise impacts are anticipated from the Project's cumulative contributions.

Operational Noise

Mechanical equipment (HVAC) and normal residential activities are anticipated to comply with the County's Noise Ordinance 36.404. Therefore, no impacts will occur and no mitigation is needed for the project operations to comply with the County's standards and no impacts are anticipated and no mitigation is required.

Construction Noise Analysis

Construction noise levels at an average distance of 120 feet would attenuate or be reduced 7.6 dBA. Given this and the spatial separation of the equipment, the noise levels are projected to comply with the County of San Diego's Noise Ordinance Section 36.409 standard of 75 dBA at all Project property lines and no significant impacts to noise would occur. Additionally, all equipment should be properly fitted with mufflers and all staging and maintenance should be conducted as far away from the existing residence as possible. No blasting or rock crushing is anticipated during construction. Therefore, no impulsive noise sources are expected and the Project will comply with Section 36.410 of the County Noise Ordinance.

Based on the foregoing and the analysis set forth herein, the proposed project will not generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the County General Plan or applicable noise ordinance or applicable standards of other agencies. Additionally, the original EIR required a site-specific analysis to determine noise impacts associated with construction of the proposed project.

Vibration Analysis

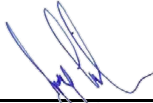
Since the project has been previously mass graded, project construction activities would be

50 to 100 feet from the property lines and would result in PPV levels below the criteria for vibration induced structural damage at adjacent structures. Therefore, project construction activities would not result in vibration induced structural damage to residential buildings near the construction areas.

There are no existing or proposed frequent activities on or near the proposed project site which would cause any significant vibration levels. The project site is adjacent to roadways and near Interstate 15. Caltrans has done extensive research on vibration created along freeways/roadways and found that because vehicles are supported by suspension systems and pneumatic tires, these vehicles are not an efficient source of ground vibration (*Source: Transportation and Construction Vibration Guidance Manual, Caltrans 2013*). Therefore, no impacts from excessive groundborne vibration or groundborne noise levels are anticipated.

6.0 CERTIFICATIONS

The contents of this report represent an accurate depiction of the future acoustical environment and impacts within and surrounding the residential development. This report was prepared utilizing the latest guidelines and reduction methodologies. This report was prepared by Jeremy Loudon; a County approved CEQA Consultant for Acoustics.



Jeremy Loudon, Principal
Ldn Consulting, Inc.
780-473-1253
jloudon@ldnconsulting.net

Date August 31, 2023

ATTACHMENT A

FUTURE NOISE CONTOUR MODEL INPUT AND OUTPUT FILES

CAMPUS PARK MULTIFAMILY - GROUND FLOOR CONTOURS

T-PEAK HOUR TRAFFIC CONDITIONS, 1

11295 , 65 , 377 , 65 , 879 , 65

T-PEAK HOUR TRAFFIC CONDITIONS, 2

11295 , 65 , 377 , 65 , 879 , 65

T-PEAK HOUR TRAFFIC CONDITIONS, 3

872 , 45 , 18 , 45 , 18 , 45

L-I-15 NORTH, 1

N,2460.,9892,362,

N,2718.,9281,352,

N,2823.,8986,347,

N,2938.,8615,343,

N,3051.,8176,375,

N,3112.,7863,337,

N,3165.,7540,337,

N,3214.,7084,330,

N,3241.,6643,324,

N,3248.,5980,322,

N,3196.,4029,300,

N,3155.,2667,300,

N,3119.,1088,290,

L-I-15 SOUTH, 2

N,2346.,9849,370,

N,2603.,9238,350,

N,2712.,8945,346,

N,2823.,8585,343,

N,2934.,8154,341,

N,2996.,7840,337,

N,3047.,7527,334,

N,3096.,7077,327,

N,3123.,6636,325,

N,3129.,5979,322,

N,3078.,4032,300,

N,3037.,2670,301,

N,2990.,1092,290,

L-HORSE RANCH CREEK, 3

N,3463.,7959,380,

N,3488.,7580,360,

N,3509.,7422,356,

N,3541.,7322,357,

N,3618.,7191,357,

N,3666.,7134,356,

N,3740.,7051,355,

N,3813.,6968,354,

N,3907.,6859,353,

N,4016.,6708,354,

N,4076.,6601,353,

N,4144.,6442,350,

N,4184.,6272,347,

N,4203.,6089,344,

B-I-15 SOUTH ROADEDGE, 1 , 1 , 0 ,0

2366.,9859,370,370,

2638.,9246,350,350,

2744.,8949,346,346,

2858.,8589,343,343,

2971.,8158,341,341,

3081.,7528,334,334,

3129.,7076,327,327,

3148.,6635,325,325,

3095.,4033,314,314,
3066.,2666,303,303,
3030.,1088,280,280,
B-I-15 North Road Edge, 2 , 1 , 0 ,0
3183.,1172,300,300,
3190.,1474,300,300,
3272.,1560,310,310,
3274.,1678,326,326,
3249.,1833,316,316,
3274.,1935,323,323,
3239.,2043,314,314,
3266.,2135,321,321,
3212.,2390,300,300,
B-I-15 North Road Edge, 3 , 1 , 0 ,0
3212.,2390,300,300,
3197.,2587,300,300,
3196.,2838,300,300,
3283.,4305,300,300,
3282.,4304,305,305,
3248.,4828,310,310,
3309.,7185,330,330,
3305.,7313,330,330,
3254.,7316,340,340,
3166.,7863,356,356,
B-I-15 North Road Edge, 4 , 1 , 0 ,0
3166.,7863,356,356,
3101.,8228,360,360,
2787.,9316,360,360,
2480.,9962,365,365,
B-NORTH LOT, 5 , 2 , 0 ,0
3831.,7624,373,373,
3766.,7590,372,372,
3727.,7576,371,371,
3697.,7552,371,371,
3675.,7515,371,371,
3668.,7470,371,371,
3666.,7414,370,370,
3664.,7383,369,369,
3660.,7347,369,369,
3661.,7321,369,369,
B-NORTH LOT 2, 6 , 2 , 0 ,0
3661.,7321,369,369,
3668.,7298,369,369,
3719.,7235,369,369,
3738.,7212,369,369,
3747.,7210,369,369,
3789.,7235,369,369,
3832.,7260,369,369,
3833.,7260,369,369,
3892.,7285,369,369,
3936.,7302,368,368,
B-SOUTH LOT, 7 , 2 , 0 ,0
4100.,7218,366,366,
4061.,7209,366,366,
4022.,7199,365,365,
3942.,7169,362,362,
3941.,7169,362,362,
3867.,7131,361,361,
3850.,7088,360.4,360.4,

3891.,7037,359,359,
3917.,7007,359,359,
3968.,6948,359,359,
B-SOUTH LOT 2, 8 , 2 , 0 ,0
3968.,6948,360,360,
4058.,6824,362,362,
4099.,6758,360,360,
4144.,6680,359,359,
4192.,6575,358,358,
4228.,6581,358,358,
4313.,6600,360,360,
4409.,6622,363,363,
4524.,6650,368,368,
R, 1 , 65 ,10
3597,7522,355,R1
R, 2 , 65 ,10
3644,7379,365,R2
R, 3 , 65 ,10
3691,7237,364,R3
R, 4 , 65 ,10
3880,7044,367,R4
R, 5 , 65 ,10
3978,6930,365,R5
R, 6 , 65 ,10
4067,6809,364,R6
R, 7 , 65 ,10
4146,6681,360,R7
R, 8 , 65 ,10
4211,6540,356,R8
R, 9 , 65 ,10
4333,6637,369,R9
R, 10 , 65 ,10
4265,6775,367,R10
R, 11 , 65 ,10
4184,6903,367,R11
R, 12 , 65 ,10
4095,7023,369,R12
R, 13 , 65 ,10
3997,7137,371,R13
R, 14 , 65 ,10
3833,7284,379,R14
R, 15 , 65 ,10
3786,7426,380,R15
R, 16 , 65 ,10
3739,7569,380,R16
R, 17 , 65 ,10
3881,7616,383,R17
R, 18 , 65 ,10
3929,7474,380,R18
R, 19 , 65 ,10
3976,7331,379,R19
R, 20 , 65 ,10
4115,7231,375,R20
R, 21 , 65 ,10
4212,7117,372,R21
R, 22 , 65 ,10
4302,6996,370,R22
R, 23 , 65 ,10
4384,6870,371,R23

R, 24 , 65 ,10
 4454,6734,374,R24
 R, 25 , 65 ,10
 4576,6831,394,R25
 R, 26 , 65 ,10
 4503,6965,376,R26
 R, 27 , 65 ,10
 4419,7090,374,R27
 R, 28 , 65 ,10
 4330,7211,379,R28
 R, 29 , 65 ,10
 4232,7324,382,R29
 R, 30 , 65 ,10
 4118,7379,374,R30
 R, 31 , 65 ,10
 4071,7521,379,R31
 R, 32 , 65 ,10
 4024,7663,385,R32
 R, 33 , 65 ,10
 4447,7304,401,R33
 R, 34 , 65 ,10
 4536,7183,399,R34
 R, 35 , 65 ,10
 4622,7060,411,R35
 D, 4.5
 ALL,ALL
 C,C

SOUND32 - RELEASE 07/30/91

TITLE:
 CAMPUS PARK MULTIFAMILY - GROUND FLOOR CONTOURS

REC REC ID DNL PEOPLE LEQ(CAL)

