440 1st Street Residential Project

Noise Study

prepared for

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December 2020

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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 440 1st Street Residential Project (herein referred to as "proposed project" or "project") in Los Altos, California. Rincon Consultants, Inc. (Rincon) prepared this study under contract to GreenTek Homes for the City of Los Altos to use 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.

Table 1 Summary of Impacts

Impact Statement	Proposed Project's Level of Significance
Would the 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
Would the project generate excessive groundborne vibration or groundborne noise levels?	Less than significant impact
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

1.2 Project Summary

Project Location

The project site is an approximately 0.1-acre lot (Assessor Parcel Number [APN] 187-41-009) in the city of Los Altos. The project site is zoned Commercial Downtown/Multiple-Family (CD/R3) with a General Plan Land Use designation of Downtown Commercial (DC) within the Los Altos Plan Area. The project site currently contains the Los Altos Veterinary Clinic and its associated parking lot. The surrounding area is a mixture of commercial and residential uses. The properties to the north, east, and south are zoned CD/R3 and are developed with multi-family residential uses, mixed retail uses, and commercial uses, respectively. The property to the west across Foothill Expressway is zoned Public & Community Facilities (PCF) and consists of a linear park with public art, utility transmission lines, and a parking lot. See Figure 1 and Figure 2 for the project site location in a regional context and local context, respectively.

Project Description

The proposed project consists of the demolition of the existing approximately 2,000-square-foot veterinary clinic and the construction of a four condominium units with a total floor area of approximately 11,735 square feet, one level of subterranean parking with nine parking spaces, and sidewalk improvements.

Figure 1 Regional Location

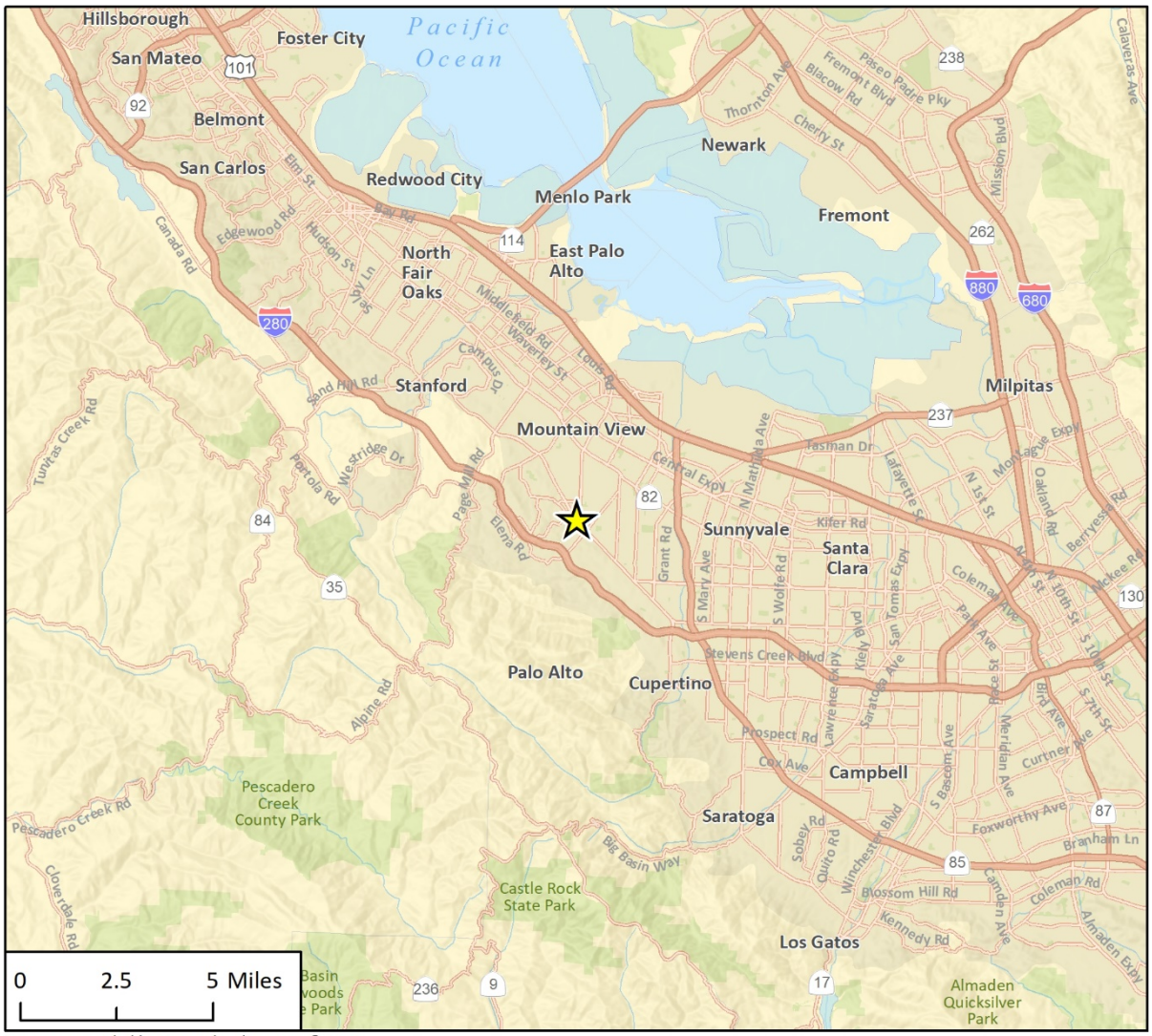

Figure 2 Project Site Location

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The ground floor of the proposed condominium building would include a main lobby, a gym, and the lower level of two residential units (units 101 and 102), each with a dining room, kitchen, office, living room, bathroom, and outdoor decks. The second floor of the building would include the upper levels of units 101 and 102, each with a family room, two bathrooms, two bedrooms, and outdoor balconies on the western and eastern sides of the building. The third floor of the building would include two residential units (units 301 and 302), each with two bedrooms, two bathrooms, a kitchen, a dining room, a living room, and an outdoor balcony. The roof of the proposed building would include two roof decks with outdoor kitchens for units 301 and 302 as well as mechanical equipment and landscaping. The project would include sustainability features such as water efficient fixtures, water efficient irrigation systems, energy efficient appliances and fixtures, four charging stations with each station to serve two spaces (eight total electric vehicles charging spaces), and a 30-kilowatt (kW) solar photovoltaic (PV) system. See Appendix A for the project site plans.

