Valor Elementary School Project

Noise and Vibration Study

prepared for

Bright Star Schools
600 South La Fayette Park Place, Suite 302
Los Angeles, California 90057
Contact: Elijah Sugay

prepared by

Rincon Consultants, Inc.
250 East 1st Street, Suite 1400
Los Angeles, California 90012

August 2022

RINCON CONSULTANTS, INC.
Environmental Scientists | Planners | Engineers
rinconconsultants.com

Table of Contents

Tables

Figures

Appendices

1 Project Description and Impact Summary

1.1 Introduction

This study analyzes the potential noise and vibration impacts of the proposed Valor Elementary School Project (herein referred to as "Proposed Project" or "Project") located in the Mission Hills - Panorama City - North Hills Community Plan Area in the City of Los Angeles, California. Rincon Consultants, Inc. (Rincon) prepared this study under contract to Bright Star Schools in support of the environmental documentation being prepared pursuant to the California Environmental Quality Act (CEQA). The purpose of this study is to analyze the Project's noise and vibration impacts related to both temporary construction activity and long-term operation of the Project. The conclusions of this study are summarized in Table 1, followed by the Regulatory Compliance Measures (RCMs) required for the Project.

Table 1 Summary of Impacts

Impact Statement	Proposed Project 's Level of Significance	Applicable RCMs/ Identified Mitigation
Would the proposed project generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	Less than significant impact with RCMs incorporated (construction) Less than significant impact with RCMs incorporated (operation)	RCM-1 through RCM-3 (construction) RCM-4 (operation)
Would the proposed project generate excessive groundborne vibration or groundborne noise levels?	Less than significant impact with mitigation (construction) Less than significant impact (operation)	MM NOI-1
For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the proposed project expose people residing or working in the project area to excessive noise levels?	No impact	None

Regulatory Compliance Measures

RCMs are existing requirements and reasonably anticipated standard conditions based on local, State, or federal regulations and laws that are frequently required independently of CEQA review and serve to offset or prevent specific impacts. RCMs are not included as mitigation measures in the environmental clearance document because the Project is required to comply with RCMs through State and local regulations.

RCM-1 Adherence to Existing Noise Standards

The Proposed Project shall comply with the City of Los Angeles General Plan Noise Element, the City of Los Angeles Noise Ordinance, and any subsequent ordinances that prohibit the emission or creation of noise beyond certain levels at adjacent uses.

To implement RCM-1 and reduce construction noise, the construction Contractor would be required to implement noise-reducing during construction, which may include but are not limited to:

- Schedule construction activities to avoid operating several pieces of equipment simultaneously, which can cause high noise levels.
- Retrofit mobile equipment with an industrial grade silencer or silencer of similar capacity.
- Enclose stationary equipment.
- Locate all construction areas for staging and warming up as far as possible from adjacent residential buildings and sensitive receivers.
- Erect temporary noise barriers with a minimum height of 12 feet along the project boundaries. The noise barriers shall be constructed with solid material with a density of at least 1 pound per square foot with no gaps from the ground to the top of the barrier and be lined on the construction side with acoustical blanket, curtain or equivalent absorptive material rated sound transmission class (STC) 32 or higher.

RCM-2 Construction Hours

The Proposed Project shall comply with LAMC Section 41.40, which restricts construction activities to the hours of 7:00 a.m. to 9:00 p.m. Monday through Friday, and 8:00 a.m. to 6:00 p.m. on Saturday and national holidays with no construction permitted on Sunday.

RCM-3 Construction Site Noticing

The Proposed Project shall comply with the City's Building Regulations Ordinance No. 178,048 (LAMC Section 91.106.4.8), which requires a construction site notice to be provided that includes the following information: job site address, permit number, name and phone number of the contractor or owner or owner's agent, hours of construction allowed by code or any discretionary approval for the site, and the Applicant's telephone number where violations can be reported. The notice shall be posted and maintained at the construction site prior to the start of construction and displayed in a location that is readily visible to the public.

RCM-4 Interior Noise Reduction

The Applicant shall consider the noise and land use compatibility of the site (such as traffic) and the characteristics of planned building components (such as Heating, Ventilation, and Air Conditioning [HVAC]), and project designs shall achieve interior classroom noise levels of 45 dBA L_{eq} or less with a target of 40 dBA L_{eq} (unoccupied), and a reverberation time of 0.6 seconds. Noise reduction methods shall include, but are not limited to, sound walls, building and/or classroom insulation, HVAC modifications, double-paned windows, and other design features.

- New construction should achieve classroom acoustical quality consistent with the current School Design Guide and California High Performance Schools (CHPS) standard of 45 dBA L_{eq}.
- New HVAC installations should be designed to achieve the lowest possible noise level consistent with the current School Design Guide. HVAC systems shall be designed so that noise from the system does not cause the ambient noise in a classroom to exceed the current School Design Guide and CHPS standard of 45 dBA L_{eq}
- Modernization of existing facilities and/or HVAC replacement projects should improve the sound performance of the HVAC system over the existing system.
- The Applicant's purchase of new units should give preference to HVAC manufacturers that sell the lowest noise level units at the lowest cost.

- Exterior doors would have a solid core with perimeter weather-stripping and threshold seals with a Sound Transmission Class (STC) rating of at least 32, with the potential for STC rating of 36 or higher if necessary.
- Exterior walls would include minimum of 5/8-inch of stucco or brick veneer over a minimum ½-inch plywood or OSB shear panel, R11 insulation and interior 5/8-inch gypsum board.
- Walls would have a STC rating of at least 46.
- Dual-paned windows would be installed with a STC rating of at least 32, with the potential for STC rating of 36 or higher if necessary.
- If exterior sliding glass doors are included, high-performance glazing would be installed with a minimum STC rating of 36.

1.2 Project Summary

Project Location and Existing Conditions

The Project Site is located at 15526-15544 Plummer Street, in the Mission Hills - Panorama City - North Hills Community Plan Area in the City of Los Angeles. The Project Site encompasses approximately 2.06 acres (approximately 89,629 square feet [sf]) and consists of two parcels identified by Assessor Parcel Numbers (APN) 265-601-5007, which is approximately 1.30 acres in size, and APN 265-601-5008, which is approximately 0.76 acre in size. The 1.30-acre parcel is currently undeveloped and covered with grasses, shrubs, and various mature trees, and the 0.76-acre parcel is currently developed with a one-story single-family residence with similar vegetation as the larger parcel. The entire Project Site is relatively flat. The on-site single-family residence located at 15526 West Plummer Street was built in 1914 and is listed in Survey LA. Therefore, the residence is recognized by the City as having historic significance.

The Project Site is bordered by Plummer Street to the north, with single-family residences beyond; single- and multi-family residences to the east, with an apartment building for senior citizens (Plummer Village) beyond; single- and multi-family residences to the south, with Vincennes Street beyond; and single-family residences to the west, with Orion Avenue beyond. The Project Site is located approximately 440 feet east of Interstate 405 (I-405). See Figure 1 for and Figure 2 for the Project Site location in a regional context and local context, respectively.

Project Description

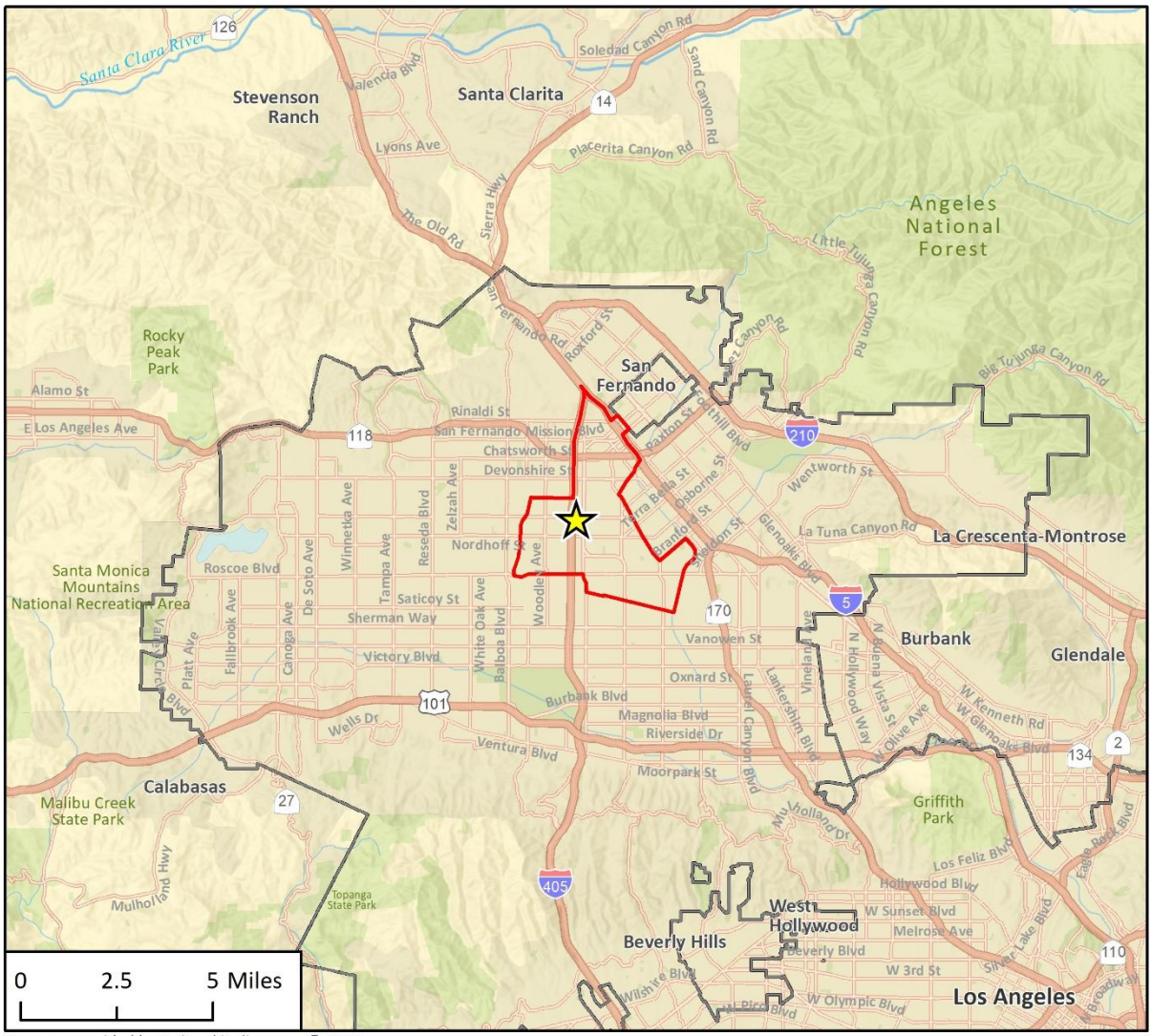
The Proposed Project involves the construction of a one and two-story, 26.5-foot-tall elementary school building with 28 classrooms (totaling 23,538 sf) for grades transitional kindergarten through fourth; a multi-purpose room (totaling 3,182 sf); administrative spaces (totaling 1,616sf); corridors, storage spaces, and covered outdoor dining (totaling 6,419 sf), and a surface parking lot with an ingress/egress driveway off Plummer Street. The elementary school building would have a total building area of 34,755 sf and would accommodate a maximum enrollment of 552 students. The Project would also include 30,726 sf of open space and landscaping, including a kindergarten play area (totaling 1,300 sf), two play areas (totaling 13,060 sf), and various trees and shrubs. The on-site single-family residence would remain on the Site as part of the Project but would be adaptively reused for additional administrative space for the school and would include a conference room, counselor office, staff support space, and psychologist office. The existing restroom in the residence would remain. The Project would include a car drop-off and pick-up area and a total of 49 surface-

level parking spaces including 17 standard, 21 compact, 9 clean air spaces and two ADA spaces located along the southern and western portions of the Site. The Project would also include 112 short-term and three long-term bicycle parking spaces, for a total of 115 bicycle parking spaces. Figure 3 illustrates the proposed site plan.

Project Construction

Project construction is expected to commence in September 2023. Construction activities would occur five days a week from 8:00 a.m. to 3:00 p.m. The Project would require cut of approximately 12,500 cubic yards (cy) of soil material. Of the 12,500 cy of cut soil, approximately 10,000 cy would be used as fill on site and the remaining 2,500 cy would be exported off the site. Construction is anticipated to end in September 2024, for a total construction period of approximately 12 months.

Figure 1 Regional Location



Imagery provided by Esri and its licensors © 2022.
Additional data provided by the City of Los Angeles, 2021.