1	R1	65.	10.	70.3
2	R2	65.	10.	70.8
3	R3	65.	10.	71.1
4	R4	65.	10.	69.4
5	R5	65.	10.	68.7
6	R6	65.	10.	68.2
7	R7	65.	10.	67.7
8	R8	65.	10.	67.5
9	R9	65.	10.	65.3
10	R10	65.	10.	65.7
11	R11	65.	10.	66.1
12	R12	65.	10.	66.7
13	R13	65.	10.	67.3
14	R14	65.	10.	68.7
15	R15	65.	10.	68.7
16	R16	65.	10.	68.7
17	R17	65.	10.	67.2
18	R18	65.	10.	67.0
19	R19	65.	10.	66.9
20	R20	65.	10.	65.9
21	R21	65.	10.	65.4
22	R22	65.	10.	64.9
23	R23	65.	10.	64.6

24	R24	65.	10.	64.3
25	R25	65.	10.	63.5
26	R26	65.	10.	63.6
27	R27	65.	10.	63.9
28	R28	65.	10.	64.4
29	R29	65.	10.	64.9
30	R30	65.	10.	65.2
31	R31	65.	10.	65.4
32	R32	65.	10.	65.8
33	R33	65.	10.	63.7
34	R34	65.	10.	63.3
35	R35	65.	10.	63.0

CAMPUS PARK MULTIFAMILY - SECOND FLOOR CONTOURS

T-PEAK HOUR TRAFFIC CONDITIONS, 1

11295 , 65 , 377 , 65 , 879 , 65

T-PEAK HOUR TRAFFIC CONDITIONS, 2

11295 , 65 , 377 , 65 , 879 , 65

T-PEAK HOUR TRAFFIC CONDITIONS, 3

872 , 45 , 18 , 45 , 18 , 45

L-I-15 NORTH, 1

N,2460.,9892,362,

N,2718.,9281,352,

N,2823.,8986,347,

N,2938.,8615,343,

N,3051.,8176,375,

N,3112.,7863,337,

N,3165.,7540,337,

N,3214.,7084,330,

N,3241.,6643,324,

N,3248.,5980,322,

N,3196.,4029,300,

N,3155.,2667,300,

N,3119.,1088,290,

L-I-15 SOUTH, 2

N,2346.,9849,370,

N,2603.,9238,350,

N,2712.,8945,346,

N,2823.,8585,343,

N,2934.,8154,341,

N,2996.,7840,337,

N,3047.,7527,334,

N,3096.,7077,327,

N,3123.,6636,325,

N,3129.,5979,322,

N,3078.,4032,300,

N,3037.,2670,301,

N,2990.,1092,290,

L-HORSE RANCH CREEK, 3

N,3463.,7959,380,

N,3488.,7580,360,

N,3509.,7422,356,

N,3541.,7322,357,

N,3618.,7191,357,

N,3666.,7134,356,

N,3740.,7051,355,

N,3813.,6968,354,

N,3907.,6859,353,

N,4016.,6708,354,
N,4076.,6601,353,
N,4144.,6442,350,
N,4184.,6272,347,
N,4203.,6089,344,
B-I-15 SOUTH ROADEGE, 1 , 1 , 0 ,0
2366.,9859,370,370,
2638.,9246,350,350,
2744.,8949,346,346,
2858.,8589,343,343,
2971.,8158,341,341,
3081.,7528,334,334,
3129.,7076,327,327,
3148.,6635,325,325,
3095.,4033,314,314,
3066.,2666,303,303,
3030.,1088,280,280,
B-I-15 North Road Edge, 2 , 1 , 0 ,0
3183.,1172,300,300,
3190.,1474,300,300,
3272.,1560,310,310,
3274.,1678,326,326,
3249.,1833,316,316,
3274.,1935,323,323,
3239.,2043,314,314,
3266.,2135,321,321,
3212.,2390,300,300,
B-I-15 North Road Edge, 3 , 1 , 0 ,0
3212.,2390,300,300,
3197.,2587,300,300,
3196.,2838,300,300,
3283.,4305,300,300,
3282.,4304,305,305,
3248.,4828,310,310,
3309.,7185,330,330,
3305.,7313,330,330,
3254.,7316,340,340,
3166.,7863,356,356,
B-I-15 North Road Edge, 4 , 1 , 0 ,0
3166.,7863,356,356,
3101.,8228,360,360,
2787.,9316,360,360,
2480.,9962,365,365,
B-NORTH LOT, 5 , 2 , 0 ,0
3831.,7624,373,373,
3766.,7590,372,372,
3727.,7576,371,371,
3697.,7552,371,371,
3675.,7515,371,371,
3668.,7470,371,371,
3666.,7414,370,370,
3664.,7383,369,369,
3660.,7347,369,369,
3661.,7321,369,369,
B-NORTH LOT 2, 6 , 2 , 0 ,0
3661.,7321,369,369,
3668.,7298,369,369,
3719.,7235,369,369,
3738.,7212,369,369,

3747.,7210,369,369,
3789.,7235,369,369,
3832.,7260,369,369,
3833.,7260,369,369,
3892.,7285,369,369,
3936.,7302,368,368,
B-SOUTH LOT, 7 , 2 , 0 ,0
4100.,7218,366,366,
4061.,7209,366,366,
4022.,7199,365,365,
3942.,7169,362,362,
3941.,7169,362,362,
3867.,7131,361,361,
3850.,7088,360.4,360.4,
3891.,7037,359,359,
3917.,7007,359,359,
3968.,6948,359,359,
B-SOUTH LOT 2, 8 , 2 , 0 ,0
3968.,6948,360,360,
4058.,6824,362,362,
4099.,6758,360,360,
4144.,6680,359,359,
4192.,6575,358,358,
4228.,6581,358,358,
4313.,6600,360,360,
4409.,6622,363,363,
4524.,6650,368,368,
R, 1 , 65 ,10
3597,7522,365.,R1
R, 2 , 65 ,10
3644,7379,375.,R2
R, 3 , 65 ,10
3691,7237,374.,R3
R, 4 , 65 ,10
3880,7044,377.,R4
R, 5 , 65 ,10
3978,6930,375.,R5
R, 6 , 65 ,10
4067,6809,374.,R6
R, 7 , 65 ,10
4146,6681,370.,R7
R, 8 , 65 ,10
4211,6540,366.,R8
R, 9 , 65 ,10
4333,6637,379.,R9
R, 10 , 65 ,10
4265,6775,377.,R10
R, 11 , 65 ,10
4184,6903,377.,R11
R, 12 , 65 ,10
4095,7023,379.,R12
R, 13 , 65 ,10
3997,7137,381.,R13
R, 14 , 65 ,10
3833,7284,389.,R14
R, 15 , 65 ,10
3786,7426,390.,R15
R, 16 , 65 ,10
3739,7569,390.,R16

R, 17 , 65 ,10
 3881,7616,393.,R17
 R, 18 , 65 ,10
 3929,7474,390.,R18
 R, 19 , 65 ,10
 3976,7331,389.,R19
 R, 20 , 65 ,10
 4115,7231,385.,R20
 R, 21 , 65 ,10
 4212,7117,382.,R21
 R, 22 , 65 ,10
 4302,6996,380.,R22
 R, 23 , 65 ,10
 4384,6870,381.,R23
 R, 24 , 65 ,10
 4454,6734,384.,R24
 R, 25 , 65 ,10
 4576,6831,404.,R25
 R, 26 , 65 ,10
 4503,6965,386.,R26
 R, 27 , 65 ,10
 4419,7090,384.,R27
 R, 28 , 65 ,10
 4330,7211,389.,R28
 R, 29 , 65 ,10
 4232,7324,392.,R29
 R, 30 , 65 ,10
 4118,7379,384.,R30
 R, 31 , 65 ,10
 4071,7521,389.,R31
 R, 32 , 65 ,10
 4024,7663,395.,R32
 R, 33 , 65 ,10
 4447,7304,411.,R33
 R, 34 , 65 ,10
 4536,7183,409.,R34
 R, 35 , 65 ,10
 4622,7060,421.,R35
 C,C

SOUND32 - RELEASE 07/30/91

TITLE:
 CAMPUS PARK MULTIFAMILY - SECOND FLOOR CONTOURS

REC REC ID DNL PEOPLE LEQ(CAL)

1	R1	65.	10.	74.0
2	R2	65.	10.	74.8
3	R3	65.	10.	75.0
4	R4	65.	10.	73.5
5	R5	65.	10.	72.6
6	R6	65.	10.	72.0
7	R7	65.	10.	71.5
8	R8	65.	10.	71.3
9	R9	65.	10.	69.7
10	R10	65.	10.	69.7
11	R11	65.	10.	70.1
12	R12	65.	10.	70.7

13	R13	65.	10.	71.5
14	R14	65.	10.	73.2
15	R15	65.	10.	73.0
16	R16	65.	10.	72.8
17	R17	65.	10.	70.9
18	R18	65.	10.	70.7
19	R19	65.	10.	70.6
20	R20	65.	10.	69.8
21	R21	65.	10.	69.1
22	R22	65.	10.	68.8
23	R23	65.	10.	68.7
24	R24	65.	10.	68.6
25	R25	65.	10.	68.1
26	R26	65.	10.	67.8
27	R27	65.	10.	68.0
28	R28	65.	10.	68.7
29	R29	65.	10.	69.1
30	R30	65.	10.	69.2
31	R31	65.	10.	69.3
32	R32	65.	10.	69.6
33	R33	65.	10.	68.2
34	R34	65.	10.	68.1
35	R35	65.	10.	68.1