Construction

Project construction is expected to commence in February 2021 and be completed by December 2022. Construction activities would occur six days a week from 8:00 a.m. to 5:00 p.m., Monday through Friday, and 9:00 a.m. to 5:00 p.m. on Saturdays. Construction would require installation of piles by drilling bore holes and backfilling with concrete for geotechnical stability.

Regulatory Compliance Measures

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. The following RCMs would reduce construction noise, construction-related vibration, and ambient exterior noise exposure to the extent feasible.

Adherence to Existing Construction Noise Standards

The proposed project shall comply with Los Altos Noise Ordinance. To achieve compliance with Los Altos Municipal Code (LAMC) Section 6.16.070(B)(6)(b)(ii), the City requires conducting construction activities that last for 10 days or longer in such a manner that the maximum noise levels at affected properties do not exceed those listed in Table 4 of LAMC Section 6.16.070. For this project, the following specific noise-reducing practices during construction will be implemented to achieve compliance:

- Schedule construction activities so as to avoid operating several pieces of equipment simultaneously, which can cause high noise levels.
- Locate all construction areas for staging and warming up as far as possible from adjacent residential buildings and sensitive receptors.
- For the duration of construction, the project contractor will construct a temporary noise barrier along the northern and southern property lines. The barrier will be of sufficient height to block the lines of sight of surrounding receivers to construction activities and shall have a minimum height of five feet above ground elevation. The noise barrier will be constructed of material with a minimum weight of 2 pounds per square foot with no gaps of perforations. Noise barriers may be constructed of, but are not limited to, 5/8-inch plywood, 5/8-inch oriented strand board, or hay bales.

Sound Amplification Devices

The proposed project shall comply with LAMC Section 6.16.070(B)(1-2), which sets forth hours and noise level restrictions for operation of radios, musical instruments, television sets, and other sound-amplifying devices.

Landscaping Equipment

The proposed project shall comply with LAMC Section 6.16.070(B)(11), which prohibits use of landscaping equipment that creates nuisance noise during nighttime hours.

2 Background

2.1 Overview of Sound Measurement

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 reduces 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 man-made 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. Structures can substantially reduce occupants' exposure to noise as well. Modern building construction generally provides an exterior-to-interior noise level reduction of 20 to 35 dBA with closed windows (Federal Highway Administration [FHWA] 2011).

The impact of noise is not a function of sound level alone. The time of day when noise occurs and the duration of the noise are also important. 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 is the equivalent noise level (L_{eq}); it considers both duration and sound power level. The L_{eq} is defined as the single steady A-weighted level equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time. Typically, L_{eq} is summed over a one-hour period. 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 are in the 60 to 65 dBA L_{eq} range; 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 occurring during the day. Community noise is usually measured using Day-Night Average Level (DNL), which is the 24-hour average noise level with a +10 dBA penalty for noise occurring during nighttime hours (10:00 p.m. to 7:00 a.m.). Community noise can also be measured using 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 1 dBA. Quiet suburban areas typically have 24-hour noise levels in the range of 40 to 50 CNEL, while areas near arterial streets are in the 50 to 60+ CNEL range.

There is no precise way to convert a peak hour L_{eq} to DNL or CNEL - the relationship between the peak hour L_{eq} value and the L_{dn}/CNEL value depends on the distribution of traffic volumes during the day, evening, and night. However, in urban areas near heavy traffic, the peak hour L_{eq} is typically 2 to 4 dBA lower than the daily DNL/CNEL. In less heavily developed areas, such as suburban areas, the peak hour L_{eq} is often roughly equal to the daily DNL/CNEL. For rural areas with little nighttime traffic, the peak hour L_{eq} will often be 3 to 4 dBA greater than the daily DNL/CNEL value (California State Water Resources Control Board 1999). The project site is located in an urban area; therefore, the DNL/CNEL in the area would be 2 to 4 dBA higher than the peak hour L_{eq}.

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 Hz. The frequency of a vibrating object describes how rapidly it oscillates. The normal frequency range of most groundborne vibration that can be felt by the human body is from a low of less than 1 Hz up to a high of about 200 Hz (Crocker 2007).

While people have varying sensitivities to vibrations at different frequencies, in general they are most sensitive to low-frequency vibration. Vibration in buildings, such as from nearby construction activities, may cause windows, items on shelves, and pictures on walls to rattle. Vibration of building components can also take the form of an audible low-frequency rumbling noise, referred to as groundborne noise. Groundborne noise is usually only a problem when the originating vibration spectrum is dominated by frequencies in the upper end of the range (60 to 200 Hz), or when foundations or utilities, such as sewer and water pipes, physically connect the structure and the vibration source (FTA 2018). Although groundborne vibration is sometimes noticeable in outdoor environments, it is almost never annoying to people who are outdoors. The primary concern from

vibration is that it can be intrusive and annoying to building occupants and vibration-sensitive land uses.

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. Discontinuities 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 impacted by vibration, a ground-to-foundation coupling loss will usually reduce the overall vibration level. However, under rare circumstances, the ground-to-foundation coupling may actually amplify the vibration level due to structural resonances of the floors and walls.

Vibration amplitudes are usually expressed in peak particle velocity (ppv) or RMS vibration velocity. The ppv and RMS velocity are normally described in inches per second (in/sec). The ppv is defined as the maximum instantaneous positive or negative peak of a vibration signal (Caltrans 2020). Table 2 summarizes the vibration limits recommended by the American Association of State Highway and Transportation Officials for structural damage to buildings.

Table 2 Maximum Vibration Levels for Preventing Damage

Type of Situation	Vibration Level (in/sec ppv)
Historic sites or other critical locations	0.1
Residential buildings, plastered walls	0.2–0.3
Residential buildings in good repair with gypsum board walls	0.4–0.5
Engineered structures, without plaster	1.0–1.5

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

Source: Caltrans 2020

In addition to the potential for building damage, the human body responds to vibration signals. However, unlike buildings, which are rigid, it takes some time for the human body to respond to vibration. In a sense, a building responds to the instantaneous movement while the human body responds to average vibration amplitude, which is measured as RMS. The averaging of the particle generally results in the rms conservatively being equivalent to 71 percent of the ppv. Thus, human annoyance usually results in a more restrictive vibration limit than structural damage limits.