Project Location

City of Los Angeles

Mission Hills – Panorama City – North Hills Plan Area

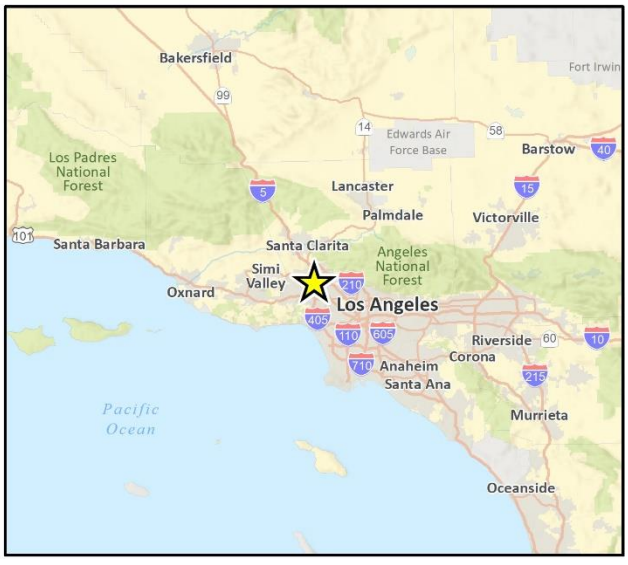


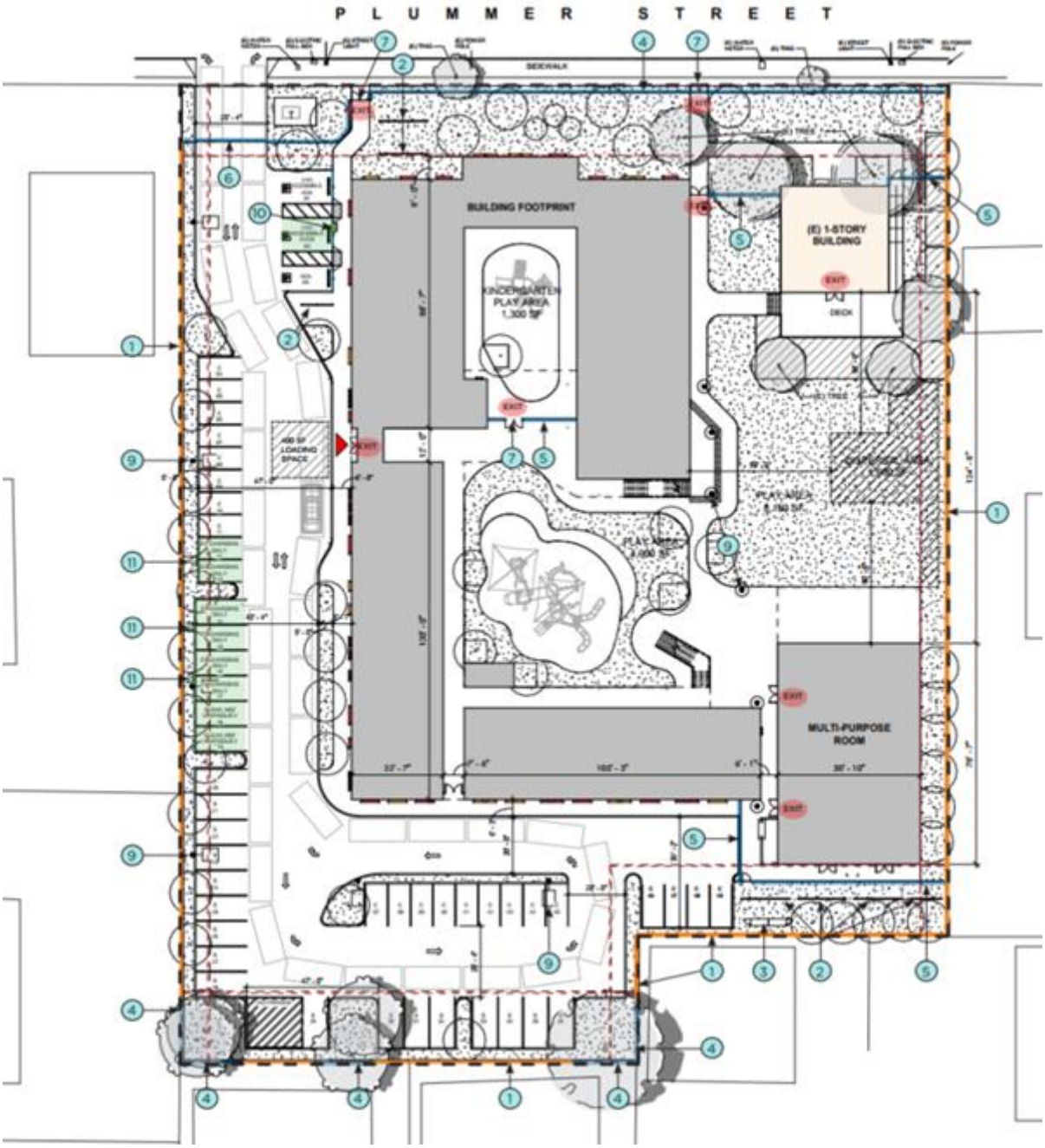
Fig 1 Regional Location

Figure 2 Project Location

Imagery provided by Microsoft Bing and its licensors © 2022.

Fig3 Adjacent Land Use

Figure 3 Project Site Plan



2 Background

2.1 Noise

Sound is a vibratory disturbance created by a moving or vibrating source, which is capable of being detected by the hearing organs (e.g., the human ear). Noise is defined as sound that is loud, unpleasant, unexpected, or undesired and may therefore be classified as a more specific group of sounds. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment (California Department of Transportation [Caltrans] 2013).

Noise levels are commonly measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels so that they are consistent with the human hearing response, which is most sensitive to frequencies around 4,000 Hertz (Hz) and less sensitive to frequencies around and below 100 Hz (Kinsler, et. al. 1999). Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used to measure earthquake magnitudes. A doubling of the energy of a noise source, such as a doubling of traffic volume, would increase the noise level by 3 dB; similarly, dividing the energy in half would result in a decrease of 3 dB (Crocker 2007).

Human perception of noise has no simple correlation with sound energy: the perception of sound is not linear in terms of dBA or in terms of sound energy. Two sources do not "sound twice as loud" as one source. It is widely accepted that the average healthy ear can barely perceive an increase (or decrease) of up to 3 dBA in noise levels (i.e., twice [or half] the sound energy); that a change of 5 dBA is readily perceptible (8 times the sound energy); and that an increase (or decrease) of 10 dBA sounds twice (or half) as loud (10.5 times the sound energy) (Crocker 2007).

Sound changes in both level and frequency spectrum as it travels from the source to the receiver. The most obvious change is the decrease in sound level as the distance from the source increases. The manner by which noise declines with distance depends on factors such as the type of sources (e.g., point or line), the path the sound will travel, site conditions, and obstructions. Noise levels from a point source (e.g., construction, industrial machinery, ventilation units) typically attenuate, or drop off, at a rate of 6 dBA per doubling of distance. Noise from a line source (e.g., roadway, pipeline, railroad) typically attenuates at about 3 dBA per doubling of distance (Caltrans 2013). The propagation of noise is also affected by the intervening ground, known as ground absorption. A hard site, such as a parking lot or smooth body of water, receives no additional ground attenuation and the changes in noise levels with distance (drop-off rate) result simply from the geometric spreading of the source. An additional ground attenuation value of 1.5 dBA per doubling of distance applies to a soft site (e.g., soft dirt, grass, or scattered bushes and trees) (Caltrans 2013). Noise levels may also be reduced by intervening structures. The amount of attenuation provided by this "shielding" depends on the size of the object and the frequencies of the noise levels. Natural terrain features, such as hills and dense woods, and manufactured features, such as buildings and walls, can significantly alter noise levels. Generally, any large structure blocking the line of sight will provide at least a 5-dBA reduction in source noise levels at the receiver (Federal Highway Administration [FHWA] 2011). Structures can reduce occupants' exposure to noise as well. The FHWA's guidelines indicate that modern building construction generally provides an exterior-to-interior noise level reduction of 20 to 35 dBA with closed windows.

Descriptors

The impact of noise is not a function of loudness alone. The time of day when noise occurs, its frequency, and the duration of the noise are also important. In addition, most noise that lasts for more than a few seconds is variable in its intensity. Consequently, a variety of noise descriptors have been developed.

One of the most frequently used noise metrics that considers both duration and intensity is the equivalent noise level (L_{eq}). The L_{eq} is defined as the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time. Typically, L_{eq} is equivalent to a one-hour period, even when measured for shorter durations as the noise level of a 10- to 30-minute period would be the same as the hour if the noise source is relatively steady. L_{max} is the highest Root Mean Squared (RMS) sound pressure level within the sampling period, and L_{min} is the lowest RMS sound pressure level within the measuring period (Crocker 2007). Normal conversational levels at three feet are in the 60- to 65-dBA L_{eq} range and ambient noise levels greater than 65 dBA L_{eq} can interrupt conversations (Federal Transit Administration [FTA] 2018).

Noise that occurs at night tends to be more disturbing than that which occurs during the day. Community noise is usually measured using Day-Night Average Level (L_{dn} or DNL), which is a 24-hour average noise level with a +10 dBA penalty for noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours, or Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with a +5 dBA penalty for noise occurring from 7:00 p.m. to 10:00 p.m. and a +10 dBA penalty for noise occurring from 10:00 p.m. to 7:00 a.m. (Caltrans 2013). Noise levels described by DNL and CNEL usually differ by about 0.5 dBA. Quiet suburban areas typically have a CNEL in the range of 40 to 50 dBA, while areas near arterial streets are typically in the 50 to 70+ CNEL range.

Propagation

Sound from a small, localized source (approximating a “point” source) radiates uniformly outward as it travels away from the source in a spherical pattern, known as geometric spreading. The sound level decreases or drops off at a rate of approximately 6 dBA for each doubling of distance.

Traffic noise is not a single, stationary point source of sound. Rather, the movement of vehicles makes the source of the sound appear to emanate from a line (line source) rather than a point. The drop-off rate for a line source is approximately 3 dBA for each doubling of distance.

2.2 Vibration

Groundborne vibration of concern in environmental analysis consists of the oscillatory waves that move from a source through the ground to adjacent structures. The number of cycles per second of oscillation makes up the vibration frequency, described in terms of hertz (Hz). The frequency of a vibrating object describes how rapidly it oscillates.

Descriptors

Vibration amplitudes are usually expressed in peak particle velocity (PPV). The PPV is normally described in inches per second (in/sec). PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is often used in monitoring of vibration because it is related to the stresses that are experienced by buildings (Caltrans 2020).

Response to Vibration

Caltrans has developed limits for the assessment of vibrations from transportation and construction sources. The Caltrans vibration limits are reflective of standard practice for analyzing vibration impacts on structures. The Caltrans *Transportation and Construction Vibration Guidance Manual* (Caltrans 2020) identifies impact criteria for buildings. Table 2 presents the impact criteria for buildings.

Table 2 Vibration Damage Potential

Structure and Condition	Maximum PPV (in./sec.)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient mountains	0.12	0.08
Fragile buildings	0.20	0.10
Historic and similar old buildings	0.50	0.25
Older residential structures	0.50	0.30
New residential structures	1.00	0.50
Modern industrial/commercial buildings	2.00	0.50

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls (i.e., a loose steel ball that is dropped onto structures or rock to reduce them to a manageable size). Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

PPV = peak particle velocity; in/sec = inches per second

Source: Caltrans 2020

Propagation

Vibration energy spreads out as it travels through the ground, causing the vibration level to diminish with distance away from the source. High-frequency vibrations diminish much more rapidly than low frequencies, so low frequencies tend to dominate the spectrum at large distances from the source. Variability in the soil strata can also cause diffractions or channeling effects that affect the propagation of vibration over long distances (Caltrans 2020). When a building is exposed to vibration, a ground-to-foundation coupling loss (the loss that occurs when energy is transferred from one medium to another) will usually reduce the overall vibration level. However, under rare circumstances, the ground-to-foundation coupling may amplify the vibration level due to structural resonances of the floors and walls.

2.3 Sensitive Receivers

Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with those uses. According to the City of Los Angeles Noise Element, the following land uses are considered noise-sensitive: single-family and multi-unit dwellings, long-term care facilities (including convalescent and retirement facilities), dormitories, motels, hotels, transient lodgings and other residential uses, houses of worship, hospitals, libraries, schools, auditoriums, concert halls, outdoor theaters, nature and wildlife preserves, and parks (City of Los Angeles 1999).

Vibration-sensitive receivers, which are similar to noise-sensitive receivers, include residences and institutional uses, such as schools, churches, and hospitals. Vibration-sensitive receivers also include buildings where vibrations may interfere with vibration-sensitive equipment that is affected by

vibration levels that may be well below those associated with human annoyance (e.g., recording studies or medical facilities with sensitive equipment).

As shown in Figure 2, the Site is surrounded by residential uses. The nearest sensitive receivers consist of residences directly adjacent to the east, south, and west, and residences approximately 130 feet to the north across Plummer Street, as well as Plummer Village Senior Community approximately 215 feet to the east. The Project Site includes an existing residence that would be converted into additional administrative space for the proposed elementary school. In addition, the Project would include construction of an elementary school, which would add new sensitive receivers to the Project Site.

2.4 Project Noise Setting

The most common source of noise in urban areas is vehicular traffic. In the Project area, vehicular traffic along Plummer Street is the primary noise source along steady traffic on I-405, located approximately 440 feet west of the Site. Ambient noise levels are generally highest during the daytime and peak traffic hours unless congestion substantially slows speeds.

To further characterize ambient noise levels at and near the Project Site, two 15-minute noise level measurements were collected by Rincon on May 25, 2022 between 8:57 a.m. and 9:31 a.m. using an Extech (Model 407780A) ANSI Type 2 integrating sound level meter. An additional 24-hour noise level measurement was collected between May 25, 2022 and May 26, 2022. Table 3 summarizes the short-term noise measurement results and Figure 4 shows the noise measurement locations. Short-term noise measurement (ST) 1 is located at the northern property line of the Site facing Plummer Street and ST 2 is located along Orion Avenue adjacent to single-family residences. The long-term noise measurement (LT) 1 is located near the southern property line of the Site. Noise levels for the 15-minute measurements are provided in L_{eq} for the measurement period; L_{min} and L_{max} are also provided. The noise level for the 24-hour measurement is provided in CNEL. Table 4 summarizes the results of the long-term noise measurement. Detailed sound level measurement data are included in Appendix A.

Table 3 Project Vicinity Sound Level Monitoring Results

	Measurement Location	Sample Times	Approximate Distance to Primary Noise Source	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)
ST 1	Northern property line of Site	8:57 a.m. – 9:12 a.m.	30 feet from centerline of Plummer Street	70	53	93
ST 2	West of Site, adjacent to residences	9:16 a.m. – 9:31 a.m.	15 feet from centerline of Orion Avenue	59	54	75

See Appendix A for noise monitoring data. Noise level measurements have been rounded to the nearest whole number.

Source: Rincon field visit between May 25, 2022 and May 26, 2022.

Table 4 Project Site Long-Term Noise Monitoring Results

Sample Time	dBA L_{eq}	Sample Time[1]	dBA L_{eq}
24-hour Measurement – 5/25- 5/26/2022			
8:42 a.m.	57	8:42 p.m.	50
9:42 a.m.	51	9:42 p.m.	49
10:42 a.m.	51	10:42 p.m.	48
11:42 a.m.	53	11:42 p.m.	49
12:42 p.m.	49	12:42 a.m.	50
1:42 p.m.	51	1:42 a.m.	47
2:42 p.m.	46	2:42 a.m.	49
3:42 p.m.	48	3:42 a.m.	51
4:42 p.m.	50	4:42 a.m.	51
5:42 p.m.	48	5:42 a.m.	57
6:42 p.m.	51	6:42 a.m.	53
7:42 p.m.	50	7:42 a.m.	57
24-hour Noise Level (CNEL)			**58**

dBA = A-weighted decibels; L_{eq} = equivalent noise level; CNEL = community equivalent noise level

[1]Sample times shown in this table are the correct sample times. The date and time located in the raw data is not shown correctly due to an input error.

See Figure 4 for noise measurement locations; see Appendix A for full measurement details.

Figure 4 Noise Measurement and Sensitive Receiver Locations

Imagery provided by Microsoft Bing and its licensors © 2022.

Fig X Noise Measurment Locations

2.5 Regulatory Setting

City of Los Angeles Noise Element

The goals, policies, and actions contained in the City of Los Angeles General Plan Noise Element focus on establishing and applying criteria for acceptable noise levels for different land uses in order to minimize the negative impacts of noise, especially at sensitive receiver locations. In support of these goals and policies, the City's Noise Element contains a land use and noise compatibility matrix (shown in Table 5) that determines the normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable noise levels for various land uses. According to the City's noise compatibility matrix shown in Table 5, ambient noise up to 60 CNEL is normally acceptable for schools whereas ambient noise up to 70 CNEL is conditionally acceptable for schools (City of Los Angeles 1999).