ATTACHMENT B

DETAILED FUTURE NOISE MODEL INPUT AND OUTPUT FILES

CAMPUS PARK MULTIFAMILY - GROUND FLOOR UNMITIGATED

T-PEAK HOUR TRAFFIC CONDITIONS, 1

11295 , 65 , 377 , 65 , 879 , 65

T-PEAK HOUR TRAFFIC CONDITIONS, 2

11295 , 65 , 377 , 65 , 879 , 65

T-PEAK HOUR TRAFFIC CONDITIONS, 3

872 , 45 , 18 , 45 , 18 , 45

L-I-15 NORTH, 1

N,2460.,9892,362,

N,2718.,9281,352,

N,2823.,8986,347,

N,2938.,8615,343,

N,3051.,8176,375,

N,3112.,7863,337,

N,3165.,7540,337,

N,3214.,7084,330,

N,3241.,6643,324,

N,3248.,5980,322,

N,3196.,4029,300,

N,3155.,2667,300,

N,3119.,1088,290,

L-I-15 SOUTH, 2

N,2346.,9849,370,

N,2603.,9238,350,

N,2712.,8945,346,

N,2823.,8585,343,

N,2934.,8154,341,

N,2996.,7840,337,

N,3047.,7527,334,

N,3096.,7077,327,

N,3123.,6636,325,

N,3129.,5979,322,

N,3078.,4032,300,

N,3037.,2670,301,

N,2990.,1092,290,

L-HORSE RANCH CREEK, 3

N,3463.,7959,380,

N,3488.,7580,360,

N,3509.,7422,356,

N,3541.,7322,357,

N,3618.,7191,357,

N,3666.,7134,356,

N,3740.,7051,355,

N,3813.,6968,354,

N,3907.,6859,353,

N,4016.,6708,354,

N,4076.,6601,353,

N,4144.,6442,350,

N,4184.,6272,347,

N,4203.,6089,344,

B-I-15 SOUTH ROADEDGE, 1 , 1 , 0 ,0

2366.,9859,370,370,

2638.,9246,350,350,

2744.,8949,346,346,

2858.,8589,343,343,

2971.,8158,341,341,

3081.,7528,334,334,

3129.,7076,327,327,

3148.,6635,325,325,

3095.,4033,314,314,
3066.,2666,303,303,
3030.,1088,280,280,
B-I-15 North Road Edge, 2 , 1 , 0 ,0
3183.,1172,300,300,
3190.,1474,300,300,
3272.,1560,310,310,
3274.,1678,326,326,
3249.,1833,316,316,
3274.,1935,323,323,
3239.,2043,314,314,
3266.,2135,321,321,
3212.,2390,300,300,
B-I-15 North Road Edge, 3 , 1 , 0 ,0
3212.,2390,300,300,
3197.,2587,300,300,
3196.,2838,300,300,
3283.,4305,300,300,
3282.,4304,305,305,
3248.,4828,310,310,
3309.,7185,330,330,
3305.,7313,330,330,
3254.,7316,340,340,
3166.,7863,356,356,
B-I-15 North Road Edge, 4 , 1 , 0 ,0
3166.,7863,356,356,
3101.,8228,360,360,
2787.,9316,360,360,
2480.,9962,365,365,
B-NORTH LOT, 5 , 2 , 0 ,0
3831.,7624,373,373,
3766.,7590,372,372,
3727.,7576,371,371,
3697.,7552,371,371,
3675.,7515,371,371,
3668.,7470,371,371,
3666.,7414,370,370,
3664.,7383,369,369,
3660.,7347,369,369,
3661.,7321,369,369,
B-NORTH LOT 2, 6 , 2 , 0 ,0
3661.,7321,369,369,
3668.,7298,369,369,
3719.,7235,369,369,
3738.,7212,369,369,
3747.,7210,369,369,
3789.,7235,369,369,
3832.,7260,369,369,
3833.,7260,369,369,
3892.,7285,369,369,
3936.,7302,368,368,
B-SOUTH LOT, 7 , 2 , 0 ,0
4100.,7218,366,366,
4061.,7209,366,366,
4022.,7199,365,365,
3942.,7169,362,362,
3941.,7169,362,362,
3867.,7131,361,361,
3850.,7088,360.4,360.4,

3891.,7037,359,359,
3917.,7007,359,359,
3968.,6948,359,359,
B-SOUTH LOT 2, 8 , 2 , 0 ,0
3968.,6948,360,360,
4058.,6824,362,362,
4099.,6758,360,360,
4144.,6680,359,359,
4192.,6575,358,358,
4228.,6581,358,358,
4313.,6600,360,360,
4409.,6622,363,363,
4524.,6650,368,368,
B-UNIT 42 HOUSE, 9 , 2 , 0 ,0
3932.,7155,361.1,381.1,
3909.,7132,361.1,381.1,
3937.,7105,361.1,381.1,
B-UNIT 41 HOUSE, 10 , 2 , 0 ,0
3893.,7111,360.4,380.4,
3886.,7079,360.4,380.4,
3918.,7073,360.4,380.4,
R, 1 , 65 ,10
3901,7616,375.4,20
R, 2 , 65 ,10
3815,7593,374.4,18
R, 3 , 65 ,10
3745,7562,373.4,16
R, 4 , 65 ,10
3696,7516,373.1,15
R, 5 , 65 ,10
3684,7429,372.3,13
R, 6 , 65 ,10
3678,7351,371.2,11
R, 7 , 65 ,10
3696,7288,370.9,10
R, 8 , 65 ,10
3721,7256,371.,9
R, 9 , 65 ,10
3809,7253,371.,8
R, 10 , 65 ,10
3881,7286,371.7,6
R, 11 , 65 ,10
3953,7312,372.5,4
R, 12 , 65 ,10
4044,7200,370.7,45
R, 13 , 65 ,10
3964,7172,367.8,43
R, 14 , 65 ,10
3917,7146,366.1,42
R, 15 , 65 ,10
3863,7100,365.4,41
R, 16 , 65 ,10
3909,7025,364.2,40
R, 17 , 65 ,10
3959,6967,364.,38
R, 18 , 65 ,10
4008,6907,365.6,36
R, 19 , 65 ,10
4072,6811,366.5,33

R, 20 , 65 ,10
 4114,6744,365.2,31
 R, 21 , 65 ,10
 4158,6667,363.6,29
 R, 22 , 65 ,10
 4248,6594,362.6,28
 R, 23 , 65 ,10
 4331,6608,365.6,26
 R, 24 , 65 ,10
 4426,6631,368.6,24
 D, 4.5
 ALL,ALL
 K,-3
 ALL,10,11,12,13
 C,C

SOUND32 - RELEASE 07/30/91

TITLE:
 CAMPUS PARK MULTIFAMILY - GROUND FLOOR UNMITIGATED

REC	REC ID	DNL	PEOPLE	LEQ(CAL)
-----	--------	-----	--------	----------

1	20	65.	10.	66.6
2	18	65.	10.	67.5
3	16	65.	10.	68.4
4	15	65.	10.	69.3
5	13	65.	10.	69.9
6	11	65.	10.	70.4
7	10	65.	10.	70.4
8	9	65.	10.	70.2
9	8	65.	10.	68.8
10	6	65.	10.	64.7
11	4	65.	10.	63.8
12	45	65.	10.	62.8
13	43	65.	10.	63.1
14	42	65.	10.	67.4
15	41	65.	10.	69.2
16	40	65.	10.	69.0
17	38	65.	10.	68.6
18	36	65.	10.	68.3
19	33	65.	10.	68.1
20	31	65.	10.	67.9
21	29	65.	10.	67.7
22	28	65.	10.	66.3
23	26	65.	10.	65.4
24	24	65.	10.	64.6

CAMPUS PARK MULTIFAMILY - GROUND FLOOR MITIGATED

T-PEAK HOUR TRAFFIC CONDITIONS, 1

11295 , 65 , 377 , 65 , 879 , 65

T-PEAK HOUR TRAFFIC CONDITIONS, 2

11295 , 65 , 377 , 65 , 879 , 65

T-PEAK HOUR TRAFFIC CONDITIONS, 3

872 , 45 , 18 , 45 , 18 , 45

L-I-15 NORTH, 1

N,2460.,9892,362,

N,2718.,9281,352,

N,2823.,8986,347,
N,2938.,8615,343,
N,3051.,8176,375,
N,3112.,7863,337,
N,3165.,7540,337,
N,3214.,7084,330,
N,3241.,6643,324,
N,3248.,5980,322,
N,3196.,4029,300,
N,3155.,2667,300,
N,3119.,1088,290,
L-I-15 SOUTH, 2
N,2346.,9849,370,
N,2603.,9238,350,
N,2712.,8945,346,
N,2823.,8585,343,
N,2934.,8154,341,
N,2996.,7840,337,
N,3047.,7527,334,
N,3096.,7077,327,
N,3123.,6636,325,
N,3129.,5979,322,
N,3078.,4032,300,
N,3037.,2670,301,
N,2990.,1092,290,
L-HORSE RANCH CREEK, 3
N,3463.,7959,380,
N,3488.,7580,360,
N,3509.,7422,356,
N,3541.,7322,357,
N,3618.,7191,357,
N,3666.,7134,356,
N,3740.,7051,355,
N,3813.,6968,354,
N,3907.,6859,353,
N,4016.,6708,354,
N,4076.,6601,353,
N,4144.,6442,350,
N,4184.,6272,347,
N,4203.,6089,344,
B-I-15 SOUTH ROADEDGE, 1 , 1 , 0 ,0
2366.,9859,370,370,
2638.,9246,350,350,
2744.,8949,346,346,
2858.,8589,343,343,
2971.,8158,341,341,
3081.,7528,334,334,
3129.,7076,327,327,
3148.,6635,325,325,
3095.,4033,314,314,
3066.,2666,303,303,
3030.,1088,280,280,
B-I-15 North Road Edge, 2 , 1 , 0 ,0
3183.,1172,300,300,
3190.,1474,300,300,
3272.,1560,310,310,
3274.,1678,326,326,
3249.,1833,316,316,
3274.,1935,323,323,