Numerous studies have been conducted to characterize the human response to vibration. The general human response to different levels of groundborne vibration velocity levels is described in Table 3 and Table 4.

Table 3 Human Response to Steady State Vibration

Human Response	Vibration Level (in/sec ppv)
Very disturbing	3.6 (at 2 Hz) – 0.4 (at 20 Hz)
Disturbing	0.7 (at 2 Hz) – 0.17 (at 20 Hz)
Strongly perceptible	0.10
Distinctly perceptible	0.035
Slightly perceptible	0.012

in/sec = inches per second; ppv = peak particle velocity; Hz = Hertz

Source: Caltrans 2020

Table 4 Human Response to Transient Vibration

Human Response	Vibration Level (in/sec ppv)
Severe	2.0
Strongly perceptible	0.9
Distinctly perceptible	0.24
Barely perceptible	0.035

Source: Caltrans 2020

2.3 Sensitive Receivers

Noise exposure goals for land use types reflect the varying noise sensitivities associated with those uses. According to the City of Los Altos Natural Environmental and Hazards Element, noise-sensitive land uses include residential uses, schools, libraries, churches, and hospitals (City of Los Altos 2002). Sensitive receivers in the project site vicinity include multi-family residences located immediately north of the project site as well as Saint Nicholas Catholic Church located approximately 260 feet southwest of the project site. The nearest single-family residence is approximately 290 feet southwest of the project site. Figure 3 shows a map of the nearest sensitive receivers.

2.4 Project Noise Setting

The most common source of noise in the project site vicinity is vehicular traffic on Foothill Expressway, which is approximately 30 feet west of the project site, and 1st Street, which runs immediately adjacent to the project site to the east. Ambient noise levels are generally highest during daytime and rush hours unless congestion substantially slows speeds. According to the City of Los Altos General Plan, noise levels along First Street and Foothill Expressway in the First Street District (the district in which the project site is located) are estimated to be approximately 65 CNEL (City of Los Altos 2002).

2.5 Regulatory Setting

State

California Government Code Section 65302 encourages each local government entity to implement a noise element as part of its general plan. In addition, the Office of Planning and Research has developed guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure.

Local

Los Altos General Plan

The Los Altos General Plan Natural Environment and Hazards Element, adopted in November 2002, identifies noise reduction standards to control noise within the community. Listed below are noise-related goals and policies that would be applicable to the proposed project:

Figure 3 Sensitive Receiver Locations

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Fig 3 Sensitive Receiver Locations

Goal 7 Minimize the amount of noise to which the community is exposed and the amount of noise created by future development and urban activities.

- **Policy 7.1.** Ensure that new development can be made compatible with the noise environment by utilizing noise/land use compatibility standards and the Noise Contours Map as a guide for future planning and development decisions.
- **Policy 7.2.** Enforce the following maximum acceptable noise levels for new construction of various noise-sensitive uses in an existing noise environment.
  - 60 dBA CNEL is the maximum acceptable outdoor noise exposure level for single-family residential areas.
  - 65 dBA CNEL is the maximum acceptable outdoor noise exposure level for multiple-family residential areas.
  - 70 dBA CNEL is the maximum acceptable outdoor noise exposure level for schools (public and private), libraries, churches, hospitals, nursing homes, parks, commercial, and recreation areas. Excepted from these standards are golf courses, stables, water recreation, and cemeteries.
- **Policy 7.3.** Work to achieve indoor noise levels not exceeding 45 dBA CNEL in the event that outdoor acceptable noise exposure levels cannot be achieved by various noise attenuation mitigation measures.
- **Policy 7.6.** Consider noise attenuation measures to reduce noise levels to City-adopted acceptable levels for any development along roadways.
- **Policy 7.7.** Require the inclusion of design features in development and reuse/revitalization projects to reduce the impact of noise on residential development.
- **Policy 7.8.** Require an acoustical analysis for new construction and in areas with higher-than-established noise levels.
- **Policy 7.9.** Minimize stationary noise sources and noise emanating from construction activities.

Los Altos Noise Ordinance

Chapter 6.16 of the LAMC establishes certain policies to control unnecessary, excessive, and annoying noise and vibration in the city in the interest of public health, welfare, and safety. Section 6.16.050 of the LAMC sets the following exterior noise limits:

A. Maximum permissible sound levels by receiving land use.
   1. The noise standards for the various categories of land use identified by the noise control office as presented in Table 1 of this section (reproduced herein as Table 5), unless otherwise specifically indicated, shall apply to all such property within a designated zone.
   2. No person shall operate, or cause to be operated, any source of sound at any location within the city, or allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, which causes the noise level, when measured on any other property, either incorporated or unincorporated, to exceed:
      i. The noise standard for that land use as specified in Table 1 (reproduced herein as Table 5) for a cumulative period of more than 30 minutes in any hour; or

ii. The noise standard plus 5 dB for a cumulative period of more than 15 minutes in any hour; or

iii. The noise standard plus 10 dB for a cumulative period of more than five minutes in any hour; or

iv. The noise standard plus 15 dB for a cumulative period of more than one minute in any hour; or

v. The noise standard plus 20 dB or the maximum measured ambient for any period of time.

3. If the measured ambient level exceeds that permissible within any of the first four noise limit categories above, the allowable noise exposure standard shall be increased in 5-dB increments in each category as appropriate to encompass or reflect such ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.
4. If the noise measurement occurs on a property adjacent to a zone boundary, the noise level limit applicable to the lower noise zone, plus 5 dB, shall apply.
5. If possible, the ambient noise shall be measured at a consistent location on the property with the alleged offending noise source inoperative. If for any reason the alleged offending noise source cannot be shut down, the ambient noise shall be estimated by performing a measurement in the same general area of the source but at a sufficient distance such that the noise from the source is at least 10 dB below the ambient in order that only the ambient level be measured. If the difference between the ambient and the noise source is 5 to 10 dB, then the level of the ambient itself can be reasonably determined by subtracting a one decibel correction to account for the contribution of the source.

B. Corrections for character of sound. In the event the alleged offensive noise contains a steady, audible tone, such as a whine, screech, or hum, or contains music or speech conveying informational content, the standard limits set forth in Table 1 (reproduced herein as Table 5) shall be reduced by 5 dB.