Table 5 Land Use and Noise Compatibility Matrix (CNEL)

Land Use	Normally Acceptable[1]	Conditionally Acceptable[2]	Normally Unacceptable[3]	Clearly Unacceptable[4]
Single-Family, Duplex, Mobile Homes	50 – 55	55 – 70	70 – 75	75+
Multi-Family	50 – 60	60 – 70	70 – 75	75+
School, Library, Church, Hospital, Nursing Home	50 – 60	60 – 70	70 – 80	80+
Transient Lodging, Motel, Hotel	50 – 60	60 – 70	70 – 75	75+
Auditorium, Concert Hall, Amphitheater	–	50 – 65	–	65+
Sports Arena, Outdoor Spectator Sports	–	50 – 70	–	70+
Playground, Neighborhood Park	50 – 65	–	65 – 75	75+
Golf Course, Riding Stable, Water Recreation, Cemetery	50 – 70	–	70 – 75	75+
Office Building, Business, Commercial, Professional	50 – 65	65 – 75	75+	–
Agriculture, Industrial, Manufacturing, Utilities	50 – 70	70 – 75	75+	–

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

[2] Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning would normally suffice.

[3] Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

[4] Clearly Unacceptable: New construction or development should generally not be undertaken.

Source: City of Los Angeles 1999

City of Los Angeles Municipal Code

The City implements and enforces construction and operational noise regulations through the Los Angeles Municipal Code (LAMC). LAMC Section 91.1206 establishes noise insulation performance standards to protect persons within new hotels, motels, dormitories, residential care facilities,

apartment houses, dwellings, private schools, and places of worship from the effects of excessive noise, including but not limited to, hearing loss or impairment and interference with speech and sleep. According to Subsection 91.1206.14.1, these structures shall be designed to prevent the intrusion of exterior noise beyond prescribed levels when located in noise critical areas, such as proximity to highways, country roads, city streets, railroads, airports, and commercial or industrial areas. Proper design shall include, but shall not be limited to, orientation of the structure, setbacks, shielding, and sound insulation of the building itself. According to Subsection 91.1206.14.3, structures identified under Subsection 91.1206.1 that are exposed to airport noise greater than 60 dBA L_{dn} or CNEL, shall require an acoustical analysis showing that the proposed design will achieve the allowable interior noise level.

LAMC Section 111.02 provides procedures and criteria for the measurement of the sound level of "offending" noise sources. In accordance with the LAMC, a noise source that causes a noise level increase of 5 dBA over the existing average ambient noise level as measured at an adjacent property line creates a noise violation. This standard applies to radios, television sets, air conditioning, refrigeration, heating, pumping and filtering equipment, powered equipment intended for repetitive use in residential areas, and motor vehicles driven on-site. To account for people's increased tolerance for short-duration noise events, the LAMC provides a 5 dBA allowance for a noise source that causes noise lasting more than five but less than 15 minutes in any one-hour period, and an additional 5 dBA allowance (for a total of 10 dBA) for a noise source that causes noise lasting five minutes or less in any one-hour period.

LAMC Section 111.03 indicates that, in cases where the actual ambient noise conditions are not known, the City's presumed daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) minimum ambient noise levels should be used, as shown in Table 6. For example, for residential-zoned areas, the presumed ambient noise level is 50 dBA during the daytime and 40 dBA during the nighttime. According to LAMC Section 111.03, where the ambient noise level is less than the presumed ambient noise level shown in Table 6, the presumed ambient noise level is to be considered the minimum ambient noise level.

Table 6 Minimum Ambient Noise Level by Zone

Zone	Noise Level (dBA, L_{eq})	
	Day 7 a.m. to 10 p.m.	Night 10 p.m. to 7 a.m.
Residential (A1, A2, RA, RE, RS, RD, RW1, RW1, RW2, R1, R2, R3, R4, and R5)	50	40
Commercial (P, PB, CR, C1, C1.5, C2, C4, C5, and CM)	60	55
Manufacturing (M1, MR1, and MR2)	60	55
Heavy Manufacturing (M2 and M3)	65	65

Note: At the boundary between two zones, the presumed ambient noise level of the quieter zone is to be applied.

Source: LAMC Section 111.03

LAMC Section 112.02 limits increases in noise levels from air conditioning, refrigeration, heating, pumping, and filtering equipment. Such equipment may not be operated in such manner as to create any noise that would cause the noise level on the premises of any other occupied property, or, if a condominium, apartment house, duplex, or attached business, within any adjoining unit, to exceed the ambient noise level by more than 5 dBA.

LAMC Section 112.04 prohibits the operation of any lawn mower, backpack blower, lawn edger, riding tractor, or any other machinery equipment, or other mechanical or electrical device, or any

hand tool which creates a loud, raucous or impulsive sound, within any residential zone or within 500 feet of a residence between 10:00 p.m. and 7:00 a.m. LAMC Section 114.03 prohibits the loading or unloading of any vehicle, operation of any dollies, carts, forklifts, or other wheeled equipment, which causes any impulsive sound, raucous or unnecessary noise within 200 feet of any residential building between 10:00 p.m. and 7:00 a.m.

LAMC Section 112.05 limits noise from construction equipment located within 500 feet of a residential zone to 75 dBA between 7:00 a.m. and 10:00 p.m., as measured at a distance of 50 feet from the source (i.e., construction site) unless compliance is technically infeasible. Technical infeasibility means that noise limitations cannot be met despite the use of mufflers, shields, sound barriers, and/or other noise reduction devices or techniques during the operation of construction equipment. LAMC Section 41.40 also restricts construction activity to the hours below:

- Monday through Friday between 7:00 a.m. and 9:00 p.m.
- Saturdays and national holidays between 8:00 a.m. and 6:00 p.m. except for individual homeowners engaged in the repair or construction of a single-family residence
- No construction on Sundays except for individual homeowners engaged in the repair or construction of a single-family residence

3 Impact Analysis

3.1 Methodology

Construction Noise

Construction noise was estimated using the FHWA Roadway Construction Noise Model (RCNM) (FHWA 2006). RCNM predicts construction noise levels for a variety of construction operations based on empirical data and the application of acoustical propagation formulas. Using RCNM, construction noise levels were estimated at noise sensitive receivers near the project site. RCNM provides reference noise levels for standard construction equipment, with an attenuation rate of 6 dBA per doubling of distance for stationary equipment. Each phase of construction has a specific equipment mix, depending on the work to be accomplished during that phase. Each phase also has its own noise characteristics; some will have higher continuous noise levels than others.

Construction activity would result in temporary noise in the project site vicinity, exposing surrounding nearby receivers to increased noise levels, but only during certain times of a day. Project construction phases would include site preparation, grading, building construction, architectural coating, and paving of the Project Site. It is assumed that diesel engines would power all construction equipment. Project construction noise modeling is based on the conservative assumption that a grader, excavator and concrete saw would be operating simultaneously. Construction noise would typically be higher during the heavier periods of initial construction (i.e., site preparation and grading) and would be lower during the later construction phases (i.e., building construction and paving). However, construction equipment would not all operate at the same time or location. In addition, construction equipment would not be in constant use during the 8-hour

Using RCNM, noise was modeled at the property line of the nearest noise-sensitive receptors from the edge of proposed construction activity. As discussed in discussed in Section 2.3, *Sensitive Receivers*, sensitive receivers nearest to the Project Site include single-family residences directly adjacent to the east, south, and west and the Plummer Street Senior Community approximately 215 feet to the east. RCNM calculations are included in Appendix B.

On-site Operational Noise

The primary on-site operational noise source from the project would be HVAC units. The HVAC used in the analysis was a Trane Split System Heat Pump. Specific model data for the future HVAC systems are not available at this stage of project design; however, this analysis assumes the use of a typical Trane HVAC system. The unit used in this analysis is a 5-ton Carrier 4TWA4036A3, which has a sound power level of 75 dBA (see Appendix C for manufacturer's specifications). Based on the location of the proposed buildings, it is anticipated that the closest rooftop-mounted HVAC unit would be installed on the proposed multi-purpose building located approximately 30 feet from the nearest off-site sensitive receivers east of the project site. HVAC equipment would diminish at a rate of at least 6 dBA per doubling of distance (conservatively ignoring other attenuation effects from ground and shielding effects).

Off-site Traffic Noise

In addition to producing on-site sources of noise, the Project would generate vehicle trips, thereby increasing traffic on area roadways. A Transportation Assessment (TA) for the Proposed Project was prepared by the Linscott Law & Greenspan Engineers (LLG) in May 2022. The trip generation rate for a private school (grades K-12) use (ITE Code 536) is 2.48 average daily trips (ADT) per student. Due to the Project Site's proximity to Metro bus stops and various bus lines as well as the land use characteristics of the Project, the Project trip generation accounts for a 10 percent trip reduction (LLG 2022). Based on a daily trip generation rate of 2.48 vehicle trips per student, the Proposed Project would generate approximately 1,369 ADT (2.48 ADT x 552 students). With a 10 percent trip reduction rate, the Proposed Project would generate approximately 1,232 ADT (0.1 x 1,369 ADT) (LLG 2022). Vehicles would be able to access the parking lot via the Project's proposed driveway along Plummer Street. Therefore, worst-case scenarios for traffic noise increase and related impacts were analyzed for the adjacent roadway segment of Plummer Street, which would receive the bulk of Project-generated vehicle trips.

Groundborne Vibration

Operation of the Project would not include any substantial vibration sources, such as heavy equipment operations. Construction activities would, however, have the greatest potential to generate groundborne vibration affecting nearby structures. As discussed in Section 1, *Project Description and Impact Summary*, the existing single-family residence on site located at 15526 Plummer Street is recognized by the City as having historic significance and would remain as part of the project. Due to the building's significance, groundborne vibration impacts from Project construction were also assessed for this on-site building.

A quantitative assessment of potential vibration impacts from construction activities was conducted using the methodology and vibration levels provided by Caltrans (Caltrans 2020). The greatest vibratory sources during construction would be from operation of jackhammers, bulldozers, and loaded trucks. Vibratory rollers are not proposed for use. Table 7 shows typical vibration levels for various pieces of construction equipment used in the assessment of construction vibration.

Table 7 Typical Vibration Levels during Construction Activities

Equipment	in./sec. PPV at 25 feet
Large bulldozer	0.089
Loaded trucks	0.076
Jack Hammer	0.035
Small bulldozer	0.003

Source: FTA 2018

Because groundborne vibration could cause physical damage to structures and is measured in an instantaneous period, vibration impacts were modeled based on the distance from the location of vibration-intensive construction activities, conservatively assumed to be at edge of the Project Site, to the edge of nearby off-site structures and the on-site structure.

Land Use Compatibility

The City has adopted noise guidelines that provide the normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable noise levels for different land uses.

According to the City's noise compatibility matrix shown in Table 5, ambient noise up to 60 CNEL is normally acceptable for school uses. Per RCM-4, the project would be required to attenuate interior classroom spaces noise levels to 45 dBA L_{eq} or less.

3.2 Significance Thresholds

To determine whether a project would have a significant noise impact, Appendix G of the CEQA Guidelines requires consideration of whether a project would result in:

1. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies
2. Generation of excessive groundborne vibration or groundborne noise levels
3. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels

Construction Noise

Based on LAMC Section 112.05, noise from construction equipment located within 500 feet of a residential zone should not exceed 75 L_{max} dBA between 7:00 a.m. and 10:00 p.m., as measured at a distance of 50 feet from the source, unless compliance is technically infeasible. Based on LAMC Section 41.40, construction noise would also be significant if generated outside of allowable construction hours.

On-site Operational Noise

The City has adopted noise standards in the LAMC that regulate operational noise sources in the City. The Project would result in a significant impact if it generates noise from on-site sources in excess of LAMC standards included in Sections 112.02, 112.04, and 114.03, which collectively regulate noise from operations that are typical school uses (e.g., air conditioning equipment).

Off-site Traffic Noise

Off-site Project noise (i.e., roadway noise) would result in a significant impact if the Project would cause the ambient noise level measured at the property line of affected uses to increase by 3 dBA, which would be a perceptible increase in traffic noise.

Construction Vibration

The City has not adopted a significance threshold to assess vibration impacts during construction and operation. Therefore, the Caltrans *Transportation and Construction Vibration Guidance Manual* (2013) is used to evaluate potential construction vibration impacts related to both potential building damage and human annoyance. Based on the Caltrans criteria shown in Table 2, construction vibration impacts would be significant if vibration levels exceed 0.3 in/sec PPV for residential structures and 0.25 in/sec PPV for historic structures, which is the limit where minor cosmetic (i.e., non-structural) damage may occur to these buildings.

Land Use Compatibility

The City has adopted noise guidelines that provide the normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable noise levels for different land uses. According to the City's noise compatibility matrix shown in Table 5, ambient noise up to 60 CNEL is normally acceptable for schools, whereas ambient noise up to 70 CNEL is conditionally acceptable for schools.

3.3 Impact Analysis

CEQA Appendix G Noise Threshold 1 Would the proposed project generate a substantial temporary increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? **LESS THAN SIGNIFICANT**

Impact N-1 CONSTRUCTION ACTIVITY WOULD TEMPORARILY INCREASE AMBIENT NOISE LEVELS IN THE PROJECT SITE VICINITY AND WOULD EXCEED 75 DBA AT 50 FEET IF UNCONTROLLED. HOWEVER, THE PROJECT WOULD COMPLY WITH RCMS RELATED TO EQUIPMENT OPERATIONS, CONSTRUCTION HOURS, AND SITE NOTICING. THEREFORE, TEMPORARY CONSTRUCTION NOISE IMPACTS WOULD BE LESS THAN SIGNIFICANT.

Temporary Construction Noise Impacts

Construction activity would result in temporary increases in ambient noise in the Project Site vicinity on an intermittent basis and, as such, would expose surrounding noise sensitive receivers to increased noise. RCNM calculations are included in Appendix B. Pursuant to LAMC Section 112.05, in which construction noise in a residential zone shall not exceed 75 dBA L_{max} between 7:00 a.m. and 10:00 p.m. at a distance of 50 feet, construction noise was modeled at a distance of 50 feet from the nearest residential receivers. In addition, construction activities are limited to the hours of 7:00 a.m. and 9:00 p.m. on weekdays and between the hours of 8:00 a.m. and 6:00 p.m. on Saturday pursuant to the City's Noise Ordinance Section 41.40.

Construction noise is typically loudest during activities that involve excavation and moving soil, such as site preparation and grading. A potential high-intensity construction scenario based on client provided information includes a grader, excavator and concrete saw working during site preparation to excavate and move soil. At a distance of 50 feet, a grader, excavator and concrete saw would generate a noise level of 90 dBA L_{max} (RCNM calculations are included in Appendix B). Therefore, construction noise could exceed the threshold of 75 dBA L_{max}. The approximate 75 dBA L_{max} noise contour for project construction is estimated at 150 feet (i.e., if construction occurs at a distance of 150 feet or greater from a sensitive receptor, it would not exceed the threshold). Therefore, if construction occurs within 150 feet of sensitive receivers, noise levels from construction may exceed the City's construction noise limit.

The nearest sensitive receivers include single-family residences adjacent to the east, south, and west of the project boundary. Other sensitive receivers include single-family residences approximately 130 feet to the north across Plummer Street, as well as Plummer Village Senior Community approximately 215 feet to the east. At nearby residences, construction noise could exceed the 75 dBA L_{max} threshold since construction activity could occur within 50 feet of these sensitive receptors if uncontrolled. Construction noise at the Plummer Village Senior Community, approximately 215 feet to the east of the project boundary, is not estimated to exceed the 75 dBA L_{max} threshold.