3239.,2043,314,314,
3266.,2135,321,321,
3212.,2390,300,300,
B-I-15 North Road Edge, 3 , 1 , 0 ,0
3212.,2390,300,300,
3197.,2587,300,300,
3196.,2838,300,300,
3283.,4305,300,300,
3282.,4304,305,305,
3248.,4828,310,310,
3309.,7185,330,330,
3305.,7313,330,330,
3254.,7316,340,340,
3166.,7863,356,356,
B-I-15 North Road Edge, 4 , 1 , 0 ,0
3166.,7863,356,356,
3101.,8228,360,360,
2787.,9316,360,360,
2480.,9962,365,365,
B-NORTH LOT, 5 , 2 , 0 ,0
3831.,7624,373,381,
3766.,7590,372,380,
3727.,7576,371,379,
3697.,7552,371,379,
3675.,7515,371,379,
3668.,7470,371,379,
3666.,7414,370,378,
3664.,7383,369,377,
3660.,7347,369,377,
3661.,7321,369,377,
B-NORTH LOT 2, 6 , 2 , 0 ,0
3661.,7321,369,377,
3668.,7298,369,377,
3719.,7235,369,377,
3738.,7212,369,377,
3747.,7210,369,377,
3789.,7235,369,377,
3832.,7260,369,377,
3833.,7260,369,374,
3892.,7285,369,374,
3936.,7302,368,373,
B-SOUTH LOT, 7 , 2 , 0 ,0
4100.,7218,366,371,
4061.,7209,366,371,
4022.,7199,365,370,
3942.,7169,362,367,
3941.,7169,362,370,
3867.,7131,361,369,
3850.,7088,360.4,368.4,
3891.,7037,359,367,
3917.,7007,359,367,
3968.,6948,359,367,
B-SOUTH LOT 2, 8 , 2 , 0 ,0
3968.,6948,360,368,
4058.,6824,362,370,
4099.,6758,360,368,
4144.,6680,359,367,
4192.,6575,358,366,
4228.,6581,358,366,

4313.,6600,360,368,
4409.,6622,363,371,
4524.,6650,368,376,
B-UNIT 42 HOUSE, 9 , 2 , 0 ,0
3932.,7155,361.1,381.1,
3909.,7132,361.1,381.1,
3937.,7105,361.1,381.1,
B-UNIT 41 HOUSE, 10 , 2 , 0 ,0
3893.,7111,360.4,380.4,
3886.,7079,360.4,380.4,
3918.,7073,360.4,380.4,
R, 1 , 65 ,10
3901,7616,375.4,20
R, 2 , 65 ,10
3815,7593,374.4,18
R, 3 , 65 ,10
3745,7562,373.4,16
R, 4 , 65 ,10
3696,7516,373.1,15
R, 5 , 65 ,10
3684,7429,372.3,13
R, 6 , 65 ,10
3678,7351,371.2,11
R, 7 , 65 ,10
3696,7288,370.9,10
R, 8 , 65 ,10
3721,7256,371.,9
R, 9 , 65 ,10
3809,7253,371.,8
R, 10 , 65 ,10
3881,7286,371.7,6
R, 11 , 65 ,10
3953,7312,372.5,4
R, 12 , 65 ,10
4044,7200,370.7,45
R, 13 , 65 ,10
3964,7172,367.8,43
R, 14 , 65 ,10
3917,7146,366.1,42
R, 15 , 65 ,10
3863,7100,365.4,41
R, 16 , 65 ,10
3909,7025,364.2,40
R, 17 , 65 ,10
3959,6967,364.,38
R, 18 , 65 ,10
4008,6907,365.6,36
R, 19 , 65 ,10
4072,6811,366.5,33
R, 20 , 65 ,10
4114,6744,365.2,31
R, 21 , 65 ,10
4158,6667,363.6,29
R, 22 , 65 ,10
4248,6594,362.6,28
R, 23 , 65 ,10
4331,6608,365.6,26
R, 24 , 65 ,10
4426,6631,368.6,24

D, 4.5
ALL,ALL
K,-3
ALL,10,11,12,13
C,C

SOUND32 - RELEASE 07/30/91

TITLE:
CAMPUS PARK MULTIFAMILY - GROUND FLOOR MITIGATED

REC REC ID DNL PEOPLE LEQ(CAL)

1 20 65. 10. 65.3
2 18 65. 10. 64.6
3 16 65. 10. 65.1
4 15 65. 10. 64.6
5 13 65. 10. 64.8
6 11 65. 10. 64.7
7 10 65. 10. 64.6
8 9 65. 10. 64.7
9 8 65. 10. 64.7
10 6 65. 10. 62.7
11 4 65. 10. 62.9
12 45 65. 10. 62.2
13 43 65. 10. 62.2
14 42 65. 10. 65.1
15 41 65. 10. 65.4
16 40 65. 10. 65.3
17 38 65. 10. 64.6
18 36 65. 10. 64.8
19 33 65. 10. 63.6
20 31 65. 10. 64.5
21 29 65. 10. 63.6
22 28 65. 10. 64.7
23 26 65. 10. 64.6
24 24 65. 10. 64.0

CAMPUS PARK MULTIFAMILY - SECOND FLOOR MITIGATED

T-PEAK HOUR TRAFFIC CONDITIONS, 1

11295 , 65 , 377 , 65 , 879 , 65

T-PEAK HOUR TRAFFIC CONDITIONS, 2

11295 , 65 , 377 , 65 , 879 , 65

T-PEAK HOUR TRAFFIC CONDITIONS, 3

872 , 45 , 18 , 45 , 18 , 45

L-I-15 NORTH, 1

N,2460.,9892,362,

N,2718.,9281,352,

N,2823.,8986,347,

N,2938.,8615,343,

N,3051.,8176,375,

N,3112.,7863,337,

N,3165.,7540,337,

N,3214.,7084,330,

N,3241.,6643,324,

N,3248.,5980,322,

N,3196.,4029,300,

N,3155.,2667,300,

N,3119.,1088,290,
L-I-15 SOUTH, 2
N,2346.,9849,370,
N,2603.,9238,350,
N,2712.,8945,346,
N,2823.,8585,343,
N,2934.,8154,341,
N,2996.,7840,337,
N,3047.,7527,334,
N,3096.,7077,327,
N,3123.,6636,325,
N,3129.,5979,322,
N,3078.,4032,300,
N,3037.,2670,301,
N,2990.,1092,290,
L-HORSE RANCH CREEK, 3
N,3463.,7959,380,
N,3488.,7580,360,
N,3509.,7422,356,
N,3541.,7322,357,
N,3618.,7191,357,
N,3666.,7134,356,
N,3740.,7051,355,
N,3813.,6968,354,
N,3907.,6859,353,
N,4016.,6708,354,
N,4076.,6601,353,
N,4144.,6442,350,
N,4184.,6272,347,
N,4203.,6089,344,
B-I-15 SOUTH ROADEDGE, 1 , 1 , 0 ,0
2366.,9859,370,370,
2638.,9246,350,350,
2744.,8949,346,346,
2858.,8589,343,343,
2971.,8158,341,341,
3081.,7528,334,334,
3129.,7076,327,327,
3148.,6635,325,325,
3095.,4033,314,314,
3066.,2666,303,303,
3030.,1088,280,280,
B-I-15 North Road Edge, 2 , 1 , 0 ,0
3183.,1172,300,300,
3190.,1474,300,300,
3272.,1560,310,310,
3274.,1678,326,326,
3249.,1833,316,316,
3274.,1935,323,323,
3239.,2043,314,314,
3266.,2135,321,321,
3212.,2390,300,300,
B-I-15 North Road Edge, 3 , 1 , 0 ,0
3212.,2390,300,300,
3197.,2587,300,300,
3196.,2838,300,300,
3283.,4305,300,300,
3282.,4304,305,305,
3248.,4828,310,310,