Table 5 Exterior Noise Limits

Receiving Land Use Category	Time Period	Noise Level (dBA)[1]
All R1 Zoning Districts	10:00 p.m. — 7:00 a.m.	45
	7:00 a.m. — 10:00 p.m.	55
All R3 and PCF Zoning Districts	10:00 p.m. — 7:00 a.m.	50
	7:00 a.m. — 10:00 p.m.	55
All OA Zoning Districts	10:00 p.m. — 7:00 a.m.	55
	7:00 a.m. — 10:00 p.m.	60
All C Zoning Districts	10:00 p.m. — 7:00 a.m.	60
	7:00 a.m.—10:00 p.m.	65

[1] Levels not to be exceeded more than 30 minutes in any hour.

Source. LAMC Section 6.16.050, Table 1

Section 6.16.070 of the LAMC establishes prohibited acts for operation of construction equipment, demolition, and operational use which includes the following:

B. Specific prohibitions. The following acts, and the causing or permitting thereof, are declared to be in violation of this chapter:

1. Radios, television sets, musical instruments, and similar devices. Operating, playing, or permitting the operation or playing of any radio, television set, phonograph, drum, musical instrument, or similar device which produces or reproduces sound:

a. Between the hours of 10:00 p.m. and 7:00 a.m. of the following day Monday through Friday or between 10:00 p.m. and 8:00 a.m. Saturday and Sunday in such a manner as to create a noise disturbance across a residential or commercial real property line or at any time to violate the provisions of LAMC Sections 6.16.050 or 6.16.060, except for activities for which a variance has been issued; or

b. In such a manner as to exceed the levels set forth for public space in Table 1 (reproduced herein as Table 5), measured at a distance of at least 50 feet (15 meters) from such device operating on a public right-of-way or public space;

5. Loading and unloading. Loading, unloading, opening, closing, or handling of boxes, crates, containers, building materials, or similar objects, between the hours of 10:00 p.m. and 7:00 a.m. of the following day, in such a manner as to cause a noise disturbance across a residential real property line or at any time to violate the provisions of Section 6.16.050 of this chapter;

6. Construction and demolition.

a.i. Single-family zoning districts. Operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration, or demolition work on weekdays before 7:00 a.m. and after 5:30 p.m. and on Saturdays before 9:00 a.m. or after 3:00 p.m. or any time on Sundays or the city observed holidays of New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day and Christmas Day, such that the sound therefrom creates a noise disturbance across a residential or commercial real property line, except for emergency work of public utilities or by special exception. This section shall apply to operations on residentially zoned property only. This section shall not apply to the use of lawn or garden tools as specified in subsection (B)(11) of this section;

ii. All other zoning districts. Operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration, or demolition work on weekdays before 7:00 a.m. and after 7:00 p.m. and Saturdays before 9:00 a.m. or after 6:00 p.m. or any time on Sundays or the city observed holidays of New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day and Christmas Day, such that the sound therefrom creates a noise disturbance across a residential or commercial real property line, except for emergency work of public service utilities or by special exception. This section shall apply to operations on properties other than residentially zoned property. This section shall not apply to the use of lawn or garden tools as specified in subsection (B)(11) of this section;

b. Where technically and economically feasible, construction activities shall be conducted in such a manner that the maximum noise levels at affected properties will not exceed those listed in the following schedules:

i. Mobile equipment. Maximum noise levels for the nonscheduled, intermittent, short-term operation (less than 10 days) of mobile equipment as shown in Table 6.

Table 6 Mobile Equipment Maximum Noise Levels

	All R1 Zoning Districts	All PCF and R3 Zoning Districts	All OA and C Zoning Districts
Daily, except Sundays and legal holidays 7:00 a.m. — 7:00 p.m.	75 dBA	80 dBA	85 dBA
Daily, 7:00 p.m. — 7:00 a.m. and all day Sundays and legal holidays	50 dBA	55 dBA	60 dBA

Source: LAMC Section 6.16.070, Table 3

ii. Stationary equipment. Maximum noise levels for the respectively scheduled and relatively long-term operation (periods of 10 days or more) of stationary equipment as shown in Table 7.

Table 7 Stationary Equipment Maximum Noise Levels

	All R1 Zoning Districts	All PCF and R3 Zoning Districts	All OA and C Zoning Districts
Daily, 7:00 a.m. — 7:00 p.m., except Sundays and legal holidays	75 dBA	80 dBA	85 dBA
Daily, 7:00 p.m. — 7:00 a.m., and all day Sundays and legal holidays	50 dBA	55 dBA	60 dBA

Source. LAMC Section 6.16.070, Table 4

c. Deliveries, start-up and closing down. The construction times above shall apply to deliveries of materials and equipment, and arrival of workers, start-up and closing down and departure activities on a job site.

7. Vibration. Operating or permitting the operation of any device that creates a vibration which is above the vibration perception threshold of an individual at or beyond the property boundary of the source if on private property or at 150 feet (46 meters) from the source if on a public space or public right-of-way.

10. Noise sensitive zones.
    a. Creating or causing the creation of any sound within any noise sensitive zone so as to exceed the specified land use noise standards set forth in LAMC Sections 6.16.050 and 6.16.060 provided conspicuous signs are displayed indicating the presence of the zone; or
    b. Creating or causing the creation of any sound within or adjacent to any noise sensitive zone containing a hospital, nursing home, school, or other designated area, so as to interfere with the functions of such activity or annoy the occupants in the activity, provided conspicuous signs are displayed indicating the presence of the zone;

11. Lawn or garden tools.
    a. Operating or permitting the operation of any lawn or garden tool (except portable gasoline engine powered blowers), or similar tool between 8:00 p.m. and 8:00 a.m. of the following day Monday through Friday or between 6:00 p.m. and 9:00 a.m. of the following Saturday and Sunday; and portable electric powered blowers used to blow leaves, dirt and other debris off sidewalks, driveways, lawns, landscape areas or other surfaces between 5:00 p.m. and 9:00 a.m. seven days a week, so as to create a noise disturbance across a residential or commercial real property line. This section shall apply to operations on residentially zoned property only.
    b. Where technically and economically feasible, any motor, machinery, or pump shall be sufficiently enclosed or muffled and maintained so as not to create a noise disturbance in accordance with Section 6.16.050 of this chapter.