Implementation of RCM-1 would reduce construction noise by at least 15 dBA, thereby reducing construction noise levels to 75 dBA L_{max}. Therefore, with RCM-1, this impact would be less than significant

CEQA Appendix G Noise Threshold 1 Would the proposed project generate a substantial permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? **LESS THAN SIGNIFICANT**

Impact N-2 OPERATION OF THE PROJECT WOULD GENERATE ADDITIONAL SOURCES OF NOISE WHEN COMPARED TO THE PROJECT SITE'S EXISTING CONDITIONS DUE TO THE ADDITION OF SCHOOL STAFF AND STUDENTS AND ADDITIONAL VEHICLE TRIPS. THE PROJECT WOULD COMPLY WITH RCMS RELATED TO THE FUTURE INTERIOR NOISE ENVIRONMENT OF CLASSROOMS. PERMANENT OPERATIONAL NOISE IMPACTS WOULD BE LESS THAN SIGNIFICANT.

Off-site Traffic Noise Impacts

The Project would generate new vehicle trips and incrementally increase traffic on area roadways, particularly on Plummer Street due to the location of the Project's proposed driveway. According to the TA prepared by the LLG, the Project would result in approximately 1,232 daily vehicle trips on Plummer Street (LLG 2022). As discussed in the TA, new traffic count data could not be collected due to the COVID-19 pandemic (LLG 2022). While the TA uses the City's peak hour traffic data, the TA does not include 24-hour traffic volume data for the segment of Plummer Street nearest to the Site. Based on the City's 24-hour traffic volume data, the segment of Plummer Street nearest to the Site has a volume of approximately 17,710 ADT.[1] Conservatively adding all 1,232 daily vehicle trips generated by the Project to Plummer Street would increase traffic along these roadways by approximately seven percent. This traffic increase would, in turn, increase traffic noise by an estimated 0.3 CNEL along Plummer Street.[2] Therefore, the Project would not generate substantial traffic noise from vehicle trips that would result a perceptible 3-dBA increase above existing traffic noise at Plummer Street. Noise impacts associated with off-site traffic generated by the Project would be less than significant.

On-site Operations

The Project would require periodic delivery and trash hauling services. However, noise associated with delivery and trash-hauling trucks would be an intermittent noise source and are already a common occurrence in the Project area due to existing residential and commercial uses that make up the developed urban area. Therefore, such services associated with the Project would not result in a substantial permanent increase in ambient noise levels without the Project. Furthermore, LAMC Section 114.03 prohibits the loading or unloading of any vehicle, operation of any dollies, carts, forklifts, or other wheeled equipment, which causes any impulsive sound, raucous or unnecessary noise within 200 feet of any residential building between 10:00 p.m. and 7:00 a.m. Therefore, operational noise impacts associated with delivery and trash-hauling trucks would be less than significant.

[1] Based on the City's 24 hour traffic volume data, the nearest intersection (Plummer Street West of Orion Avenue) had approximately 16,100 ADT in 2012 (City of Los Angeles 2012). To estimate current year traffic volumes, the 16,100 ADT were increased by a one percent annual traffic growth rate through the year 2022.

[2] A doubling of traffic is required for an audible 3 dB increase in traffic noise levels. However, the increase in traffic generated by the Proposed Project would be approximately seven percent of the estimated existing daily traffic along Plummer Street.

HVAC Units

The proposed project would have heating, ventilation, and air conditioning systems (HVAC). Mechanical equipment is anticipated to be installed on the roof of the proposed buildings. The unit used in this analysis is a 5-ton Carrier 4TWA4036A3, which has a sound power level of 75 dBA. HVAC noise would diminish at a rate of at least 6 dBA per doubling of distance (conservatively ignoring other attenuation effects from ground and shielding effects). The nearest sensitive receivers are single-family residences, which are approximately 30 feet from the nearest proposed multi-purpose building to the east. A two-and-half-foot-high parapet wall is proposed on the rooftop, which would reduce HVAC noise levels by approximately 5 dBA. At a distance of 30 feet and with the shielding from the proposed parapet wall, HVAC noise would attenuate to approximately 43 dBA or less, which would not exceed the lowest measured hourly L_{eq} at LT-1 of 46 dBA. According to LAMC Section 111.03, where the ambient noise level is less than the presumed ambient noise level shown in Table 6, the measured ambient becomes the standard. Project HVAC noise would be less at other sensitive receptors located at further distances. This impact would be less than significant.

Outdoor Noise

The primary on-site noise source associated with operation of the Project would consist of student recreational activity in the proposed outdoor play areas. Outdoor noise would be an intermittent and periodic noise source, which would be limited to the daytime during school hours and when staff and students are outdoors (e.g., mornings prior to class start times, study breaks or lunch breaks throughout the day, afterschool prior to students getting picked up). The new elementary school would serve traditional kindergarten through grade four. Campus hours of operation for Valor Elementary School would be from 7:15 a.m. to 6:00 p.m., Monday through Friday during normal school months. During the summer months, the school campus would be closed. The proposed school would not host athletic events that would occur during the late afternoon/early evening hours. No lighting is proposed for the proposed playfields and a limited amount of special events are proposed throughout the school years. Additionally, there would be no PA system proposed for recreational activities. Since student recreational activities would be limited to daytime hours and there are no proposed PA systems for sports activities, impacts would be less than significant.

Land Use Compatibility

As discussed in Section 2.4, *Project Noise Setting,* and shown in Table 4, the peak hour ambient noise level along Plumer Street is 70 dBA L_{eq}, which indicates that future classrooms closest to Plummer Street could be exposed to ambient noise levels on the order of 70 CNEL. According to the City's noise compatibility matrix shown in Table 5, ambient noise up to 60 CNEL is normally acceptable and noise up to 70 CNEL is conditionally acceptable for a school use. Based on existing noise levels described in Section 2.4, *Project Noise*, the project is anticipated to be within the "conditionally acceptable" range for school uses at the project site. RCM-4 would require that future classrooms are designed for an interior noise environment of 45 dBA L_{eq} or less, and impacts would be less than significant.

CEQA Appendix G Noise Threshold 2 Would the proposed project generate excessive groundborne vibration or groundborne noise levels? **LESS THAN SIGNIFICANT WITH MITIGATION**

Impact N-3 OPERATION OF THE PROPOSED PROJECT WOULD NOT INCLUDE ANY STATIONARY SOURCES OF SIGNIFICANT VIBRATION AND WOULD THEREFORE NOT GENERATE EXCESSIVE GROUNDBORNE VIBRATION. CONSTRUCTION OF THE PROPOSED PROJECT WOULD NOT EXCEED APPLICABLE BUILDING DAMAGE THRESHOLDS OF 0.30 IN./SEC. PPV FOR RESIDENTIAL BUILDINGS AND 0.25 IN./SEC. PPV FOR HISTORIC BUILDINGS. IMPACTS RELATING TO GROUNDBORNE VIBRATION WOULD BE LESS THAN SIGNIFICANT WITH MITIGATION.

Vibration Impacts

Operation of the Project would not include stationary sources of significant vibration, such as heavy equipment operations and operational vibration impacts would be less than significant.

Construction activities have the potential to generate groundborne vibration affecting nearby structures. Construction of the Project would utilize loaded trucks and bulldozers and other heavy-duty construction equipment during the grading phase. Vibratory rollers are not proposed for use during the paving phase.

Vibration impacts are assessed based on the distance from the location of vibration-intensive construction activities, conservatively assumed to be at edge of the Project Site, to the edge of nearby off-site structures. Based on the distance of the nearest structures to the Project Site, heavy-duty equipment could potentially come within very close distances to the adjacent single-family residences and the existing building on site with historic significant per SurveyLA. If dozers or other heavy earthmoving equipment were to work within approximately 10 feet or less of adjacent single-family structures, vibration levels could reach 0.352 in/sec PPV or greater and exceed the threshold of 0.3 in/sec PPV for typical residential structures. If such equipment were to work within approximately 12 feet or less of the existing on-site structure, vibration levels could reach 0.268 in/sec PPV or greater and exceed the threshold of 0.25 in/sec PPV for historic structures. Therefore, construction vibration impacts would be considered significant. Implementation of Mitigation Measure NOI-1 would reduce this impact to a level of less than significant.

Mitigation Measure

NOI-1 Construction Vibration

Grading and earthwork activities within 12 feet of adjacent residential structures or within 10 feet of the on-site existing building shall be conducted with off-road equipment that is limited to 100 horsepower or less.

CEQA Appendix G Noise Threshold 3 For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the proposed project expose people residing or working in the project area to excessive noise levels? **NO IMPACT**

Impact N-4 THE PROPOSED PROJECT IS NOT LOCATED WITHIN ANY AIRPORT NOISE CONTOURS OR NEAR A PRIVATE AIRPORT. THEREFORE, NO IMPACTS RELATING TO AIRPORT NOISE WOULD OCCUR.

Airport Noise Impacts

The airports closest to the Project Site are the Van Nuys Airport, located approximately 2.3 miles to the southwest and the Whiteman Airport, located approximately 3.5 miles to the northeast. While the Project Site would be subject to temporary and intermittent noise from aircraft overflights, the Site is not located in either airports' noise contours and would not be affected by substantial noise from aircraft operations (Los Angeles County 2003). In addition, the Project Site is not near a private airport. Therefore, the Project would not expose people working in the Project area to excessive noise levels from aircraft noise and no impact would occur.

4 Conclusions

Construction would occur within 500 feet of residential uses and construction noise could exceed 75 dBA L_{max} at 50 feet. However, noise associated with construction of the Project would be typical of that associated with construction. With implementation of RCM-1 through RCM-3, construction noise would be reduced to the degree feasible at the nearest noise-sensitive receivers and to below 75 dBA at 50 feet. Noise related to project construction would not result in a significant short-term increase in noise levels nor would construction noise conflict with the LAMC.

Project construction would also result in vibration and could potentially exceed the applicable thresholds for typical residential structures and for the on-site structure with historic significance per SurveyLA if construction is conducted within close distances to sensitive structures (i.e., within 12 feet of typical residential structures or within 10 feet of the on-site structure). With implementation of Mitigation Measure NOI-1, construction vibration impacts would be less than significant.

On-site operational noise impacts such as outdoor noise and activities would be less than significant. Noise from proposed HVAC equipment would be less than significant. Furthermore, the Project would not expose people working in the Project area to excessive noise levels from aircraft noise and the Proposed Project would be compatible with the existing noise environment through adherence to RCM-4.

The Project would be required to comply with the RCMs listed at the beginning of this report. This analysis demonstrates that, with implementation of applicable RCMs and Mitigation Measure NOI-1, the Project would not result in significant noise or vibration impacts.

Regulatory Compliance Measures

RCMs are existing requirements and reasonably anticipated standard conditions based on local, State, or federal regulations and laws that are frequently required independently of CEQA review and serve to offset or prevent specific impacts. RCMs are not included as mitigation measures in the environmental clearance document because the Project is required to comply with RCMs through State and local regulations.

RCM-1 Adherence to Existing Noise Standards

The Proposed Project shall comply with the City of Los Angeles General Plan Noise Element, the City of Los Angeles Noise Ordinance, and any subsequent ordinances that prohibit the emission or creation of noise beyond certain levels at adjacent uses.

To implement RCM-1 and reduce construction noise, the construction Contractor would be required to implement noise-reducing during construction, which may include but are not limited to:

- Schedule construction activities to avoid operating several pieces of equipment simultaneously, which can cause high noise levels.
- Retrofit mobile equipment with an industrial grade silencer or silencer of similar capacity.
- Enclose stationary equipment.
- Locate all construction areas for staging and warming up as far as possible from adjacent residential buildings and sensitive receivers.

- Erect temporary noise barriers with a minimum height of 12 feet along the project boundaries. The noise barriers shall be constructed with solid material with a density of at least 1 pound per square foot with no gaps from the ground to the top of the barrier and be lined on the construction side with acoustical blanket, curtain or equivalent absorptive material rated sound transmission class (STC) 32 or higher.

RCM-2 Construction Hours

The Proposed Project shall comply with LAMC Section 41.40, which restricts construction activities to the hours of 7:00 a.m. to 9:00 p.m. Monday through Friday, and 8:00 a.m. to 6:00 p.m. on Saturday and national holidays with no construction permitted on Sunday.

RCM-3 Construction Site Noticing

The Proposed Project shall comply with the City's Building Regulations Ordinance No. 178,048 (LAMC Section 91.106.4.8), which requires a construction site notice to be provided that includes the following information: job site address, permit number, name and phone number of the contractor or owner or owner's agent, hours of construction allowed by code or any discretionary approval for the site, and the Applicant's telephone number where violations can be reported. The notice shall be posted and maintained at the construction site prior to the start of construction and displayed in a location that is readily visible to the public.

RCM-4 Interior Noise Reduction

The Applicant shall consider the noise and land use compatibility of the site (such as traffic) and the characteristics of planned building components (such as Heating, Ventilation, and Air Conditioning [HVAC]), and project designs shall achieve interior classroom noise levels of 45 dBA L_{eq} or less with a target of 40 dBA L_{eq} (unoccupied), and a reverberation time of 0.6 seconds. Noise reduction methods shall include, but are not limited to, sound walls, building and/or classroom insulation, HVAC modifications, double-paned windows, and other design features.

- New construction should achieve classroom acoustical quality consistent with the current School Design Guide and California High Performance Schools (CHPS) standard of 45 dBA L_{eq}.
- New HVAC installations should be designed to achieve the lowest possible noise level consistent with the current School Design Guide. HVAC systems shall be designed so that noise from the system does not cause the ambient noise in a classroom to exceed the current School Design Guide and CHPS standard of 45 dBA L_{eq}
- Modernization of existing facilities and/or HVAC replacement projects should improve the sound performance of the HVAC system over the existing system.
- The Applicant's purchase of new units should give preference to HVAC manufacturers that sell the lowest noise level units at the lowest cost.
- Exterior doors would have a solid core with perimeter weather-stripping and threshold seals with a Sound Transmission Class (STC) rating of at least 32, with the potential for STC rating of 36 or higher if necessary.
- Exterior walls would include minimum of 5/8-inch of stucco or brick veneer over a minimum ½-inch plywood or OSB shear panel, R11 insulation and interior 5/8-inch gypsum board.
- Walls would have a STC rating of at least 46.

- Dual-paned windows would be installed with a STC rating of at least 32, with the potential for STC rating of 36 or higher if necessary.

If exterior sliding glass doors are included, high-performance glazing would be installed with a minimum STC rating of 36.

Mitigation Measure

NOI-1 Construction Vibration

Grading and earthwork activities within 12 feet of adjacent residential structures or within 10 feet of the on-site existing building shall be conducted with off-road equipment that is limited to 100 horsepower or less.

5 References

California Department of Transportation (Caltrans). 2013. Technical Noise Supplement to the Traffic Noise Analysis Protocol. (CT-HWANP-RT-13-069.25.2). https://www.dtsc-ssfl.com/files/lib_ceqa/ref_draft_peir/Chap4_10-Noise/Caltrans_2013a_Tech_Noise_Supplement.pdf (accessed May 2022).