3309.,7185,330,330,
3305.,7313,330,330,
3254.,7316,340,340,
3166.,7863,356,356,
B-I-15 North Road Edge, 4 , 1 , 0 ,0
3166.,7863,356,356,
3101.,8228,360,360,
2787.,9316,360,360,
2480.,9962,365,365,
B-NORTH LOT, 5 , 2 , 0 ,0
3831.,7624,373,381,
3766.,7590,372,380,
3727.,7576,371,379,
3697.,7552,371,379,
3675.,7515,371,379,
3668.,7470,371,379,
3666.,7414,370,378,
3664.,7383,369,377,
3660.,7347,369,377,
3661.,7321,369,377,
B-NORTH LOT 2, 6 , 2 , 0 ,0
3661.,7321,369,377,
3668.,7298,369,377,
3719.,7235,369,377,
3738.,7212,369,377,
3747.,7210,369,377,
3789.,7235,369,377,
3832.,7260,369,377,
3833.,7260,369,374,
3892.,7285,369,374,
3936.,7302,368,373,
B-SOUTH LOT, 7 , 2 , 0 ,0
4100.,7218,366,371,
4061.,7209,366,371,
4022.,7199,365,370,
3942.,7169,362,367,
3941.,7169,362,370,
3867.,7131,361,369,
3850.,7088,360.4,368.4,
3891.,7037,359,367,
3917.,7007,359,367,
3968.,6948,359,367,
B-SOUTH LOT 2, 8 , 2 , 0 ,0
3968.,6948,360,368,
4058.,6824,362,370,
4099.,6758,360,368,
4144.,6680,359,367,
4192.,6575,358,366,
4228.,6581,358,366,
4313.,6600,360,368,
4409.,6622,363,371,
4524.,6650,368,376,
B-UNIT 42 HOUSE, 9 , 2 , 0 ,0
3932.,7155,361.1,381.1,
3909.,7132,361.1,381.1,
3937.,7105,361.1,381.1,
B-UNIT 41 HOUSE, 10 , 2 , 0 ,0
3893.,7111,360.4,380.4,
3886.,7079,360.4,380.4,

3918.,7073,360.4,380.4,
R, 1 , 65 ,10
3901,7616,385.4,20
R, 2 , 65 ,10
3815,7593,384.4,18
R, 3 , 65 ,10
3745,7562,383.4,16
R, 4 , 65 ,10
3696,7516,383.1,15
R, 5 , 65 ,10
3684,7429,382.3,13
R, 6 , 65 ,10
3678,7351,381.2,11
R, 7 , 65 ,10
3696,7288,380.9,10
R, 8 , 65 ,10
3721,7256,381.,9
R, 9 , 65 ,10
3809,7253,381.,8
R, 10 , 65 ,10
3881,7286,381.7,6
R, 11 , 65 ,10
3953,7312,382.5,4
R, 12 , 65 ,10
4044,7200,380.7,45
R, 13 , 65 ,10
3964,7172,377.8,43
R, 14 , 65 ,10
3917,7146,376.1,42
R, 15 , 65 ,10
3863,7100,375.4,41
R, 16 , 65 ,10
3909,7025,374.2,40
R, 17 , 65 ,10
3959,6967,374.,38
R, 18 , 65 ,10
4008,6907,375.6,36
R, 19 , 65 ,10
4072,6811,376.5,33
R, 20 , 65 ,10
4114,6744,375.2,31
R, 21 , 65 ,10
4158,6667,373.6,29
R, 22 , 65 ,10
4248,6594,372.6,28
R, 23 , 65 ,10
4331,6608,375.6,26
R, 24 , 65 ,10
4426,6631,378.6,24
K,-3
ALL,10,11,12,13
C,C

SOUND32 - RELEASE 07/30/91

TITLE:
CAMPUS PARK MULTIFAMILY - SECOND FLOOR MITIGATED

REC REC ID DNL PEOPLE LEQ(CAL)

1	20	65.	10.	69.4
2	18	65.	10.	70.4
3	16	65.	10.	71.4
4	15	65.	10.	72.4
5	13	65.	10.	73.4
6	11	65.	10.	74.0
7	10	65.	10.	74.0
8	9	65.	10.	73.9
9	8	65.	10.	71.7
10	6	65.	10.	67.3
11	4	65.	10.	66.5
12	45	65.	10.	66.3
13	43	65.	10.	67.0
14	42	65.	10.	71.3
15	41	65.	10.	73.3
16	40	65.	10.	73.0
17	38	65.	10.	72.6
18	36	65.	10.	72.3
19	33	65.	10.	72.0
20	31	65.	10.	71.7
21	29	65.	10.	71.5
22	28	65.	10.	70.2
23	26	65.	10.	69.5
24	24	65.	10.	68.8

ATTACHMENT C

HVAC NOISE LEVELS AND SPECIFICATIONS

**CA15NA
Single-Stage Air Conditioner
with Puron® Refrigerant
1-1/2 To 5 Tons**



Product Data



INDUSTRY LEADING FEATURES / BENEFITS

Efficiency

- 14.0 SEER / 11.7 – 12.2 EER (based on tested combination)
- Microtube Technology™ refrigeration system

Reliability

- Puron® refrigerant
- Scroll compressor
- Internal pressure relief valve
- Internal thermal overload
- Filter drier

Durability

WeatherArmor™ protection package:

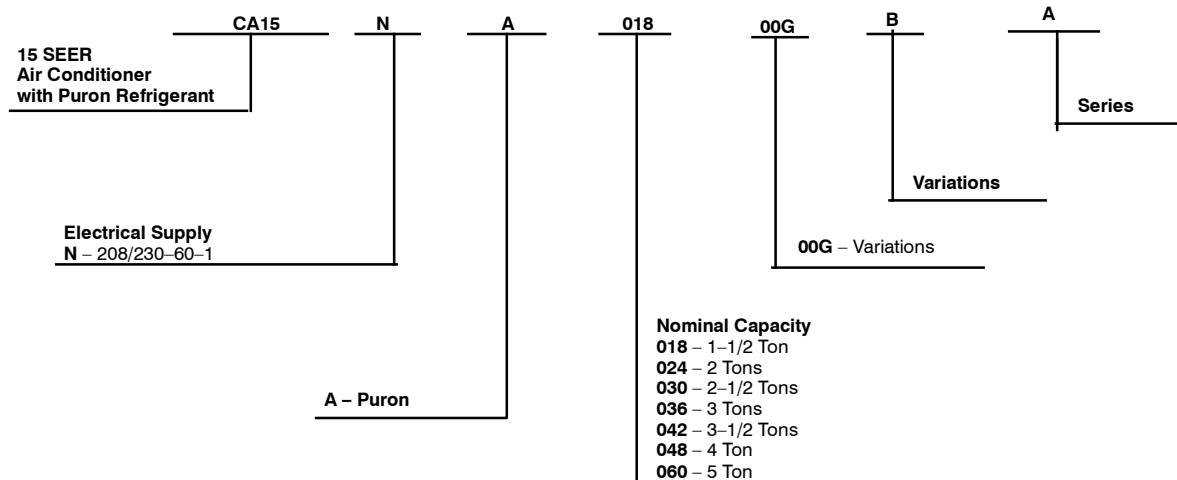
- Solid, durable sheet metal construction
- Dense wire coil guard

Applications

- Long-line – up to 250 feet (76.20 m) total equivalent length, up to 200 feet (60.96 m) condenser above evaporator, or up to 80 ft. (24.38 m) evaporator above condenser (See Longline Guide for more information.)
- Low ambient (down to -20°F/-28.9°C) with accessory kit

NOTE: Ratings contained in this document are subject to change at any time. Always refer to the AHRI directory (www.ahridirectory.org) for the most up-to-date ratings information.

PRODUCT NUMBER NOMENCLATURE



Use of the AHRI Certified TM Mark indicates a manufacturer's participation in the program. For verification of certification for individual products, go to www.ahridirectory.org.



PHYSICAL DATA

UNIT SIZE	18–A	24–A	30–A	36–A	42–A	48–A	60–A
Compressor Type	Scroll						
REFRIGERANT	Puron® (R–410A)						
Control	TXV (Puron Hard Shutoff)						
Charge (lb)	3.20 (1.45)	4.60 (2.09)	5.67 (2.57)	6.40 (2.90)	7.46 (3.38)	8.31 (3.77)	9.39 (4.26)
COND FAN	Propeller Type, Direct Drive						
Air Discharge	Vertical						
Air Qty (CFM)	1700	1881	2614	3365	3700	3545	3700
Motor HP	1/12	1/12	1/10	1/5	1/4	1/4	1/4
Motor RPM	1100	1100	1100	1100	1100	1110	1100
COND COIL							
Face Area (Sq ft)	9.85	11.2	17.24	19.4	15.1	15.1	17.25
Fins per In.	25	25	25	25	20	20	25
Rows	1	1	1	1	2	2	2
Circuits	3	5	4	5	6	6	8
VALVE CONNECT. (In. ID)							
Vapor	3/4	3/4	3/4	7/8	7/8	7/8	7/8
Liquid	3/8						
REFRIGERANT TUBES (In. OD)							
Rated Vapor*	3/4	3/4	3/4	7/8	7/8	7/8	1–1/8
Max Liquid Line	3/8						

* Units are rated with 25 ft (7.6 m) of lineset length. See Vapor Line Sizing and Cooling Capacity Loss table when using other sizes and lengths of lineset.

Note: See unit Installation Instruction for proper installation.

† See *Liquid Line Sizing For Cooling Only Systems with Puron Refrigerant* tables.

REFRIGERANT PIPING LENGTH LIMITATIONS

Liquid Line Sizing and Maximum Total Equivalent Lengths[†] for Cooling Only Systems with Puron® Refrigerant:

The maximum allowable length of a residential split system depends on the liquid line diameter and vertical separation between indoor and outdoor units.