3 Impact Analysis

3.1 Methodology

Construction Noise

Construction noise was estimated using the FHWA Roadway Construction Noise Model (RCNM) (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 of 6 dBA per doubling of distance for stationary equipment.

For construction noise assessment, construction equipment can be considered to operate in two modes: stationary and mobile. As a rule, stationary equipment operates in a single location for one or more days at a time, with either fixed-power operation (e.g., pumps, generators, and compressors) or variable-power operation (e.g., pile drivers, rock drills, and pavement breakers). Mobile equipment moves around the construction site with power applied in cyclic fashion, such as bulldozers, graders, and loaders (FTA 2018). Noise impacts from stationary equipment are assessed from the center of the equipment, while noise impacts from mobile construction equipment are assessed from the center of the equipment activity area (e.g., construction site).

Variation in power imposes additional complexity in characterizing the noise source level from construction equipment. Power variation is accounted for by describing the noise at a reference distance from the equipment operating at full power and adjusting it based on the duty cycle, or percent of operational time, of the activity to determine the L_{eq} of the operation (FTA 2018).

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, and some may have high-impact noise levels. The maximum hourly L_{eq} of each phase is determined by combining the L_{eq} contributions from each piece of equipment used in that phase (FTA 2018). In typical construction projects, grading activities generate the highest noise levels because grading involves the largest equipment and covers the greatest area.

Project construction is estimated to occur over 23 months. Construction phases would include demolition, site preparation, grading, building construction, and architectural coating at the project site. The construction equipment analyzed was based on applicant-provided information. It is assumed that diesel engines would power all construction equipment. For assessment purposes, and to be conservative, the loudest hour has been used for assessment. The loudest hour would include an auger drill rig, an excavator, and a front-end loader operating simultaneously during the grading phase. Using the FHWA RCNM to estimate noise associated with construction equipment maximum hourly noise levels are calculated to be approximately 86 dBA L_{eq} at 30 feet during the grading phase. RCNM calculations are included in Appendix B.

On-site Operational Noise

The project's heat pump equipment would include six Bryant 286B 3-Ton Heat Pump (17 SEER) condensers located on the rooftop (see Appendix C for manufacturers' specifications). Noise levels

from the heat pumps can range from approximately 68 to 73 L_w (sound power level), which is equivalent to approximately 38 to 43 dBA L_{eq} at 40 feet (LG 2020). To provide a conservative estimate of project impacts, it was assumed that each heat pump would generate a noise level of 43 dBA L_{eq} at 40 feet. Sensitive receivers to the north of the project site would be exposed to noise from approximately six condensers located on the rooftop. Noise levels at the nearest sensitive receivers are estimated assuming a standard distance attenuation rate of 6 dBA per doubling of distance. Using the site plans provided by the applicant, it was estimated that all condensers would be 40 feet from any given residence.

Groundborne Vibration

The proposed project does not include any substantial vibration sources associated with operation. Thus, construction activities have the greatest potential to generate groundborne vibration affecting nearby receivers, especially during grading of the project site. The greatest vibratory sources during construction would be a pile driver (caisson drilling used as a proxy) and loaded trucks. Construction vibration estimates are based on vibration levels reported by Caltrans and the FTA (Caltrans 2020; FTA 2018).

A quantitative assessment of potential vibration impacts from construction activities, such as blasting, pile-driving, vibratory compaction, demolition, drilling, or excavation, may be conducted using the equations developed by Caltrans and the FTA (Caltrans 2020; FTA 2018). Table 8 shows typical vibration levels for various pieces of construction equipment used in the assessment of construction vibration (FTA 2018).

Table 8 Vibration Levels Measured during Construction Activities

Equipment	Vibration Level at 25 feet (in/sec ppv)
Loaded trucks	0.076
Bore drilling	0.089

[1] Caisson drilling used as a proxy for bore drilling.

Source: FTA 2018

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. 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; or
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, exposure of people residing or working in the project area to excessive noise levels.

Construction Noise

Construction of the project is anticipated for 23 months with construction activities occurring from 8:00 a.m. to 5:00 p.m., Monday through Friday, and 9:00 a.m. to 5:00 p.m. on Saturdays. Therefore,

the construction noise level standards set forth in LAMC Section 6.16.070(B) would be most applicable for use as thresholds of significance. LAMC Section 6.16.070(B)(6) prohibits noise levels generated by individual pieces of machinery, equipment, or devices used during construction activities for relatively long-term operation (periods of 10 days or more) to exceed 75 dBA L_{eq} at affected properties within the R1 zoning district, 80 dBA L_{eq} at affected properties within the R3 and PCF zoning districts, and 85 dBA L_{eq} at affected properties within the C zoning district between the hours of 7:00 a.m. to 7:00 p.m. on Monday through Saturday (see Table 7 in Section 2.5, *Regulatory Setting*).

On-site Operational Noise

The City has adopted noise standards in the LAMC that regulate operational noise sources in the City. The proposed project would result in a significant impact if it generates noise from on-site sources in excess of LAMC standards included in Section 6.16.070, which collectively regulate noise from operations that are typical to urban uses (e.g., sound-amplifying devices, air conditioning, lawn maintenance equipment, hand tools, wheeled equipment). In addition, an impact would occur if noise levels at affected properties would exceed the exterior noise level limits set forth in LAMC Section 6.16.050 (see Table 5 in Section 2.5, *Regulatory Setting*).

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

LAMC Section 6.16.070(B)(7) prohibits vibration above the perception threshold of an individual at or beyond the property boundary of the source but does not provide a numeric threshold. Therefore, the quantitative thresholds provided by Caltrans, as summarized in Section 2.2 *Vibration*, are utilized in this analysis to determine whether vibration levels would exceed the perception threshold of an individual. 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 from continuous and intermittent sources. As shown in Section 2.2, *Vibration*, the Caltrans (2020) *Transportation and Construction Vibration Guidance Manual* identifies three sets of impact criteria for buildings and humans. Table 1 presents the impact criteria for buildings; Table 2 presents impact criteria for humans from operational vibration sources; and Table 3 presents the impact criteria for humans from construction sources. For purposes of assessing impacts to humans, vibrations would potentially be significant if vibration levels exceeded the distinctly perceptible vibration levels of 0.035 in/sec ppv from project operation or 0.24 in/sec ppv from project construction in occupied off-site structures. For purposes of assessing impacts to structures regardless of occupancy, vibrations would be potentially significant if vibration levels exceed 1.5 in/sec ppv at any structure.