_____. 2020. Transportation and Construction Vibration Guidance Manual CT-HWANP-RT-20-365.01.01. https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf (accessed May 2022).

Crocker, Malcolm J. Crocker (Editor). 2007. *Handbook of Noise and Vibration Control Book*, ISBN: 978-0-471-39599-7, Wiley-VCH, October.

Federal Highway Administration (FHWA). 2006*. FHWA Highway Construction Noise Handbook*. (FHWAHEP-06-015; DOT-VNTSC-FHWA-06-02). https://rosap.ntl.bts.gov/view/dot/8837/dot_8837_DS1.pdf? (accessed May 2022).

_____. 2011. *Highway Traffic Noise: Analysis and Abatement Guidance* (FHWA-HEP-10-025). https://www.fhwa.dot.gov/environment/noise/regulations_and_guidance/analysis_and_abatement_guidance/revguidance.pdf (accessed May 2022).

Federal Transit Administration (FTA). 2018. *Transit Noise and Vibration Impact Assessment Manual.* https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf (accessed May 2022).

Kinsler, Lawrence E. and R. Frey, Austin and B. Coppens, Alan and V. Sanders, James. 1999. Fundamentals of Acoustics, 4th Edition. ISBN 0-471-84789-5. Wiley-VCH, December 1999.

Linscott Law & Greenspan Engineers (LLG). 2022. Transportation Assessment – Valor Elementary School. May 31, 2022. Document.

Los Angeles, City of. 1999. Noise Element of the City of Los Angeles General Plan. https://planning.lacity.org/odocument/b49a8631-19b2-4477-8c7f-08b48093cddd/Noise_Element.pdf (accessed May 2022).

_____. 2012. 24 Hour Traffic Volume for Plummer Street West of Orion Avenue. April 2013. https://navigatela.lacity.org/dot/traffic_data/automatic_counts/PLUMMER.ORION.120917W-AUTO.pdf (accessed June 2022).

Los Angeles, County of. 2003. Airport Land Use Plan. http://planning.lacounty.gov/assets/upl/data/pd_alup.pdf (accessed May 2022).

Appendix A

Noise Measurement Data

- Freq Weight : A
- Time Weight : SLOW
- Level Range : 40-100
- Max dB : 80.8 - 2022/05/25 10:07:49
- Level Range : 40-100
- SEL : 119.3
- Leq : 70.0
-

No.s	Date Time	(dB)
1	2022/05/25 08:42:03	57.2
2	2022/05/25 08:46:03	55.7
3	2022/05/25 08:50:03	54.2
4	2022/05/25 08:54:03	56.6
5	2022/05/25 08:58:03	53.7
6	2022/05/25 09:02:03	56.7
7	2022/05/25 09:06:03	54.2
8	2022/05/25 09:10:03	51.8
9	2022/05/25 09:14:03	53.1
10	2022/05/25 09:18:03	50.6
11	2022/05/25 09:22:03	50.5
12	2022/05/25 09:26:03	51.2
13	2022/05/25 09:30:03	53.1
14	2022/05/25 09:34:03	51.8
15	2022/05/25 09:38:03	49.4
16	2022/05/25 09:42:03	51.4
17	2022/05/25 09:46:03	52.5
18	2022/05/25 09:50:03	51.5
19	2022/05/25 09:54:03	49.6
20	2022/05/25 09:58:03	51.4
21	2022/05/25 10:02:03	54.3
22	2022/05/25 10:06:03	50.8
23	2022/05/25 10:10:03	49.4
24	2022/05/25 10:14:03	51.2
25	2022/05/25 10:18:03	50.3
26	2022/05/25 10:22:03	51.5
27	2022/05/25 10:26:03	48.8
28	2022/05/25 10:30:03	51.0
29	2022/05/25 10:34:03	52.2
30	2022/05/25 10:38:03	49.7
31	2022/05/25 10:42:03	51.0
32	2022/05/25 10:46:03	49.7
33	2022/05/25 10:50:03	52.5
34	2022/05/25 10:54:03	53.0
35	2022/05/25 10:58:03	56.6
36	2022/05/25 11:02:03	48.8
37	2022/05/25 11:06:03	49.5
38	2022/05/25 11:10:03	49.1
39	2022/05/25 11:14:03	51.3
40	2022/05/25 11:18:03	54.9
41	2022/05/25 11:22:03	49.5
42	2022/05/25 11:26:03	49.2
43	2022/05/25 11:30:03	50.0
44	2022/05/25 11:34:03	52.0
45	2022/05/25 11:38:03	49.6
46	2022/05/25 11:42:03	53.2
47	2022/05/25 11:46:03	51.1
48	2022/05/25 11:50:03	49.0
49	2022/05/25 11:54:03	56.1
50	2022/05/25 11:58:03	61.9
51	2022/05/25 12:02:03	48.7
52	2022/05/25 12:06:03	49.3
53	2022/05/25 12:10:03	46.9
54	2022/05/25 12:14:03	49.9
55	2022/05/25 12:18:03	48.6
56	2022/05/25 12:22:03	47.6
57	2022/05/25 12:26:03	48.8
58	2022/05/25 12:30:03	49.6
59	2022/05/25 12:34:03	49.4
60	2022/05/25 12:38:03	46.5
61	2022/05/25 12:42:03	49.4
62	2022/05/25 12:46:03	48.7
63	2022/05/25 12:50:03	50.0
64	2022/05/25 12:54:03	49.0
65	2022/05/25 12:58:03	48.4
66	2022/05/25 13:02:03	51.4
67	2022/05/25 13:06:03	50.1
68	2022/05/25 13:10:03	48.2
69	2022/05/25 13:14:03	49.2
70	2022/05/25 13:18:03	47.5
71	2022/05/25 13:22:03	50.2
72	2022/05/25 13:26:03	48.6
73	2022/05/25 13:30:03	50.4
74	2022/05/25 13:34:03	49.9
75	2022/05/25 13:38:03	49.3
76	2022/05/25 13:42:03	50.6
77	2022/05/25 13:46:03	55.7
78	2022/05/25 13:50:03	48.8
79	2022/05/25 13:54:03	48.9
80	2022/05/25 13:58:03	52.5
81	2022/05/25 14:02:03	49.9
82	2022/05/25 14:06:03	50.1
83	2022/05/25 14:10:03	54.8
84	2022/05/25 14:14:03	51.9

85	2022/05/25	14:18:03	48.2
86	2022/05/25	14:22:03	49.4
87	2022/05/25	14:26:03	47.9
88	2022/05/25	14:30:03	48.4
89	2022/05/25	14:34:03	48.6
90	2022/05/25	14:38:03	47.3
91	2022/05/25	14:42:03	45.9
92	2022/05/25	14:46:03	46.6
93	2022/05/25	14:50:03	48.4
94	2022/05/25	14:54:03	47.2
95	2022/05/25	14:58:03	50.4
96	2022/05/25	15:02:03	49.3
97	2022/05/25	15:06:03	47.9
98	2022/05/25	15:10:03	49.0
99	2022/05/25	15:14:03	49.6
100	2022/05/25	15:18:03	51.8
101	2022/05/25	15:22:03	47.9
102	2022/05/25	15:26:03	52.7
103	2022/05/25	15:30:03	47.9
104	2022/05/25	15:34:03	49.1
105	2022/05/25	15:38:03	49.0
106	2022/05/25	15:42:03	47.5
107	2022/05/25	15:46:03	48.2
108	2022/05/25	15:50:03	47.9
109	2022/05/25	15:54:03	47.3
110	2022/05/25	15:58:03	54.2
111	2022/05/25	16:02:03	49.1
112	2022/05/25	16:06:03	47.9
113	2022/05/25	16:10:03	49.5
114	2022/05/25	16:14:03	48.8
115	2022/05/25	16:18:03	50.4
116	2022/05/25	16:22:03	48.2
117	2022/05/25	16:26:03	49.9
118	2022/05/25	16:30:03	48.3
119	2022/05/25	16:34:03	47.3
120	2022/05/25	16:38:03	46.9
121	2022/05/25	16:42:03	50.2
122	2022/05/25	16:46:03	50.6
123	2022/05/25	16:50:03	49.6
124	2022/05/25	16:54:03	51.1
125	2022/05/25	16:58:03	49.3
126	2022/05/25	17:02:03	47.3
127	2022/05/25	17:06:03	49.5
128	2022/05/25	17:10:03	50.6
129	2022/05/25	17:14:03	51.4
130	2022/05/25	17:18:03	52.1
131	2022/05/25	17:22:03	53.1
132	2022/05/25	17:26:03	48.3
133	2022/05/25	17:30:03	50.5
134	2022/05/25	17:34:03	50.1
135	2022/05/25	17:38:03	51.8
136	2022/05/25	17:42:03	47.9
137	2022/05/25	17:46:03	49.1
138	2022/05/25	17:50:03	50.9
139	2022/05/25	17:54:03	51.7
140	2022/05/25	17:58:03	57.6
141	2022/05/25	18:02:03	49.1
142	2022/05/25	18:06:03	50.7
143	2022/05/25	18:10:03	49.5
144	2022/05/25	18:14:03	52.9
145	2022/05/25	18:18:03	51.9
146	2022/05/25	18:22:03	48.5
147	2022/05/25	18:26:03	50.3
148	2022/05/25	18:30:03	51.6
149	2022/05/25	18:34:03	49.4
150	2022/05/25	18:38:03	48.4
151	2022/05/25	18:42:03	50.6
152	2022/05/25	18:46:03	48.6
153	2022/05/25	18:50:03	49.4
154	2022/05/25	18:54:03	52.0
155	2022/05/25	18:58:03	48.6
156	2022/05/25	19:02:03	49.9
157	2022/05/25	19:06:03	49.2
158	2022/05/25	19:10:03	50.5
159	2022/05/25	19:14:03	49.2
160	2022/05/25	19:18:03	50.9
161	2022/05/25	19:22:03	54.6
162	2022/05/25	19:26:03	49.7
163	2022/05/25	19:30:03	50.0
164	2022/05/25	19:34:03	51.1
165	2022/05/25	19:38:03	50.7
166	2022/05/25	19:42:03	49.8
167	2022/05/25	19:46:03	50.0
168	2022/05/25	19:50:03	50.0
169	2022/05/25	19:54:03	48.7
170	2022/05/25	19:58:03	51.1
171	2022/05/25	20:02:03	50.9
172	2022/05/25	20:06:03	55.2
173	2022/05/25	20:10:03	49.0
174	2022/05/25	20:14:03	48.6
175	2022/05/25	20:18:03	53.7
176	2022/05/25	20:22:03	49.8
177	2022/05/25	20:26:03	51.6
178	2022/05/25	20:30:03	49.4
179	2022/05/25	20:34:03	52.4
180	2022/05/25	20:38:03	51.5
181	2022/05/25	20:42:03	49.9
182	2022/05/25	20:46:03	50.8

183	2022/05/25	20:50:03	49.0
184	2022/05/25	20:54:03	52.2
185	2022/05/25	20:58:03	53.2
186	2022/05/25	21:02:03	50.6
187	2022/05/25	21:06:03	51.8
188	2022/05/25	21:10:03	48.7
189	2022/05/25	21:14:03	50.2
190	2022/05/25	21:18:03	49.6
191	2022/05/25	21:22:03	54.5
192	2022/05/25	21:26:03	49.5
193	2022/05/25	21:30:03	50.8
194	2022/05/25	21:34:03	52.4
195	2022/05/25	21:38:03	50.6
196	2022/05/25	21:42:03	48.7
197	2022/05/25	21:46:03	51.4
198	2022/05/25	21:50:03	53.2
199	2022/05/25	21:54:03	49.4
200	2022/05/25	21:58:03	51.7
201	2022/05/25	22:02:03	50.4
202	2022/05/25	22:06:03	50.4
203	2022/05/25	22:10:03	52.1
204	2022/05/25	22:14:03	49.7
205	2022/05/25	22:18:03	51.5
206	2022/05/25	22:22:03	49.7
207	2022/05/25	22:26:03	51.6
208	2022/05/25	22:30:03	49.0
209	2022/05/25	22:34:03	53.2
210	2022/05/25	22:38:03	54.4
211	2022/05/25	22:42:03	48.4
212	2022/05/25	22:46:03	50.9
213	2022/05/25	22:50:03	49.4
214	2022/05/25	22:54:03	51.3
215	2022/05/25	22:58:03	52.4
216	2022/05/25	23:02:03	52.2
217	2022/05/25	23:06:03	52.4
218	2022/05/25	23:10:03	52.5
219	2022/05/25	23:14:03	51.0
220	2022/05/25	23:18:03	49.9
221	2022/05/25	23:22:03	49.8
222	2022/05/25	23:26:03	49.0
223	2022/05/25	23:30:03	57.3
224	2022/05/25	23:34:03	48.7
225	2022/05/25	23:38:03	50.1
226	2022/05/25	23:42:03	48.9
227	2022/05/25	23:46:03	53.3
228	2022/05/25	23:50:03	53.8
229	2022/05/25	23:54:03	46.6
230	2022/05/25	23:58:03	48.8
231	2022/05/26	00:02:03	49.9
232	2022/05/26	00:06:03	49.1
233	2022/05/26	00:10:03	54.0
234	2022/05/26	00:14:03	51.1
235	2022/05/26	00:18:03	48.7
236	2022/05/26	00:22:03	52.1
237	2022/05/26	00:26:03	50.6
238	2022/05/26	00:30:03	50.2
239	2022/05/26	00:34:03	47.6
240	2022/05/26	00:38:03	49.7
241	2022/05/26	00:42:03	50.3
242	2022/05/26	00:46:03	52.8
243	2022/05/26	00:50:03	51.2
244	2022/05/26	00:54:03	49.1
245	2022/05/26	00:58:03	51.7
246	2022/05/26	01:02:03	47.6
247	2022/05/26	01:06:03	49.6
248	2022/05/26	01:10:03	48.6
249	2022/05/26	01:14:03	48.3
250	2022/05/26	01:18:03	47.7
251	2022/05/26	01:22:03	50.7
252	2022/05/26	01:26:03	46.1
253	2022/05/26	01:30:03	49.7
254	2022/05/26	01:34:03	49.2
255	2022/05/26	01:38:03	49.1
256	2022/05/26	01:42:03	46.6
257	2022/05/26	01:46:03	47.1
258	2022/05/26	01:50:03	50.1
259	2022/05/26	01:54:03	50.0
260	2022/05/26	01:58:03	46.8
261	2022/05/26	02:02:03	50.1
262	2022/05/26	02:06:03	46.7
263	2022/05/26	02:10:03	46.2
264	2022/05/26	02:14:03	46.8
265	2022/05/26	02:18:03	50.1
266	2022/05/26	02:22:03	47.2
267	2022/05/26	02:26:03	50.2
268	2022/05/26	02:30:03	54.5
269	2022/05/26	02:34:03	47.6
270	2022/05/26	02:38:03	47.7
271	2022/05/26	02:42:03	49.3
272	2022/05/26	02:46:03	45.8
273	2022/05/26	02:50:03	46.9
274	2022/05/26	02:54:03	44.2
275	2022/05/26	02:58:03	45.8
276	2022/05/26	03:02:03	44.8
277	2022/05/26	03:06:03	46.5
278	2022/05/26	03:10:03	45.4
279	2022/05/26	03:14:03	46.2
280	2022/05/26	03:18:03	44.8