See Table below for liquid line sizing and maximum lengths :

Maximum Total Equivalent Length Outdoor Unit BELOW Indoor Unit

Size	Liquid Line Connection	Liquid Line Diam. w/ TXV	AC with Puron Refrigerant Maximum Total Equivalent Length [†] : Outdoor unit BELOW Indoor Vertical Separation ft (m)								
			0-5 (0-1.5)	6-10 (1.8-3.0)	11-20 (3.4-6.1)	21-30 (6.4-9.1)	31-40 (9.4-12.2)	41-50 (12.5-15.2)	51-60 (15.5-18.3)	61-70 (18.6-21.3)	71-80 (21.6-24.4)
18000 AC with Puron	3/8	1/4	150	150	125	100	100	75	--	--	--
		5/16	250*	250*	250*	250*	250*	250*	250*	225*	150
		3/8	250*	250*	250*	250*	250*	250*	250*	250*	250*
24000 AC with Puron	3/8	1/4	75	75	75	50	50	--	--	--	--
		5/16	250*	250*	250*	250*	250*	225*	175	125	100
		3/8	250*	250*	250*	250*	250*	250*	250*	250*	250*
30000 AC with Puron	3/8	1/4	30	--	--	--	--	--	--	--	--
		5/16	175	225*	200	175	125	100	75	--	--
		3/8	250*	250*	250*	250*	250*	250*	250*	250*	250*
36000 AC with Puron	3/8	5/16	175	150	150	100	100	100	75	--	--
		3/8	250*	250*	250*	250*	250*	250*	250*	250*	250*
		3/8	250*	250*	250*	250*	250*	250*	250*	250*	250*
42000 AC with Puron	3/8	5/16	125	100	100	75	75	50	--	--	--
		3/8	250*	250*	250*	250*	250*	250*	250*	250*	150
		3/8	250*	250*	250*	250*	250*	250*	250*	250*	150
48000 AC with Puron	3/8	3/8	250*	250*	250*	250*	250*	250*	230	160	--
60000 AC with Puron	3/8	3/8	250*	250*	250*	225*	190	150	110	--	--

* Maximum actual length not to exceed 200 ft (61 m)

† Total equivalent length accounts for losses due to elbows or fitting. See the Long Line Guideline for details.

-- = outside acceptable range

Maximum Total Equivalent Length Outdoor Unit ABOVE Indoor Unit

Size	Liquid Line Connection	Liquid Line Diam. w/ TXV	AC with Puron Refrigerant Maximum Total Equivalent Length [†] : Outdoor unit ABOVE Indoor Vertical Separation ft (m)							
			25 (7.6)	26-50 (7.9-15.2)	51-75 (15.5-22.9)	76-100 (23.2-30.5)	101-125 (30.8-38.1)	126-150 (38.4-45.7)	151-175 (46.0-53.3)	176-200 (53.6-61.0)
18000 AC with Puron	3/8	1/4	175	250*	250*	250*	250*	250*	250*	250*
		5/16	250*	250*	250*	250*	250*	250*	250*	250*
		3/8	250*	250*	250*	250*	250*	250*	250*	250*
24000 AC with Puron	3/8	1/4	100	125	175	200	225*	250*	250*	250*
		5/16	250*	250*	250*	250*	250*	250*	250*	250*
		3/8	250*	250*	250*	250*	250*	250*	250*	250*
30000 AC with Puron	3/8	1/4	30	--	--	--	--	--	--	--
		5/16	250*	250*	250*	250*	250*	250*	250*	250*
		3/8	250*	250*	250*	250*	250*	250*	250*	250*
36000 AC with Puron	3/8	5/16	225*	250*	250*	250*	250*	250*	250*	250*
		3/8	250*	250*	250*	250*	250*	250*	250*	250*
		3/8	250*	250*	250*	250*	250*	250*	250*	250*
42000 AC with Puron	3/8	5/16	175	200	250*	250*	250*	250*	250*	250*
		3/8	250*	250*	250*	250*	250*	250*	250*	250*
		3/8	250*	250*	250*	250*	250*	250*	250*	250*
48000 AC with Puron	3/8	3/8	250*	250*	250*	250*	250*	250*	250*	250*
60000 AC with Puron	3/8	3/8	250*	250*	250*	250*	250*	250*	250*	250*

* Maximum actual length not to exceed 200 ft (61 m)

† Total equivalent length accounts for losses due to elbows or fitting. See the Long Line Guideline for details.

-- = outside acceptable range

REFRIGERANT CHARGE ADJUSTMENTS

Liquid Line Size	Puron Charge oz/ft
3/8	0.60 (Factory charge for lineset = 9 oz)
5/16	0.40
1/4	0.27

Units are factory charged for 15 ft (4.6 m) of 3/8" liquid line. The factory charge for 3/8" lineset 9 oz. When using other length or diameter liquid lines, charge adjustments are required per the chart above.

Charging Formula:

$[(\text{Lineset oz/ft} \times \text{total length}) - (\text{factory charge for lineset})] = \text{charge adjustment}$

Example 1: System has 15 ft of line set using existing 1/4" liquid line. What charge adjustment is required?

Formula: $(.27 \text{ oz/ft} \times 15\text{ft}) - (9 \text{ oz}) = (-4.95) \text{ oz.}$

Net result is to remove 4.95 oz of refrigerant from the system

Example 2: System has 45 ft of existing 5/16" liquid line. What is the charge adjustment?

Formula: $(.40 \text{ oz/ft.} \times 45\text{ft}) - (9 \text{ oz.}) = 9 \text{ oz.}$

Net result is to add 9 oz of refrigerant to the system

LONG LINE APPLICATIONS

An application is considered Long Line, when the refrigerant level in the system requires the use of accessories to maintain acceptable refrigerant management for systems reliability. See Accessory Usage Guideline table for required accessories. Defining a system as long line depends on the liquid line diameter, actual length of the tubing, and vertical separation between the indoor and outdoor units.

For Air Conditioner systems, the chart below shows when an application is considered Long Line.

AC WITH PURON® REFRIGERANT LONG LINE DESCRIPTION ft (m) Beyond these lengths, long line accessories are required

Liquid Line Size	Units On Same Level	Outdoor Below Indoor	Outdoor Above Indoor
1/4	No accessories needed within allowed lengths	No accessories needed within allowed lengths	175 (53.3)
5/16	120 (36.6)	50 (15.2)	120 (36.6)
3/8	80 (24.4)	35 (10.7)	80 (24.4)

Note: See Long Line Guideline for details

VAPOR LINE SIZING AND COOLING CAPACITY LOSS

Acceptable vapor line diameters provide adequate oil return to the compressor while avoiding excessive capacity loss. The suction line diameters shown in the chart below are acceptable for AC systems with Puron refrigerant:

Unit Nominal Size (Btuh)	Maximum Liquid Line Diameters (In. OD)	Vapor Line Diameters (In. OD)	Cooling Capacity Loss (%) Total Equivalent Line Length ft. (m)								
			26–50 (7.9–15.2)	51–80 (15.5–24.4)	81–100 (24.7–30.5)	101–125 (30.8–38.1)	126–150 (38.4–45.7)	151–175 (46.0–53.3)	176–200 (53.6–61.0)	201–225 (61.3–68.6)	226–250 (68.9–76.2)
18000 1 Stage AC with Puron	3/8	1/2	1	2	3	5	6	7	8	9	11
		5/8	0	1	1	1	2	2	2	3	3
		3/4	0	0	0	0	1	1	1	1	1
24000 1 Stage AC with Puron	3/8	5/8	0	1	2	2	3	3	4	5	5
		3/4	0	0	1	1	1	1	1	2	2
		7/8	0	0	0	0	0	1	1	1	1
30000 1 Stage AC with Puron	3/8	5/8	1	2	3	3	4	5	6	7	8
		3/4	0	0	1	1	1	2	2	2	3
		7/8	0	0	0	0	1	1	1	1	1
36000 1 Stage AC with Puron	3/8	5/8	1	2	4	5	6	8	9	10	12
		3/4	0	1	1	2	2	3	3	4	4
		7/8	0	0	0	1	1	1	1	2	2
42000 1 Stage AC with Puron	3/8	3/4	0	1	2	2	3	4	4	5	6
		7/8	0	0	1	1	1	2	2	2	3
		1 1/8	0	0	0	0	0	0	0	0	0
48000 1 Stage AC with Puron	3/8	3/4	0	1	2	3	4	5	5	6	7
		7/8	0	0	1	1	2	2	2	3	3
		1 1/8	0	0	0	0	0	0	0	1	1
60000 1 Stage AC with Puron	3/8	3/4	1	2	4	5	6	7	9	10	11
		7/8	0	1	2	2	3	4	4	5	5
		1 1/8	0	0	0	1	1	1	1	1	1

Applications in this area may be long line and may have height restrictions. See the *Residential Piping and Long Line Guideline*.