3.3 Impact Analysis

Threshold 1 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?

Impact N-1 CONSTRUCTION AND OPERATION OF THE PROPOSED PROJECT WOULD NOT GENERATE A SUBSTANTIAL TEMPORARY OR PERMANENT INCREASE IN AMBIENT NOISE LEVELS IN THE VICINITY OF THE PROJECT. IMPACTS WOULD BE LESS THAN SIGNIFICANT.

Construction Noise

The nearest sensitive receivers to the project site include multi-family residences (zoned as CD/R-3) located immediately to the northwest, Saint Nicholas Catholic Church (zoned as public and community facility [PCF]) located approximately 260 feet of the project site, and single-family residences (zoned as R-1) approximately 290 feet southwest of the project site. Construction equipment would be continuously moving across the site, coming near and then moving further away from individual sensitive receivers. Maximum hourly noise levels during project construction, which would occur during the grading phase, are calculated to be approximately 86 dBA L_{eq} at the nearest multi-family residences to the north and the nearest commercial property to the south (30 feet from the center of the project site), approximately 66 dBA L_{eq} at Saint Nicolas Catholic Church (280 feet from the center of the project site), and approximately 65 dBA L_{eq} at the nearest single-family residences (310 feet from the center of the project site; see Appendix B for RCNM results). Therefore, maximum hourly construction noise levels would exceed the City's maximum construction noise limits of 85 dBA L_{eq} in C districts and 80 dBA L_{eq} in R-3 districts at the nearest multi-family residences but would not exceed the maximum construction noise limit of 80 dBA L_{eq} in PCF districts at Saint Nicholas Church or the maximum construction noise limit of 75 dBA L_{eq} in R-1 districts at the nearest single-family residences. Therefore, the applicant would be required to comply with the RCM related to adherence to existing construction noise standards. To implement this RCM and reduce construction noise, the project contractor would install a temporary sound barrier along the northern and southern property lines during construction activities, which would reduce noise levels by approximately 20 dBA as part of the RCM (see Appendix B for barrier calculations). Therefore, maximum hourly noise levels at the nearest multi-family residences and commercial property would be reduced to 66 dBA L_{eq}. As a result, maximum hourly construction noise levels would not exceed the thresholds of 75 dBA L_{eq} at affected properties within the R-1 zoning district, 80 dBA L_{eq} at affected properties within the R-3 and PCF zoning districts, and 85 dBA L_{eq} at affected properties within the C zoning district. Therefore, with implementation of the RCM related to adherence to existing construction noise standards, impacts would be less than significant.

On-site Operational Noise

The proposed project would require periodic trash hauling services. However, the project site is located in an urban area and is surrounded by existing residential and commercial uses that require similar trash hauling and delivery services. Therefore, because trash trucks are already a common occurrence in the project vicinity, trash services would not result in a substantial permanent increase in ambient noise levels above levels existing without the project.

The project would include an outdoor roof deck for two condominium units and small landscaped areas. Operational noise associated with use of the roof decks would include conversations, music, television, or other sound-generating equipment, and operational noise associated with landscaping maintenance would include use of powered landscaping tools. These noise-generating activities would be similar to those of existing multi-family residences immediately north of the project site and in the vicinity and would result in a negligible change to existing noise levels. Noise from conversation and landscaping activities would be intermittent and temporary noise sources, which would typically be limited to the daytime, outside of noise-sensitive hours of sleep. Moreover, compliance with LAMC Section 6.16.070(B)(1-2), which sets forth hours and noise level restrictions for operation of radios, musical instruments, television sets, and other sound-amplifying devices, and LAMC Section 6.16.070(B)(11), which prohibits use of landscaping equipment that creates nuisance noise during nighttime hours, would reduce operational noise impacts related to the outdoor roof decks and landscaped areas to a less-than-significant level.

The project would include six rooftop heat pumps, which are continuous noise sources. Per LAMC Section 6.16.050*,* project impacts would be significant if exterior noise levels exceeded the standards presented in Table 5 for more than 30 minutes at a time. Rooftop equipment would be located as close as 40 feet from the nearest adjacent properties, which are zoned CD/R3. Noise levels generated by rooftop heat pumps would be approximately 51 dBA L_{eq} at 40 feet. However, the heat pumps would be located toward the center of the rooftop, which would break the line-of-sight between the heat pumps and the nearest receiving properties, which would provide at least a 5-dB reduction in noise levels (FHWA 2011). Therefore, noise levels would be approximately 46 dBA L_{eq} at the adjacent properties, which would not exceed the daytime or nighttime noise standards of 55 dBA L_{eq} and 50 dBA L_{eq}, respectively, for R3 and PCF districts, and 65 dBA L_{eq} and 60 dBA L_{eq}, respectively, for C zoning districts. In addition, heat pump noise levels at the nearest single-family residential properties approximately 260 feet to the south of the proposed equipment locations, would be approximately 30 dBA L_{eq}, which would not exceed the daytime or nighttime noise standards of 55 dBA L_{eq} and 45 dBA L_{eq}, respectively, for R1 districts. Therefore, impacts related to heat pump equipment noise would be less than significant.

Off-Site Traffic Noise

The project would generate vehicle trips that would contribute to existing off-site traffic noise. According to the applicant-provided information, existing land uses generate approximately 126 average daily trips.[1] Based on the trip generation estimated in the California Emissions Estimator Model for the project's air quality study, the proposed project would generate approximately 23 average daily trips on weekdays (Rincon Consultants, Inc. 2020).[2] Therefore, the project would result in a net decrease of approximately 103 average daily trips. The project would decrease existing traffic volumes and associated off-site traffic noise levels. Consequently, no off-site traffic noise impact would occur.

[1] Weekday trips include 70 trips for appointments, 20 trips for drop off/pick up, 10 trips for deliveries, and 26 trips for employees. Saturday trips include 30 trips for appointments, 10 trips for drop off/pick up, and 26 trips for employees

[2] Trip generation rates are based on Institute of Traffic Engineers 9th Edition for Condo/Townhouse ITE Code 230.

Threshold 2 Would the proposed project generate excessive groundborne vibration or groundborne noise levels?