281	2022/05/26	03:22:03	47.1
282	2022/05/26	03:26:03	45.7
283	2022/05/26	03:30:03	47.7
284	2022/05/26	03:34:03	47.8
285	2022/05/26	03:38:03	45.4
286	2022/05/26	03:42:03	50.7
287	2022/05/26	03:46:03	49.2
288	2022/05/26	03:50:03	46.6
289	2022/05/26	03:54:03	49.4
290	2022/05/26	03:58:03	49.7
291	2022/05/26	04:02:03	47.4
292	2022/05/26	04:06:03	47.9
293	2022/05/26	04:10:03	45.9
294	2022/05/26	04:14:03	53.4
295	2022/05/26	04:18:03	51.3
296	2022/05/26	04:22:03	50.7
297	2022/05/26	04:26:03	46.7
298	2022/05/26	04:30:03	48.3
299	2022/05/26	04:34:03	52.5
300	2022/05/26	04:38:03	47.4
301	2022/05/26	04:42:03	50.6
302	2022/05/26	04:46:03	51.3
303	2022/05/26	04:50:03	55.7
304	2022/05/26	04:54:03	54.3
305	2022/05/26	04:58:03	52.2
306	2022/05/26	05:02:03	52.1
307	2022/05/26	05:06:03	51.5
308	2022/05/26	05:10:03	55.1
309	2022/05/26	05:14:03	52.8
310	2022/05/26	05:18:03	56.5
311	2022/05/26	05:22:03	57.6
312	2022/05/26	05:26:03	56.2
313	2022/05/26	05:30:03	54.5
314	2022/05/26	05:34:03	53.4
315	2022/05/26	05:38:03	54.1
316	2022/05/26	05:42:03	57.1
317	2022/05/26	05:46:03	53.0
318	2022/05/26	05:50:03	51.6
319	2022/05/26	05:54:03	52.5
320	2022/05/26	05:58:03	54.3
321	2022/05/26	06:02:03	52.8
322	2022/05/26	06:06:03	53.1
323	2022/05/26	06:10:03	52.5
324	2022/05/26	06:14:03	54.0
325	2022/05/26	06:18:03	54.0
326	2022/05/26	06:22:03	53.4
327	2022/05/26	06:26:03	54.3
328	2022/05/26	06:30:03	54.2
329	2022/05/26	06:34:03	54.9
330	2022/05/26	06:38:03	54.0
331	2022/05/26	06:42:03	52.6
332	2022/05/26	06:46:03	53.9
333	2022/05/26	06:50:03	57.4
334	2022/05/26	06:54:03	56.0
335	2022/05/26	06:58:03	57.8
336	2022/05/26	07:02:03	56.8
337	2022/05/26	07:06:03	58.1
338	2022/05/26	07:10:03	56.8
339	2022/05/26	07:14:03	55.0
340	2022/05/26	07:18:03	59.8
341	2022/05/26	07:22:03	61.0
342	2022/05/26	07:26:03	56.8
343	2022/05/26	07:30:03	57.5
344	2022/05/26	07:34:03	59.0
345	2022/05/26	07:38:03	56.7
346	2022/05/26	07:42:03	56.7
347	2022/05/26	07:46:03	53.8
348	2022/05/26	07:50:03	54.0
349	2022/05/26	07:54:03	57.2
350	2022/05/26	07:58:03	56.8
351	2022/05/26	08:02:03	57.9
352	2022/05/26	08:06:03	53.4
353	2022/05/26	08:10:03	53.5
354	2022/05/26	08:14:03	52.0
355	2022/05/26	08:18:03	52.7
356	2022/05/26	08:22:03	59.0
357	2022/05/26	08:26:03	54.0
358	2022/05/26	08:30:03	53.6
359	2022/05/26	08:34:03	53.8
360	2022/05/26	08:38:03	53.5

Appendix B

Roadway Construction Noise Model Results

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 07/29/2022
Case Description: Valor Elementary School

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Single-Family Residences	Residential	65.0	65.0	65.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85.0		50.0	0.0
Excavator	No	40		80.7	50.0	0.0
Concrete Saw	No	20		89.6	50.0	0.0

Results

Noise Limits (dBA)

Noise Limit Exceedance (dBA)

Equipment	Calculated (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq	Night Lmax	Night Leq
Grader	85.0	81.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Saw	89.6	82.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	89.6	85.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Plummer Village Senior Community	Residential	65.0	65.0	65.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85.0		215.0	0.0
Excavator	No	40		80.7	215.0	0.0
Concrete Saw	No	20		89.6	215.0	0.0

Results

Noise Limits (dBA)

Noise Limit Exceedance (dBA)

Calculated (dBA)	Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader	72.3	68.4	N/A	N/A	N/A	N/A
Excavator	68.0	64.1	N/A	N/A	N/A	N/A
Concrete Saw	76.9	69.9	N/A	N/A	N/A	N/A
Total	76.9	72.8	N/A	N/A	N/A	N/A

Night						
Lmax	Leq	Lmax	Leq	Lmax	Leq	
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A	N/A	N/A	N/A

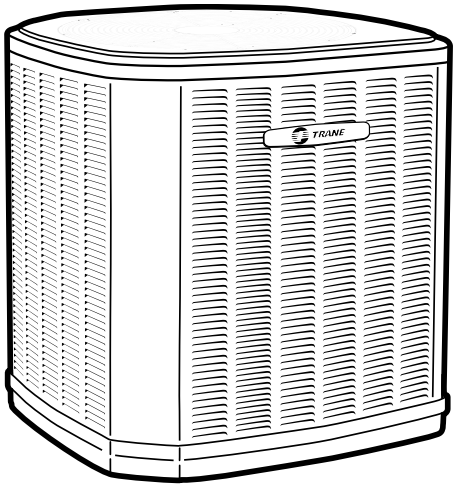
Appendix C

Manufacturer's Specifications

Product Data

Split System Heat Pump

208–230V MODEL
4TWA4036A3000A
4TWA4042A3000A
4TWA4048A3000A
4TWA4060A3000A
460V MODEL
4TWA4036A4000A
4TWA4042A4000A
4TWA4048A4000A
4TWA4060A4000A



Note: *"Graphics in this document are for representation only. Actual model may differ in appearance."*

November 2016

22-1929-1A-EN

Table of Contents

Product Specifications

Table 1. 230v Models

OUTDOOR UNIT [a]	4TWA4036A3000A	4TWA4042A3000A	4TWA4048A3000A	4TWA4060A3000A
POWER CONNS. — V/PH/HZ [b]	208–230/3/60	208–230/3/60	208–230/3/60	208–230/3/60
MIN. BRCH. CIR. AMPACITY	13	18	18	21
BR. CIR. PROT. RTG. — MAX. (AMPS)	20	30	30	35
COMPRESSOR	CLIMATUFF®- SCROLL	CLIMATUFF®- SCROLL	CLIMATUFF®-SCROLL	CLIMATUFF®-SCROLL
R.L. AMPS — L.R. AMPS	9.9 — 70	13.5— 88	13.7–83.1	15.9 — 110
OUTDOOR FAN	PROPELLER	PROPELLER	PROPELLER	PROPELLER
DIA. (IN.) — NO. USED	27.6 — 1	27.6 — 1	27.6 — 1	27.6 — 1
NO. MOTORS — HP	1 — 1/8	1 — 1/5	1 — 1/5	1 — 1/5
F.L. AMPS	0.8	1.1	1.1	1.1
OUTDOOR COIL — TYPE	SPINE FIN™	SPINE FIN™	SPINE FIN™	SPINE FIN™
REFRIGERANT				
LBS. — R-410A (O.D. UNIT)	7 LBS., 1 OZ	7LBS., 8 OZ	8 LBS., 2 OZ	10 LBS., 9 OZ
LINE SIZE — IN. O.D. GAS [c] [d]	7/8	7/8	7/8	1–1/8
LINE SIZE — IN. O.D. LIQ.	3/8	3/8	3/8	3/8
CHARGING SPECIFICATIONS				
SUBCOOLING	10°F	10°F	10°F	8°F
DIMENSIONS	H X W X D	H X W X D	H X W X D	H X W X D
CRATED (IN.)	34.4 x 38.7 x 35.1	34.4 x 38.7 x 35.1	38.4 x 38.7 x 35.1	51 x 38.7 x 35.1
WEIGHT				
SHIPPING (LBS.)	240	240	295	298
NET (LBS.)	208	208	261	248
Optional Accessories:				
Anti-short Cycle Timer	TAYASCT501A	TAYASCT501A	TAYASCT501A	TAYASCT501A
Evaporator Defrost Control	AY28X084	AY28X084	AY28X084	AY28X084
Rubber Isolator Kit	BAYISLT101	BAYISLT101	BAYISLT101	BAYISLT101
Extreme Condition Mount Kit	BAYECMT004	BAYECMT004	BAYECMT004	BAYECMT004
Seacoast Kit	BAYSEAC001	BAYSEAC001	BAYSEAC001	BAYSEAC001
Low Ambient Kit	BAYLOAM107	BAYLOAM107	BAYLOAM107	BAYLOAM107
Refrigerant Lineset [e]	TAYREFLN3*	TAYREFLN3*	TAYREFLN3*	TAYREFLN3*
Sound Enclosure	BAYSDEN004	BAYSDEN004	BAYSDEN004	BAYSDEN004
Service Valve Panel Cover	TAYSVPANL3343AA	TAYSVPANL3343AA	TAYSVPANL0046AA	TAYSVPANL0032AA

[a] Certified in accordance with the Air-Source Unitary Air-conditioner Equipment certification program, which is based on AHRI standard 210/240.
[b] Calculated in accordance with N.E.C. Only use HACR circuit breakers or fuses.
[c] Reference the outdoor unit ship-with literature for refrigerant piping length and lift guidelines. Reference the refrigerant piping software pub #32–3312–xx or refrigerant piping application guide SS-APG006–xx for long line sets or specialty applications (xx denotes latest revision).
[d] Outdoor condensing units are factory charged with the system charge required for the outdoor condensing unit and 15 feet of tested connecting lines. If connecting line length exceeds 15 feet, then final refrigerant charge adjustment is necessary. Each additional foot over 15 feet requires 0.6 ozs of refrigerant. See the Installer's Guide for full charging instructions.
[e] * = 15, 20, 25, 30, 40 and 50 foot lineset available,

Table 2. 460v Models

OUTDOOR UNIT [a]	4TWA4036A4000A	4TWA4042A4000A	4TWA4048A4000A	4TWA4060A4000A
POWER CONNS. — V/PH/HZ [b]	460/3/60	460/3/60	460/3/60	460/3/60
MIN. BRCH. CIR. AMPACITY	6	8	8	9
BR. CIR. PROT. RTG. — MAX. (AMPS)	15	15	15	15
COMPRESSOR	CLIMATUFF®- SCROLL	CLIMATUFF®- SCROLL	CLIMATUFF®-SCROLL	CLIMATUFF®-SCROLL

Table 2. 460v Models (continued)

R.L. AMPS — L.R. AMPS	4.3-31	6–44	6.2 — 41	7.1 — 52
OUTDOOR FAN	PROPELLER	PROPELLER	PROPELLER	PROPELLER
DIA. (IN.) — NO. USED	27.6 — 1	27.6 — 1	27.6 — 1	27.6 — 1
NO. MOTORS — HP	1 — 1/8	1 — 1/5	1 — 1/5	1 — 1/5
F.L. AMPS	0.4	0.6	0.6	0.6
OUTDOOR COIL — TYPE	SPINE FIN™	SPINE FIN™	SPINE FIN™	SPINE FIN™
REFRIGERANT				
LBS. — R-410A (O.D. UNIT)	7 LBS., 1 OZ	7LBS., 8 OZ	8 LBS., 2 OZ	10 LBS., 9 OZ
LINE SIZE — IN. O.D. GAS (c) (d)	7/8	7/8	7/8	1–1/8
LINE SIZE — IN. O.D. LIQ.	3/8	3/8	3/8	3/8
CHARGING SPECIFICATIONS				
SUBCOOLING	10°F	10°F	10°F	8°F
DIMENSIONS	H X W X D	H X W X D	H X W X D	H X W X D
CRATED (IN.)	34.4 x 38.7 x 35.1	34.4 x 38.7 x 35.1	38.4 x 38.7 x 35.1	51 x 38.7 x 35.1
WEIGHT				
SHIPPING (LBS.)	240	240	295	298
NET (LBS.)	208	208	261	248
Optional Accessories:				
Anti-short Cycle Timer	TAYASCT501A	TAYASCT501A	TAYASCT501A	TAYASCT501A
Evaporator Defrost Control	AY28X084	AY28X084	AY28X084	AY28X084
Rubber Isolator Kit	BAYISLT101	BAYISLT101	BAYISLT101	BAYISLT101
Extreme Condition Mount Kit	BAYECMT004	BAYECMT004	BAYECMT004	BAYECMT004
Seacoast Kit	BAYSEAC001	BAYSEAC001	BAYSEAC001	BAYSEAC001
Low Ambient Kit	BAYLOAM107	BAYLOAM107	BAYLOAM107	BAYLOAM107
Refrigerant Lineset (e)	TAYREFLN3*	TAYREFLN3*	TAYREFLN3*	TAYREFLN3*
Sound Enclosure	BAYSDEN004	BAYSDEN004	BAYSDEN004	BAYSDEN004
Service Valve Panel Cover	TAYSVPANL3343AA	TAYSVPANL3343AA	TAYSVPANL0046AA	TAYSVPANL0032AA

(a) Certified in accordance with the Air-Source Unitary Air-conditioner Equipment certification program, which is based on AHRI standard 210/240.
(b) Calculated in accordance with N.E.C. Only use HACR circuit breakers or fuses.
(c) Reference the outdoor unit ship-with literature for refrigerant piping length and lift guidelines. Reference the refrigerant piping software pub #32–3312–xx or refrigerant piping application guide SS-APG006–xx for long line sets or specialty applications (xx denotes latest revision).
(d) Outdoor condensing units are factory charged with the system charge required for the outdoor condensing unit and 15 feet of tested connecting lines. If connecting line length exceeds 15 feet, then final refrigerant charge adjustment is necessary. Each additional foot over 15 feet requires 0.6 ozs of refrigerant. See the Installer's Guide for full charging instructions.
(e) * = 15, 20, 25, 30, 40 and 50 foot lineset available,

Sound Power Level									
MODEL	**A-Weighted Sound Power Level [dB(A)]**	**Full Octave Sound Power(dB)**							
		63 Hz*	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
4TWA4036A3	75	72	72	71	69	70	62	57	52
4TWA4042A3	74	85	74	68	69	69	63	58	54
4TWA4048A3	74	85	74	68	69	69	63	58	54
4TWA4060A3	74	85	74	68	69	69	63	58	54
4TWA4036A4	75	72	72	71	69	70	62	57	52
4TWA4042A4	74	85	74	68	69	69	63	58	54
4TWA4048A4	74	85	74	68	69	69	63	58	54
4TWA4060A4	74	85	74	68	69	69	63	58	54

Accessory Description and Usage

Anti-Short Cycle Timer — Solid state timing device that prevents compressor recycling until five (5) minutes have elapsed after satisfying call or power interruptions. Use in area with questionable power delivery, commercial applications, long lineset, etc.