ACCESSORY THERMOSTATS

PART NUMBER	PROGRAM	GAS	ELECTRIC	HEAT PUMP	HEAT	COOL
TC – PAC01	5–2 Day	√	√		1	1
TC – NAC01	NP	√	√		1	1
TCSNAC01	NP	√	√		1	1

THERMOSTAT ACCESSORIES		
PART NUMBER	DESCRIPTION	THERMOSTATS USED WITH
TSTATXXCNV10‡	Thermostat Conversion Kit (4 to 5 wire) – 10 pack	All Carrier® branded thermostats
TX – LBP01	Large Decorative Backplate	TP – Pxx, TP – Nxx, TC – Pxx
TX – MBP01	Medium Decorative Backplate	TC – Nxx, TB – Pxx

ACCESSORIES

Accessory Kit Number	Description	018	024	030	036	042	048	060
HC32GE234	MOTOR,FAN	X						
HC34GE239	MOTOR,FAN		X	X				
HC38GE219	MOTOR,FAN				X	X		
HC40GE226	MOTOR,FAN						X	X
HH07AT212	BASE,THERM/SUB	X	X	X	X	X	X	X
KAACF1001MED	FILTER KIT	X	X	X	X			
KAACF1101LRG	FILTER KIT					X	X	X
KAACH1201AAA	CRKC HTR KIT					X	X	X
KAACH1401AAA	CRKC HTR KIT	X	X	X	X			
KAACS0201PTC	KIT PTC	X	X	X	X	X	X	X
KAFT0101AAA	FRZ THERM KIT	X	X	X	X	X	X	X
KAHI0501PUR	HIGH PRESSURE SW KIT	X	X	X	X	X	X	X
KAALP0401PUR	LOW PRESSURE SW KIT	X	X	X	X	X	X	X
KAALS0201LLS	SOL VALVE KIT	X	X	X	X	X	X	X
KAATD0101TDR	TIME DELAY KIT	X	X	X	X	X	X	X
KAWS0101AAA	WINTER START KIT	X	X	X	X	X	X	X
KSACY0101AAA	CYCLE PROTRACTOR KIT	X	X	X	X	X	X	X
KSAS1501AAA	HARD START KIT	X	X	X	X	X	X	X
KSALA0301410	LOW AMBIENT KIT	X	X	X	X	X	X	X
KSALA0601AAA	MOTORMASTER KIT	X	X	X	X	X	X	X
KSASH0601COP	SOUND BLKT KIT				X	X	X	
KSASH1801COP	SOUND BLKT KIT	X	X	X				
KSASH2101COP	SOUND BLKT KIT							X
KSATX0201PUR	TXV KIT	X	X	X				
KSATX0301PUR	TXV KIT				X	X		
KSATX0401PUR	TXV KIT						X	
KSATX0501PUR	TXV KIT							X
KSATX0201PUR	TXV KIT	X	X	X				
KSATX0301PUR	TXV KIT				X	X		
KSATX0401PUR	TXV KIT						X	
TSTATXXSEN01	SENSOR	X	X	X	X	X	X	X

X = Accessory

ACCESSORY USAGE GUIDELINE

ACCESSORY	REQUIRED FOR LOW-AMBI- ENT COOLING APPLICATIONS (Below 55°F/12.8°C)	REQUIRED FOR LONG LINE APPLICATIONS* (Over 80 ft./24.38 m)	REQUIRED FOR SEA COAST APPLICATIONS (Within 2 miles/3.22 km)
Ball Bearing Fan Motor	Yes	No	No
Compressor Start Assist Capacitor and Relay	Yes	Yes	No
Crankcase Heater	Yes	Yes	No
Evaporator Freeze Thermostat	Yes	No	No
Hard Shut-Off TXV	Yes	Yes	Yes
Liquid Line Solenoid Valve	No	No	No
Motor Master® Control or Low-ambient Pressure Switch	Yes†	No	No
Support Feet	Recommended	No	Recommended
Winter Start Control	Yes	No	No

* For tubing line sets between 80 and 200 ft. (24.38 and 60.96 m) and/or 20 ft. (6.09 m) vertical differential, refer to Residential Split-System Longline Application Guideline.

† Required for Low-Ambient Controller (full modulation feature) MotorMaster® Control.

Accessory Description and Usage (Listed Alphabetically)

1. Ball-Bearing Fan Motor

A fan motor with ball bearings which permits speed reduction while maintaining bearing lubrication.

Usage Guideline:

Required on all units when MotorMaster® is used.

2. Compressor Start Assist - Capacitor and Relay

Start capacitor and relay gives a "hard" boost to compressor motor at each start up.

Usage Guideline:

Required for reciprocating compressors in the following applications:

Long line

Low ambient cooling

Hard shut off expansion valve on indoor coil

Liquid line solenoid on indoor coil

Required for single-phase scroll compressors in the following applications:

Long line

Low ambient cooling

Suggested for all compressors in areas with a history of low voltage problems.

3. Compressor Start Assist — PTC Type

Solid state electrical device which gives a "soft" boost to the compressor at each start-up.

Usage Guideline:

Suggested in installations with marginal power supply.

4. Crankcase Heater

An electric resistance heater which mounts to the base of the compressor to keep the lubricant warm during off cycles. Improves compressor lubrication on restart and minimizes the chance of liquid slugging.

Usage Guideline:

Required in low ambient cooling applications.

Required in long line applications.

Suggested in all commercial applications.

5. Cycle Protector

The cycle protector is designed to prevent compressor short cycling. This control provides an approximate 5-minute delay after power to the compressor has been interrupted for any reason, including power outage, protector control trip, thermostat jiggling, or normal cycling.

6. Evaporator Freeze Thermostat

An SPST temperature-actuated switch that stops unit operation when evaporator reaches freeze-up conditions.

Usage Guideline:

Required when low ambient kit has been added.

7. Low-Ambient Pressure Switch Kit

A long life pressure switch which is mounted to outdoor unit service valve. It is designed to cycle the outdoor fan motor in order to maintain head pressure within normal operating limits (approximately 100 psig to 225 psig). The control will maintain working head pressure at low-ambient temperatures down to 0°F (-18°C) when properly installed.

Usage Guideline:

A Low-Ambient Pressure Switch or MotorMaster® Low-Ambient Controller must be used when cooling operation is used at outdoor temperatures below 55°F (12.8°C).

8. MotorMaster® Low-Ambient Controller

A fan-speed control device activated by a temperature sensor, designed to control condenser fan motor speed in response to the saturated, condensing temperature during operation in cooling mode only. For outdoor temperatures down to -20°F (-28.9°C), it maintains condensing temperature at 100°F ±10°F (37.8°C ± 5.5°C).

Usage Guideline:

A MotorMaster® Low Ambient Controller or Low-Ambient Pressure Switch must be used when cooling operation is used at outdoor temperatures below 55°F (12.8°C).

Suggested for all commercial applications.

9. Outdoor Air Temperature Sensor

Designed for use with Carrier Thermostats listed in this publication. This device enables the thermostat to display the outdoor temperature. This device also

is required to enable special thermostat features such as auxiliary heat lock out.

Usage Guideline:

Suggested for all Carrier thermostats listed in this publication.

Accessory Description and Usage (Listed Alphabetically) (Continued)

10. Support Feet

Four stick-on plastic feet that raise the unit 4 in. (101.6 mm) above the mounting pad. This allows sand, dirt, and other debris to be flushed from the unit base, minimizing corrosion.

Usage Guideline:

Suggested in the following applications:

Coastal installations.

Windy areas or where debris is normally circulating.

Rooftop installations.

For improved sound ratings.

11. Thermostatic Expansion Valve (TXV)

A modulating flow-control valve which meters refrigerant liquid flow rate into the evaporator in response to the superheat of the refrigerant gas leaving the evaporator.

Kit includes valve, adapter tubes, and external equalizer tube. Hard shut off types are available.

NOTE: When using a hard shut off TXV with single phase reciprocating compressors, a Compressor Start Assist Capacitor and Relay is required.

Usage Guideline:

Required to achieve AHRI ratings in certain equipment combinations. Refer to combination ratings.

Hard shut off TXV or LLS required in air conditioner long line applications.

Required for use on all zoning systems.

12. Time-Delay Relay

An SPST delay relay which briefly continues operation of indoor blower motor to provide additional cooling after the compressor cycles off.

NOTE: Most indoor unit controls include this feature. For those that do not, use the guideline below.

Usage Guideline:

For improved efficiency ratings for certain combinations of indoor and outdoor units. Refer to AHRI Unitary Directory.

13. Winter Start Control

This control is designed to alleviate nuisance opening of the low-pressure switch by bypassing it for the first 3 minutes of operation.

ELECTRICAL DATA

UNIT SIZE – SERIES	V/PH	OPER VOLTS*		COMPR		FAN	MCA	MAX FUSE† or CKT BRK AMPS
		MAX	MIN	LRA	RLA	FLA		
18–A	208/230/1–60	253	197	47.5	9.0	0.40	11.7	20
24–A				62.9	10.9	0.50	14.1	20
30–A				67.8	12.8	0.75	16.8	25
36–A				79.0	13.6	1.10	18.1	30
42–A				109.0	16.7	1.40	22.3	35
48–A				105.7	15.6	1.40	20.9	35
60–A				127.1	20.8	1.52	27.5	40

* Permissible limits of the voltage range at which the unit will operate satisfactorily

† Time–Delay fuse.

FLA – Full Load Amps

LRA – Locked Rotor Amps

MCA – Minimum Circuit Amps

RLA – Rated Load Amps

NOTE: Control circuit is 24V on all units and requires external power source. Copper wire must be used from service disconnect to unit.

All motors/compressors contain internal overload protection.