Impact N-2 CONSTRUCTION OF THE PROPOSED PROJECT WOULD EXPOSE NEARBY SENSITIVE RECEIVERS TO A TEMPORARY INCREASE IN VIBRATION. VIBRATION LEVELS WOULD NOT EXCEED THE HUMAN ANNOYANCE OR STRUCTURAL DAMAGE THRESHOLDS. IN ADDITION, THE PROJECT WOULD NOT INCLUDE SIGNIFICANT STATIONARY SOURCES OF VIBRATION DURING OPERATION. THEREFORE, THE PROPOSED PROJECT WOULD HAVE A LESS THAN SIGNIFICANT VIBRATION IMPACT.

Certain types of construction equipment can generate high levels of groundborne vibration. Construction of the proposed project would potentially utilize loaded trucks and bore drilling. Vibration impacts are assessed from the edge of construction activity. Therefore, bore drilling was assumed to occur at a distance of 10 feet from the nearest structures, which are residences to the north of the project site, and loaded trucks were assumed to operate at a distance of 25 feet (i.e., the distance to the centerline of the nearest travel lane on 1st Street) from the nearest structures. As shown in Table 9, groundborne vibration from construction equipment would not exceed 0.24 in/sec ppv (the threshold for impacts to humans) and 1.5 in/sec ppv (the threshold for structural damage) at the nearest structure.

Table 9 Vibration Levels at Nearest Building

Equipment	Estimated Vibration Levels at Nearest Building at 30 Feet (in/sec ppv)
Loaded Trucks[1]	0.14
Caisson Drilling[2]	0.22
Threshold for Human Annoyance	0.24
Threshold Exceeded?	No
Threshold for Structural Damage	1.5
Threshold Exceeded?	No

[1] Assessed at a distance of 25 feet (i.e., the distance from the centerline of the nearest travel lane on 1st Street to the nearest structure).

[2] Assessed at a distance of 10 feet (i.e., the distance from the nearest pile location to the nearest structure).

See Appendix D for vibration analysis worksheets.

As a multi-family use, the proposed project would not include significant stationary sources of vibration, such as heavy equipment operations. Therefore, no operational vibration impact would occur.

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?

Impact N-3 THE PROJECT WOULD BE LOCATED OUTSIDE THE AIRPORT INFLUENCE AREA FOR THE MOFFETT FEDERAL AIRFIELD. THEREFORE, THE PROJECT WOULD NOT EXPOSE PEOPLE RESIDING OR WORKING IN THE PROJECT AREA TO EXCESSIVE NOISE LEVELS. NO IMPACT WOULD OCCUR.

The airport closest to the project site is the Moffett Federal Airfield located approximately 4.2 miles north of the project site. The project site is not located in an Airport Influence Area for this airport (Santa Clara County Airport Land Use Commission 2012). In addition, the project site is not in close proximity to a private airport. Therefore, the project would not expose people residing or working in the project area to excessive noise levels, and no impact would occur.

4 Conclusions

The proposed project would have less than significant impacts related to construction noise, operational noise, and vibration, and no impacts related to off-site traffic noise and airport-related noise.

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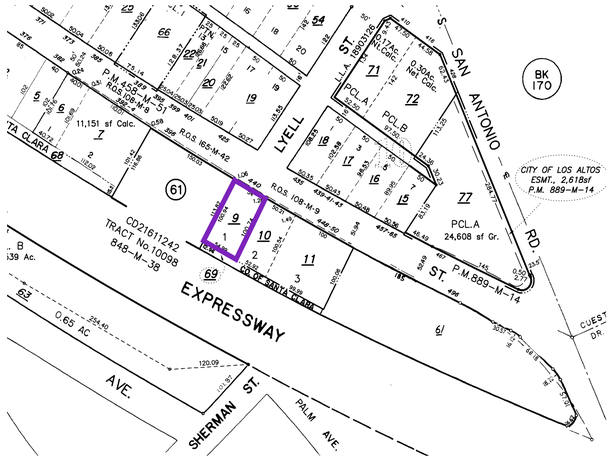
Appendix A

Project Site Plans

PROJECT DESCRIPTION:

This Zoning / Design Review Application is for a new 4 Unit Condominium Development at 440 First St in Los Altos. The proposed building will be three stories of condos over one level of underground parking. The project also proposes improvements to the First St frontage including a new sidewalk. The applicants and design team look forward to working with the city and local stakeholders to create well-designed infill development that is consistent with the vision for future Los Altos.

2 Existing Aerial Context Map



1 Assessors Parcel Map

PROJECT TEAM:

Applicant / Owner:
Abbie Bourgan / Bourgan Family Trust
25875 Estacada Way
Los Altos Hills, CA 94022
Contact: Abbie Bourgan abbie@bourgan.net
650-492-1369

Architect:
Platform GP
1431 MLK Way
Oakland, CA 94612
Contact: Chris Hall chris@platformarc.com
Contact: Ben Anderson ben@platformarc.com

Civil Engineer:
SMP Civil Engineers-Land Surveyors
1534 Carob Lane
Los Altos, CA 94024
Contact: Saeid Razavi srazavi@smpengineers.com

DRAWING INDEX:

PROJECT DATA:

GENERAL NOTES			
ASSESSORS PARCEL NUMBER	167-41-009		
ZONING	CD/R3		
CONSTRUCTION TYPE	TYPE VA FULLY SPRINKLERED		
LOT SIZE	5,495 sf		
OCCUPANCY (CBC 2016)	R2		
APPLICABLE BUILDING CODE	CBC 2019		
ZONING NOTES CD/R3			
	REQUIRED	PROPOSED	
MAX AVG. BLDG HEIGHT	35' max above average grade	35' max above average grade	
MIN SIDE SETBACK	0'	0'	
MIN FRONT SETBACK	10'	10'	
MIN REAR SETBACK	10'	10'	
MAX COVERAGE	NA	NA	
REQUIRED OFF-ST PARKING	2 SPACES PER UNIT + 1 GUEST PARKING SPACE (4 UNITS) = 9 SPACES REQUIRED		
PROPOSED CONDITIONED FLOOR AREAS			
	GROSS COMMON	GROSS RESIDENTIAL	Totals
1ST LEVEL	+/- 874 sf	+/- 2,778 sf	+/- 3,652 sf
2ND LEVEL	+/- 370 sf	+/- 3,600 sf	+/- 3,970 sf
3RD LEVEL	+/- 384 sf	+/- 3,729 sf	+/- 4,113 sf
TOTAL	+/- 1,628 sf	+/- 10,107 sf	+/- 11,735
PROPOSED UNCONDITIONED FLOOR AREAS			
BASEMENT/PARKING GARAGE	+/- 4,947 sf		
TOTAL	+/- 4,947 sf		
PROPOSED VEHICLE AND BIKE PARKING			
	Spaces		TOTAL
Garage Parking	9 (8 EV spaces)		9
Bike Parking Required	(2) Class 1 & (1) Class 2		3
Bike Parking Proposed	(4) Class 1 & (2) Class 2		6