Evaporation Defrost Control — SPST Temperature actuated switch that cycles the condenser off as indoor coil reaches freeze-up conditions. Used for low ambient cooling to 30°F with TXV.

Rubber Isolators — Five (5) large rubber donuts to isolate condensing unit from transmitting energy into mounting frame or pad. Use on any application where sound transmission needs to be minimized.

Extreme Condition Mount Kit — Bracket kits to securely mount condensing unit to a frame or pad without removing any panels. Use in areas with high winds, or on commercial roof tops, etc.

AHRI Standard Capacity Rating Conditions

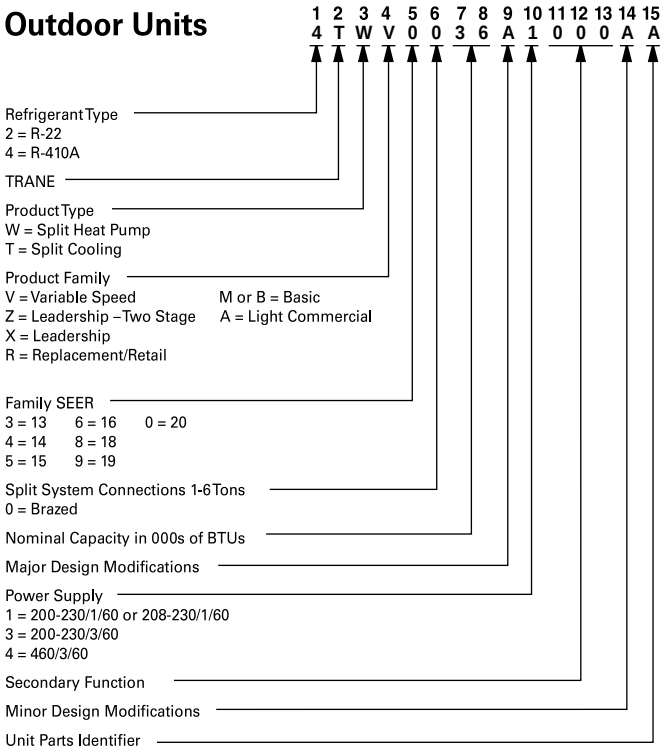
AHRI Standard 210/240 Rating Conditions

1. Cooling 80°F DB, 67°F WB air entering indoor coil, 95°F DB air entering outdoor coil.
2. High Temperature Heating 47°F DB, 43°F WB air entering outdoor coil, 70°F DB air entering indoor coil.
3. Low Temperature Heating 17°F DB air entering outdoor coil.
4. Rated indoor airflow for heating is the same as for cooling.

AHRI Standard 270 Rating Conditions — (Noise rating numbers are determined with the unit in cooling operations.) Standard Noise Rating number is at 95°F outdoor air.

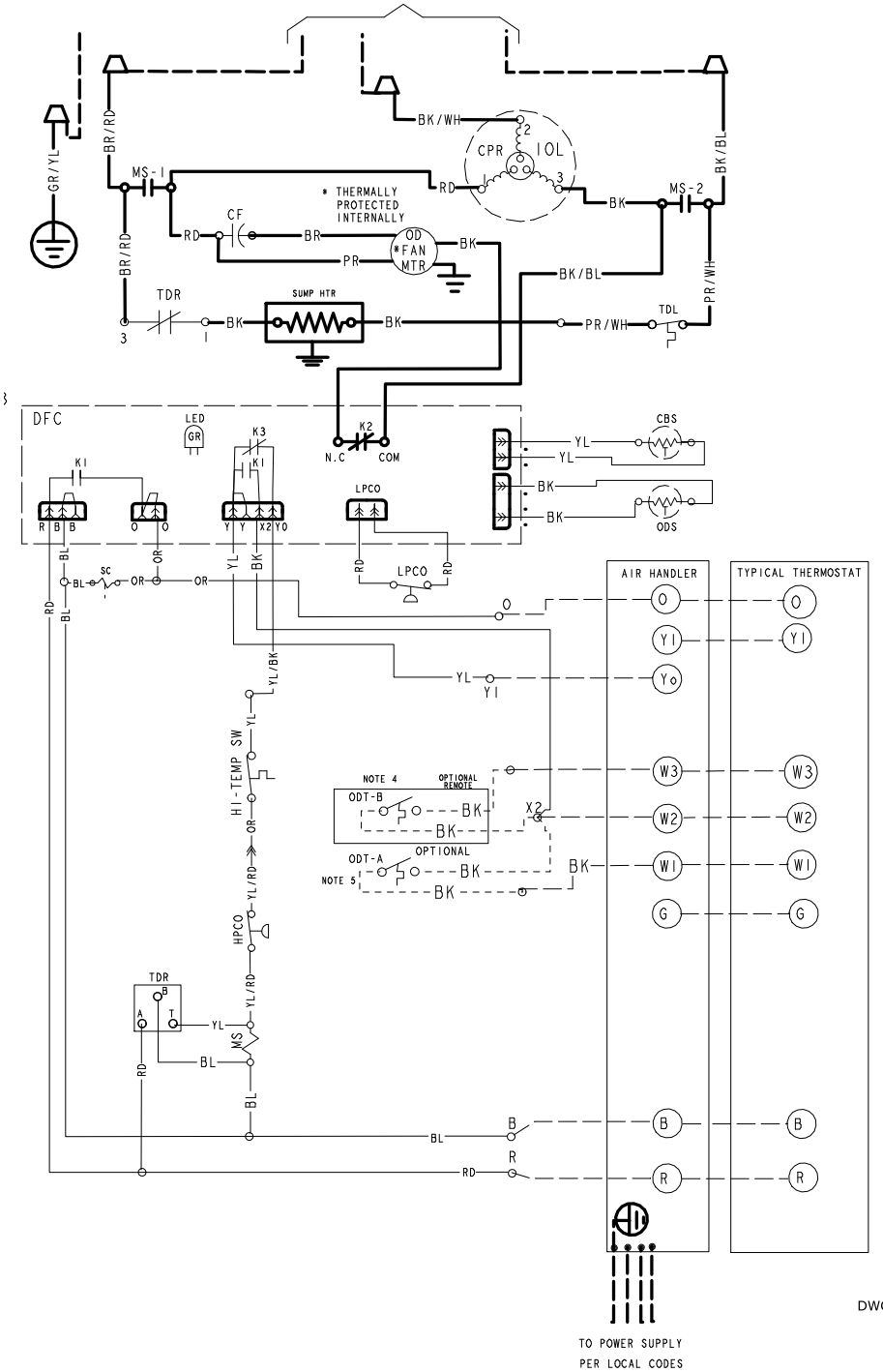
Model Nomenclature

Outdoor Units



Schematic

Figure 1. 3.0 Ton 230V Models



LEGEND

COLOR OF WIRE
BK/BL
COLOR OF MARKER

BK	BLACK	RD	RED	OR	ORANGE
BL	BLUE	WH	WHITE	GR	GREEN
BR	BROWN	YL	YELLOW	PR	PURPLE
PK	PINK				

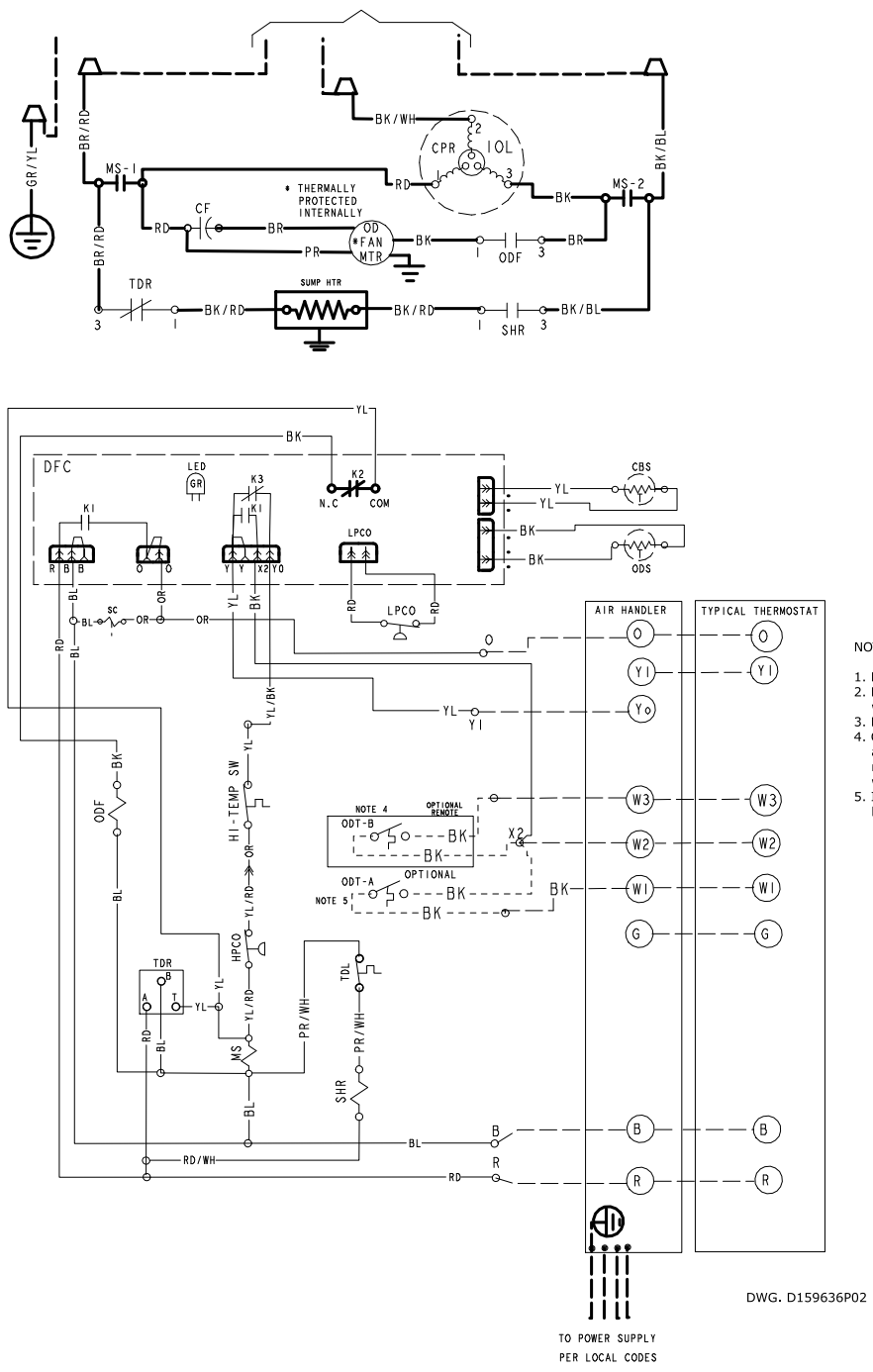
ACR	A/C RECTIFIER
CBS	COIL BOTTOM SENSOR
CF	FAN CAPACITOR
CN	WIRE CONNECTOR
CPR	COMPRESSOR
CR	RUN CAPACITOR
CS	STARTING CAPACITOR
CSR	CAPACITOR SWITCHING RELAY
DFC	DEFROST CONTROL
EEV	ELECTRONIC EXP VALVE
EEVC	ELECTRONIC EXP VALVE CONTROL
F	INDOOR FAN RELAY
HPCO	HIGH PRESSURE CUTOUT SWITCH
HTS	HIGH TEMPERATURE SWITCH
IOL	INTERNAL OVERLOAD PROTECTOR
LPCO	LOW PRESSURE CUTOUT SWITCH
MS	COMPRESSOR MOTOR CONTACTOR
ODA	OUTDOOR ANTICIPATOR
ODF	OUTDOOR FAN RELAY
OFT	OUTDOOR FAN THERMOSTAT
ODS	OUTDOOR TEMPERATURE SENSOR
ODT	OUTDOOR THERMOSTAT
P-TRD	PRESSURE TRANSDUCER
SC	SWITCH OVER VALVE SOLENOID
SHR	SUMP HEATER RELAY
SM	SYSTEM ON-OFF SWITCH
TDL	DISCHARGE LINE THERMOSTAT
TDR	TIME DELAY RELAY (5 SEC DELAY ON)
TNS	TRANSFORMER
TEMP	SENSOR, TEMPERATURE
Y2C	HIGH CAPACITY CONTROL RELAY

NOTES:

1. Be sure power supply agrees with equipment nameplate.
2. Power wiring and grounding of equipment must comply with local codes.
3. Low voltage wiring to be no. 18 AWG minimum conductor.
4. ODT-B must be set lower than ODT-A, if ODT-B is not used, add jumper between W2 and W3 at air handler. IF used, ODT-B must be mounted remote of control box in an approved weatherproof enclosure.
5. If ODT-A is not used, add jumper between W1 and W2 at air handler.

DWG. D159635P02

Figure 2. 3.0 Ton 460V Models



DWG. D159636P02

LEGEND

COLOR OF WIRE
BK/BL
COLOR OF MARKER

BK	BLACK	RD	RED	OR	ORANGE
BL	BLUE	WH	WHITE	GR	GREEN
BR	BROWN	YL	YELLOW	PR	PURPLE
PK	PINK				

ACR	A/C RECTIFIER
CBS	COIL BOTTOM SENSOR
CF	FAN CAPACITOR
CN	WIRE CONNECTOR
CPR	COMPRESSOR
CR	RUN CAPACITOR
CS	STARTING CAPACITOR
CSR	CAPACITOR SWITCHING RELAY
DFC	DEFROST CONTROL
EEV	ELECTRONIC EXP VALVE
EEVC	ELECTRONIC EXP VALVE CONTROL
F	INDOOR FAN RELAY
HPCO	HIGH PRESSURE CUTOUT SWITCH
HTS	HIGH TEMPERATURE SWITCH
IOL	INTERNAL OVERLOAD PROTECTOR
LPCO	LOW PRESSURE CUTOUT SWITCH
MS	COMPRESSOR MOTOR CONTACTOR
ODA	OUTDOOR ANTICIPATOR
ODF	OUTDOOR FAN RELAY
OFT	OUTDOOR FAN THERMOSTAT
ODS	OUTDOOR TEMPERATURE SENSOR
ODT	OUTDOOR THERMOSTAT
P-TRD	PRESSURE TRANSDUCER
SC	SWITCH OVER VALVE SOLENOID
SHR	SUMP HEATER RELAY
SM	SYSTEM ON-OFF SWITCH
TDL	DISCHARGE LINE THERMOSTAT
TDR	TIME DELAY RELAY (5 SEC DELAY O.)
TNS	TRANSFORMER
TEMP	SENSOR, TEMPERATURE
Y2C	HIGH CAPACITY CONTROL RELAY

NOTES:

1. Be sure power supply agrees with equipment nameplate.
2. Power wiring and grounding of equipment must comply with local codes.
3. Low voltage wiring to be NO. 18 AWG minimum conductor.
4. ODT-B must be set lower than ODT-A, if ODT-B is not used, add jumper between W2 and W3 at air handler. If used, ODT-B must be mounted remote of control box in an approved weatherproof enclosure.
5. If ODT-A is not used, add jumper between W1 and W2 at air handler.