Complies with 2010 requirements of ASHRAE Standards 90.1

A-WEIGHTED SOUND POWER (dBA)

UNIT SIZE – SERIES	Standard Rating (dBA)	TYPICAL OCTAVE BAND SPECTRUM (dBA without tone adjustment)						
		125	250	500	1000	2000	4000	8000
18–A	75	46.0	55.0	59.5	64.0	60.5	54.5	48.5
24–A	71	50.5	53.5	58.5	60.5	60.0	56.5	52.5
30–A	73	49.5	56.0	62.5	64.0	60.5	57.5	53.5
36–A	75	49.0	57.0	62.5	66.0	61.0	58.5	52.0
42–A	75	52.5	63.0	64.0	63.0	62.0	58.0	52.0
48–A	76	53.0	61.0	64.0	65.5	62.0	59.5	50.5
60–A	75	53.5	57.0	62.5	63.5	61.5	57.5	51.0

NOTE: Tested in compliance with AHRI 270–1995 (not listed with AHRI)

A-WEIGHTED SOUND POWER (dBA) WITH SOUND SHIELD

UNIT SIZE – SERIES	Standard Rating (dBA)	TYPICAL OCTAVE BAND SPECTRUM (dBA without tone adjustment)						
		125	250	500	1000	2000	4000	8000
18–A	75	46.5	55.5	59.5	63.5	60.0	54.0	47.0
24–A	71	47.5	53.5	58.0	59.5	60.0	55.5	49.0
30–A	72	49.0	56.5	61.5	62.5	60.0	57.0	52.0
36–A	73	49.5	57.0	62.0	64.0	60.0	58.0	51.0
42–A	74	53.5	64.0	64.0	62.5	61.0	56.5	50.5
48–A	73	54.5	61.0	63.5	62.5	60.0	56.5	47.5
60–A	73	53.5	59.0	63.0	62.5	59.5	56.0	48.0

NOTE: Tested in compliance with AHRI 270–1995 (not listed with AHRI)

METERING DEVICE

UNIT SIZE – SERIES	INDOOOR	REQUIRED SUBCOOLING °F (°C)
18–A	TXV*	13 (7.22)
24–A		10 (5.56)
30–A		12 (6.67)
36–A		11 (6.11)
42–A		11 (6.11)
48–A		11 (6.11)
60–A		13 (7.22)

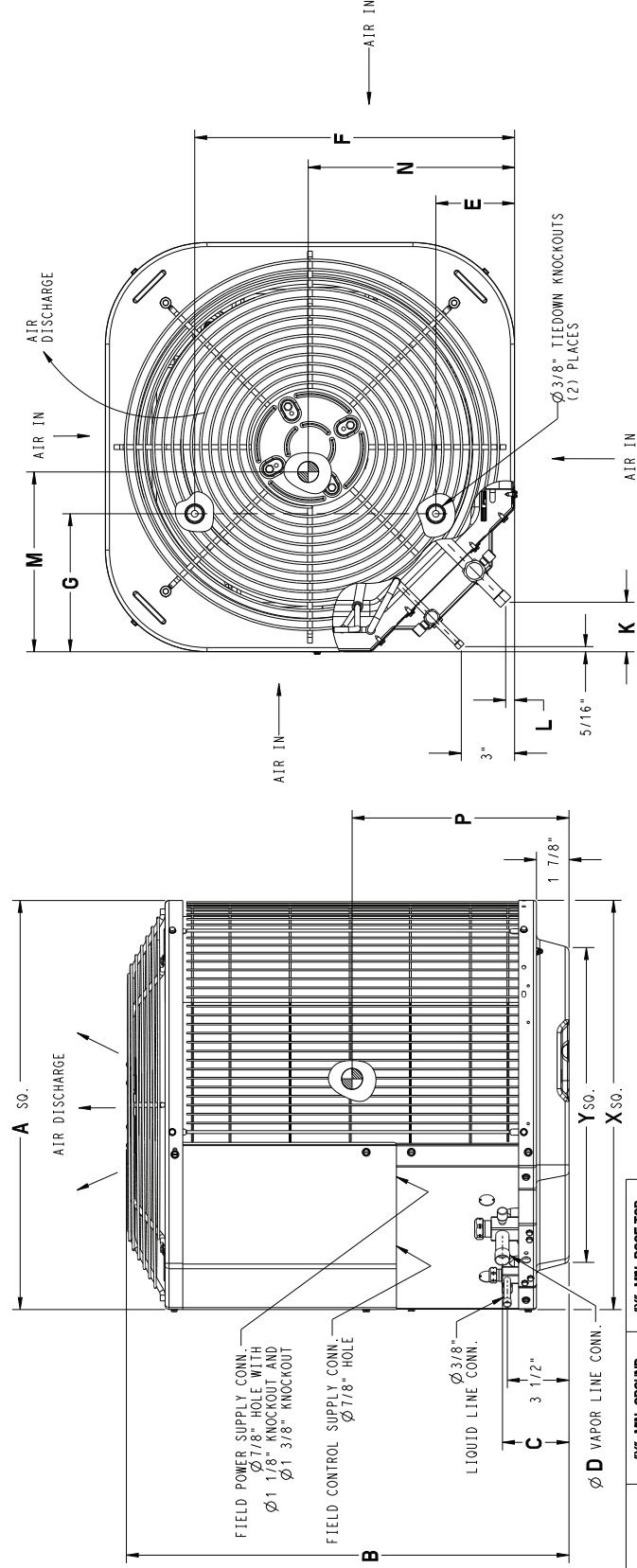
* TXV must be ordered separately when indoor coil is not equipped with a TXV. TXV must be hard-shutoff type.

DIMENSIONS - ENGLISH

UNIT	SERIES	ELECTRICAL CHARACTERISTICS		A	B	C	D	E	F	G	K	L	M	N	P	OPERATING WEIGHT (LBS)	SHIPPING WEIGHT (LBS)	SHIPPING DIMENSIONS (L x W x H)	
CA15NA018	A	X	O	O	25 3/4"	3 3/4"	3/4"	4 7/16"	21 1/4"	9 1/8"	2 13/16"	1/2"	13"	15 1/4"	9 3/4"	122	145	26 7/8" X 26 7/8" X 32 9/16"	
CA15NA024	A	X	O	O	25 3/4"	3 3/4"	3/4"	4 7/16"	21 1/4"	9 1/8"	2 13/16"	1/2"	13 3/8"	13 1/4"	15 1/16"	123	148	26 7/8" X 26 7/8" X 36 5/8"	
CA15NA030	A	X	O	O	31 13/16"	3 3/4"	3/4"	6 9/16"	24 11/16"	9 1/8"	2 13/16"	1/2"	16 1/8"	15 1/16"	12 5/8"	151	186	32 3/16" X 32 3/16" X 34"	
CA15NA036	A	X	O	O	31 3/16"	3 7/8"	7/8"	6 9/16"	24 11/16"	9 1/8"	2 13/16"	5/8"	16 1/8"	16 3/8"	14 7/16"	151	171	32 3/16" X 32 3/16" X 37 7/16"	
CA15NA042	A	X	O	O	31 3/16"	28 7/16"	3 7/8"	6 9/16"	24 11/16"	9 1/8"	2 15/16"	5/8"	15 7/8"	17"	11 7/8"	191	226	32 3/16" X 32 3/16" X 30 5/8"	
CA15NA048	A	X	O	O	31 3/16"	28 7/16"	3 7/8"	7/8"	6 9/16"	9 1/8"	2 15/16"	5/8"	16 1/16"	16 1/4"	10 1/4"	182	200	32 3/16" X 32 3/16" X 30 5/8"	
CA15NA060	A	X	O	O	31 3/16"	31 13/16"	3 7/8"	7/8"	6 9/16"	9 1/8"	2 15/16"	5/8"	15 1/2"	16"	10 7/8"	197	218	32 3/16" X 32 3/16" X 34"	

X = YES
O = NO

208-230-160	230-160	208/230-3-60	460-3-60
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UNIT SIZE	"X" MN. GROUND MOUNTING PAD APPLICATION DIMENSIONS	"Y" MN. ROOF-TOP MOUNTING PAD APPLICATION DIMENSIONS
-	23 1/8"	17 3/4"
18, 24	25 3/4"	20 7/16"
30, 36, 42, 48, 60	31 3/16"	23"
-	35"	26 3/4"

When installing, allow sufficient space for airflow clearance, wiring, refrigerant piping, and service. Allow 24 in. (609.6 mm) clearance to service end of unit and 48 in. (1219.2 mm) (above unit. For proper airflow, a 6-in. (152.4 mm) clearance on 1 side of unit and 12-in. (304.8 mm) on all remaining sides must be maintained. Maintain a distance of 24 in. (609.6 mm) between units or 18 in. (457.2 mm) if no overhang within 12 ft. (3.66 m) Position so water, snow, or ice from roof or eaves cannot fall directly on unit.

NOTE: 18" (457.2 mm) clearance option described above is approved for outdoor units with wire grille coil guard only. Units with lower panels require 24" (609.6 mm) between units.
On rooftop applications, locate unit at least 6 in. (152.4 mm) above roof surface.

ATTACHMENT D

FRESNEL BARRIER REDUCTION
CALCULATIONS

Elevated Point Source

Source to Receiver Horizontal Distance (ft) = 55.00

Source to Barrier Horizontal Distance (ft) = 50.00

Barrier to Receiver Horizontal Distance (ft) = 5.00

Source Height (ft) = 3.00

Receiver Height (ft) = 25.00

Barrier Height (ft) = 28.00

Distance Source to Receptor (ft) d = 59.24

Distance Source to Barrier top (ft) d_1 = 55.90

Distance Barrier top to Receiver (ft) d_2 = 5.83

Frequency (Hz) = 8000 Attenuation (db) = 20.0 Fresnel N = 35.433

Frequency (Hz) = 4000 Attenuation (db) = 20.0 Fresnel N = 17.717

Frequency (Hz) = 2000 Attenuation (db) = 20.0 Fresnel N = 8.858

Frequency (Hz) = 1000 Attenuation (db) = 19.4 Fresnel N = 4.429

Frequency (Hz) = 500 Attenuation (db) = 16.4 Fresnel N = 2.215

Frequency (Hz) = 250 Attenuation (db) = 13.7 Fresnel N = 1.107

Frequency (Hz) = 125 Attenuation (db) = 11.5 Fresnel N = 0.554

Frequency (Hz) = 63 Attenuation (db) = 9.7 Fresnel N = 0.277