Figure 3. 3.5, 4.0 & 5.0 Ton 230V Models

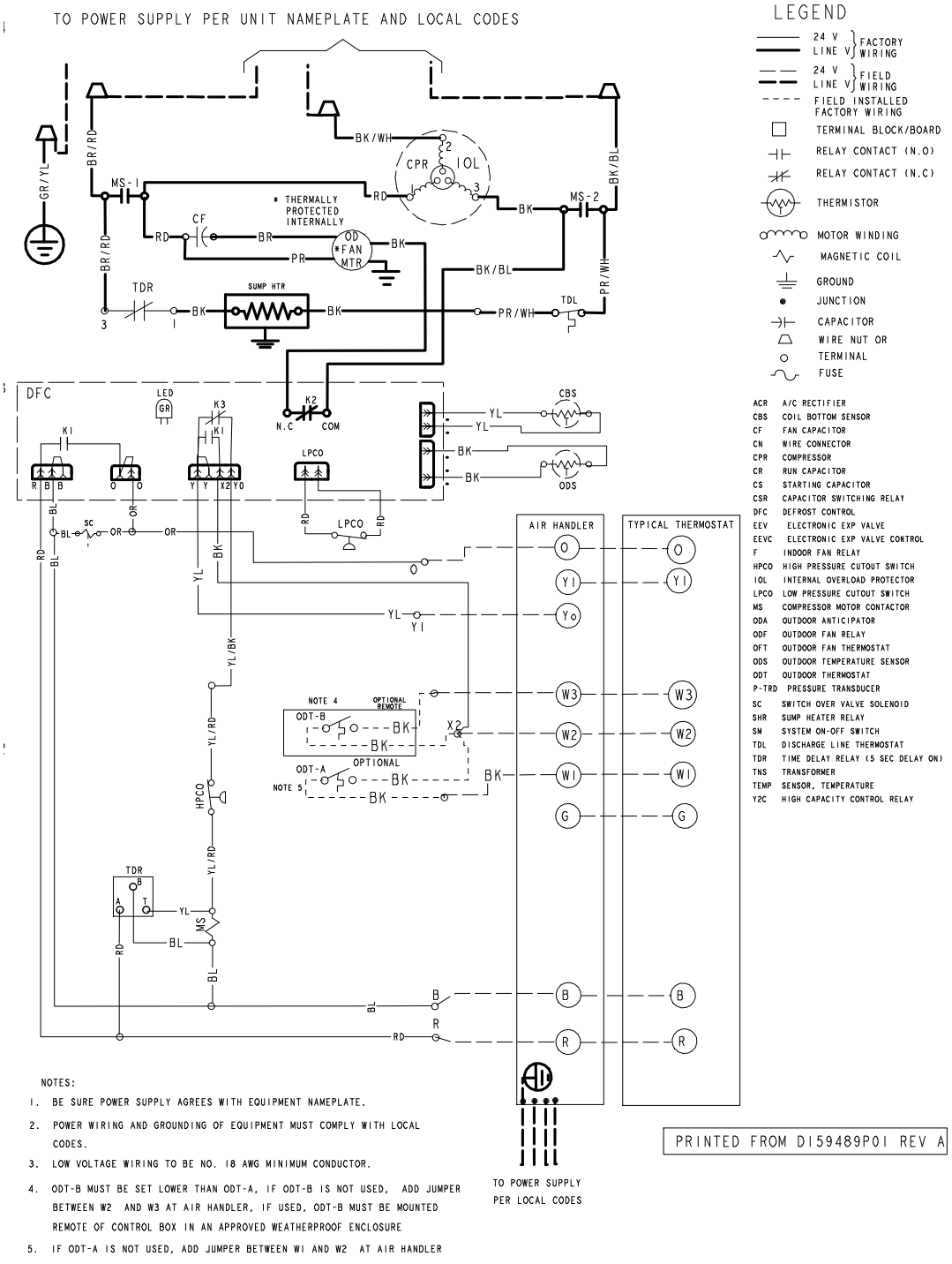
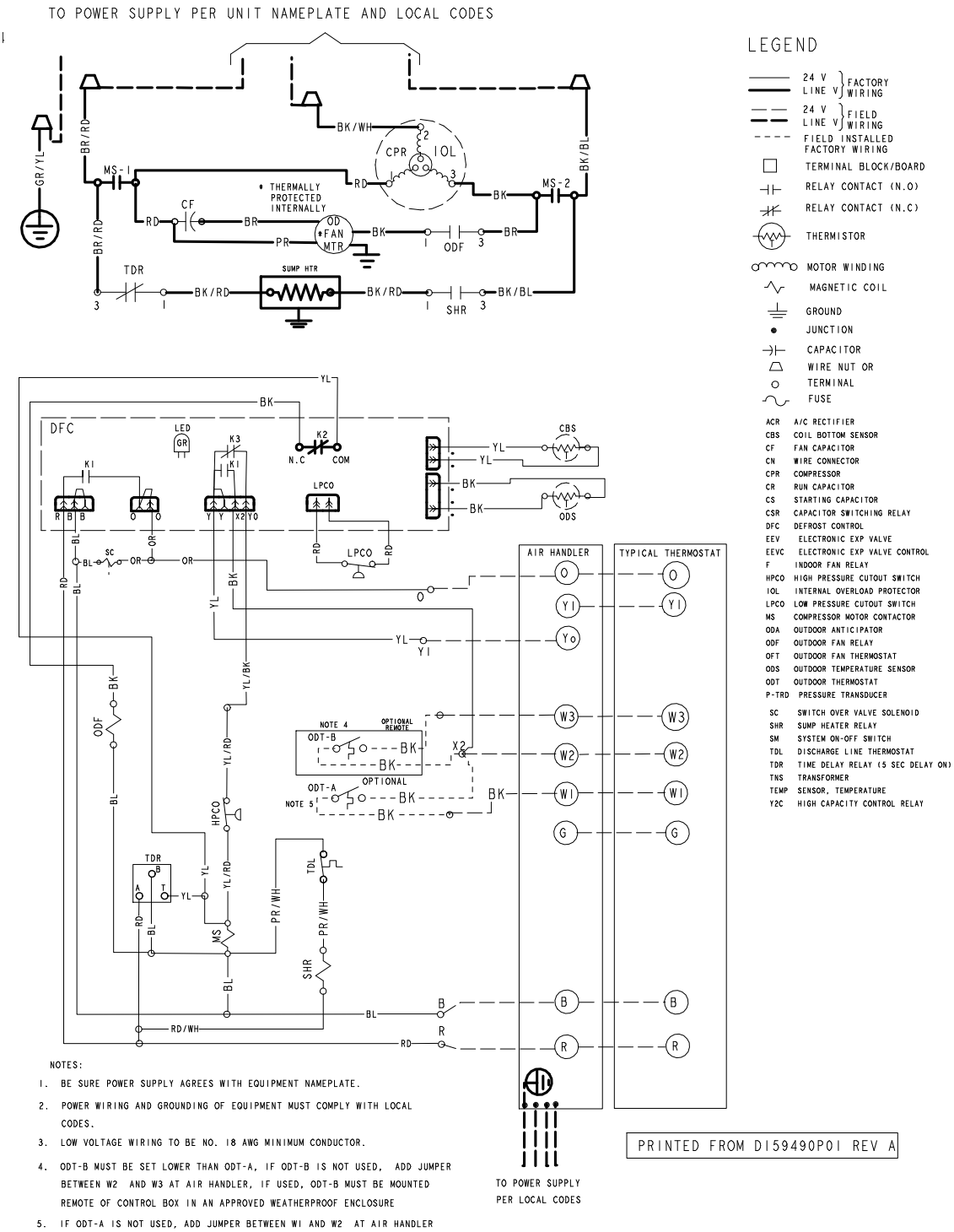
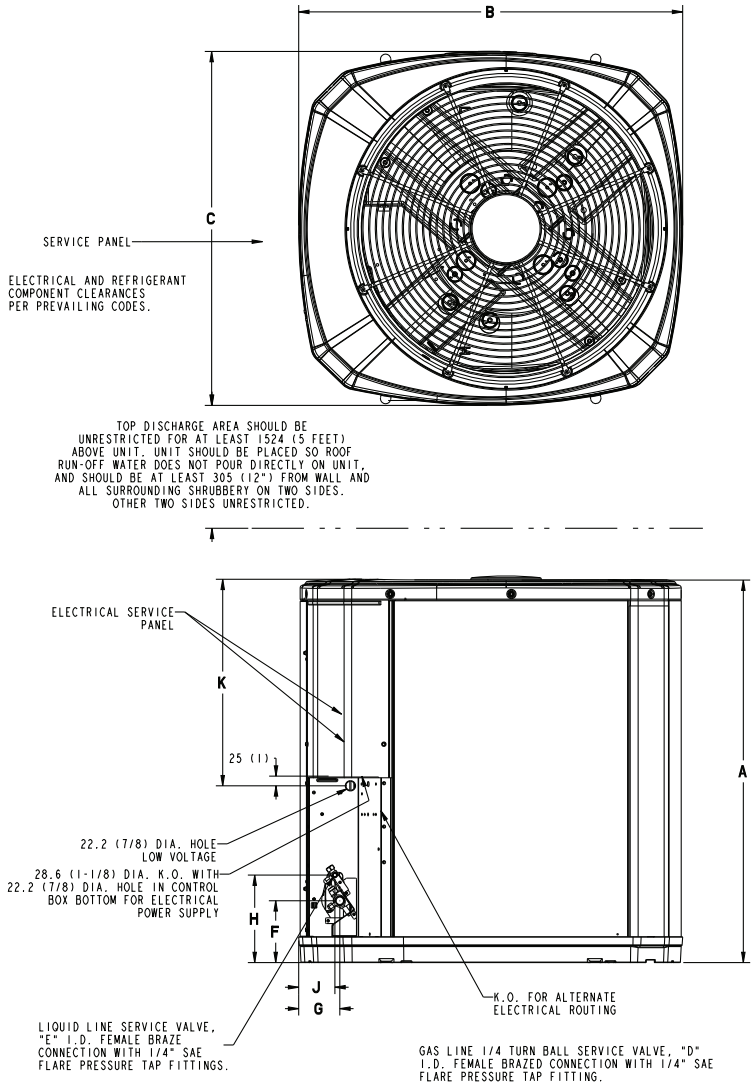


Figure 4. 3.5, 4.0 & 5.0 Ton 460V Models



Outline Drawing



Model	Base	A	B	C	D	E	F	G	H	J	K
4TWA4036A3	4	741 (29–1/8)	946 (37–1/4)	870 (34–1/4)	3/4	3/8	143 (5–5/8)	83 (3–1/4)	206 (8–1/8)	70 (2–3/4)	508 (20)
4TWA4042A3	4	741 (29–1/8)	946 (37–1/4)	870 (34–1/4)	3/4	3/8	143 (5–5/8)	83 (3–1/4)	206 (8–1/8)	70 (2–3/4)	508 (20)
4TWA4048A3	4	841 (33–1/8)	946 (37–1/4)	870 (34–1/4)	3/4	3/8	156 (6)	98 (3–7/8)	219 (8–5/8)	86 (3–3/8)	508 (20)
4TWA4060A3	4	1147 (45–1/8)	946 (37–1/4)	870 (34–1/4)	7/8	3/8	152 (6)	98 (3–7/8)	219 (8–5/8)	86 (3–3/8)	813 (32)
4TWA4036A4	4	741 (29–1/8)	946 (37–1/4)	870 (34–1/4)	7/8	3/8	143 (5–5/8)	83 (3–1/4)	206 (8–1/8)	70 (2–3/4)	508 (20)
4TWA4042A4	4	741 (29–1/8)	946 (37–1/4)	870 (34–1/4)	3/4	3/8	143 (5–5/8)	83 (3–1/4)	206 (8–1/8)	70 (2–3/4)	508 (20)
4TWA4048A4	4	841 (33–1/8)	946 (37–1/4)	870 (34–1/4)	3/4	3/8	156 (6)	98 (3–7/8)	219 (8–5/8)	86 (3–3/8)	508 (20)
4TWA4060A4	4	1147 (45–1/8)	946 (37–1/4)	870 (34–1/4)	7/8	3/8	152 (6)	98 (3–7/8)	219 (8–5/8)	86 (3–3/8)	813 (32)

Mechanical Specification Options

General

The Outdoor Units are fully charged from the factory for up to 15 feet of piping. This unit is designed to operate at outdoor ambient temperatures as high as 115°F. Cooling capacities are matched with a wide selection of air handlers and furnace coils that are AHRI certified. The unit is certified to UL 1995. Exterior is designed for outdoor application.

Casing

Unit casing is constructed of heavy gauge, galvanized steel and painted with a weather-resistant powder paint finish on all louvered panels and the fan top panel. The corner panels are prepainted. All panels are subjected to our 1,000 hour salt spray test . The base is made of a CMBP-G30 weatherproof material to resist corrosion.

Refrigerant Controls

Refrigeration system controls include condenser fan, compressor contactor and high pressure switch. High and low pressure controls are inherent to the compressor. A factory supplied liquid line drier is standard. Some models may require field installation.

Compressor

The compressor features internal over temperature, pressure protection and total dipped hermetic motor. Other features include: Centrifugal oil pump and low vibration and noise.

Condenser Coil

The outdoor coil provides low airflow resistance and efficient heat transfer. The coil is protected on all four sides by louvered panels.

Low Ambient Cooling

As manufactured, this system has a cooling capacity to 55°F. The addition of an evaporator defrost control permits operation to 40°F. The addition of an evaporator defrost control with TXV permits low ambient cooling to 30°F.

Thermostats—Cooling only and heat/cooling (manual and automatic change over). Sub-base to match thermostat and locking thermostat cover.

Evaporator Defrost Control — See Low Ambient Cooling.

Ingersoll Rand (NYSE:IR) advances the quality of life by creating comfortable, sustainable and efficient environments. Our people and our family of brands—including Club Car®, Ingersoll Rand®, Thermo King® and Trane®—work together to enhance the quality and comfort of air in homes and buildings; transport and protect food and perishables; and increase industrial productivity and efficiency. We are a global business committed to a world of sustainable progress and enduring results. For more information, visit www.ingersollrand.com.

Ingersoll Rand has a policy of continuous product and product data improvements and reserves the right to change design and specifications without notice.

The AHRI Certified mark indicates Ingersoll Rand participation in the AHRI Certification program. For verification of individual certified products, go to www.ahridirectory.org.

22-1929-1A-EN 11 Nov 2016
Supersedes (New)