NOTES:

FIRE SPRINKLERS REQUIRED: An automatic residential fire sprinkler system shall be installed in accordance with National Fire Protection Association's (NFPA) Standard 130
FIRE DEPARTMENT CONNECTION: The fire department connection (FDC) for the structure in support of the sprinkler system shall be installed at the street on the street address side of the building. It shall be located within 100 feet of a public fire hydrant and within ten (10) feet of the main PIV (unless otherwise approved by the Chief due to practical difficulties). FDC's shall be equipped with a minimum of two (2), two-and-one-half (2- 1 /2") inch national standard threaded inlet couplings. Orientation of the FDC shall be such that hose lines may be readily and conveniently attached to the inlets without interference. FDC's shall be painted safety yellow.
WATER SUPPLY REQUIREMENTS: Potable water supplies shall be protected from contamination caused by fire protection water supplies.
A PRIVATE WHARF HYDRANT to be provided for high rise pack connection at the rear yard of building. Access to the rear yard of the building is proposed to be through an access easement provided by the neighboring building at 450 First St.
FIRE ALARM SYSTEM REQUIREMENT: The building shall be provided with a fire alarm system in accordance with CFC #907.2.9
A TWO-WAY COMMUNICATION SYSTEM shall be designed and installed in accordance with NFPA 72 (2016 edition)
CONSTRUCTION SITE FIRE SAFETY: All construction sites must comply with applicable provisions of the CFC Chapter 33 and our Standard Detail and Specification SI-7

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440 FIRST ST
Los Altos, California

General Notes / Title Page **G-0**

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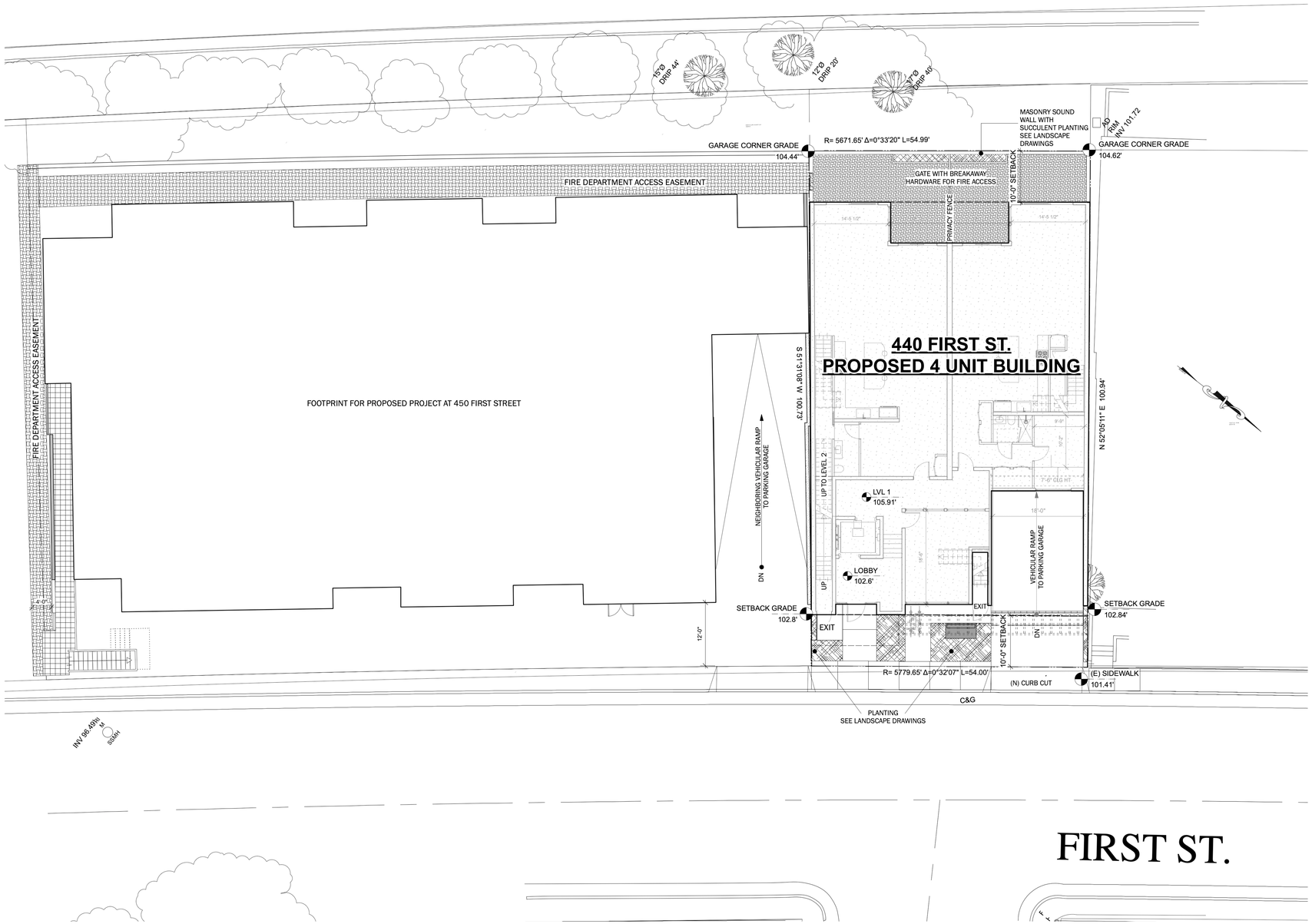
FOOTHIL EXPRESSWAY



0 10 20 30 40 50 60 80'

1" = 10' at full size (36 x 24")

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440 FIRST ST

Los Altos, California

Architectural Siteplan **G-4**

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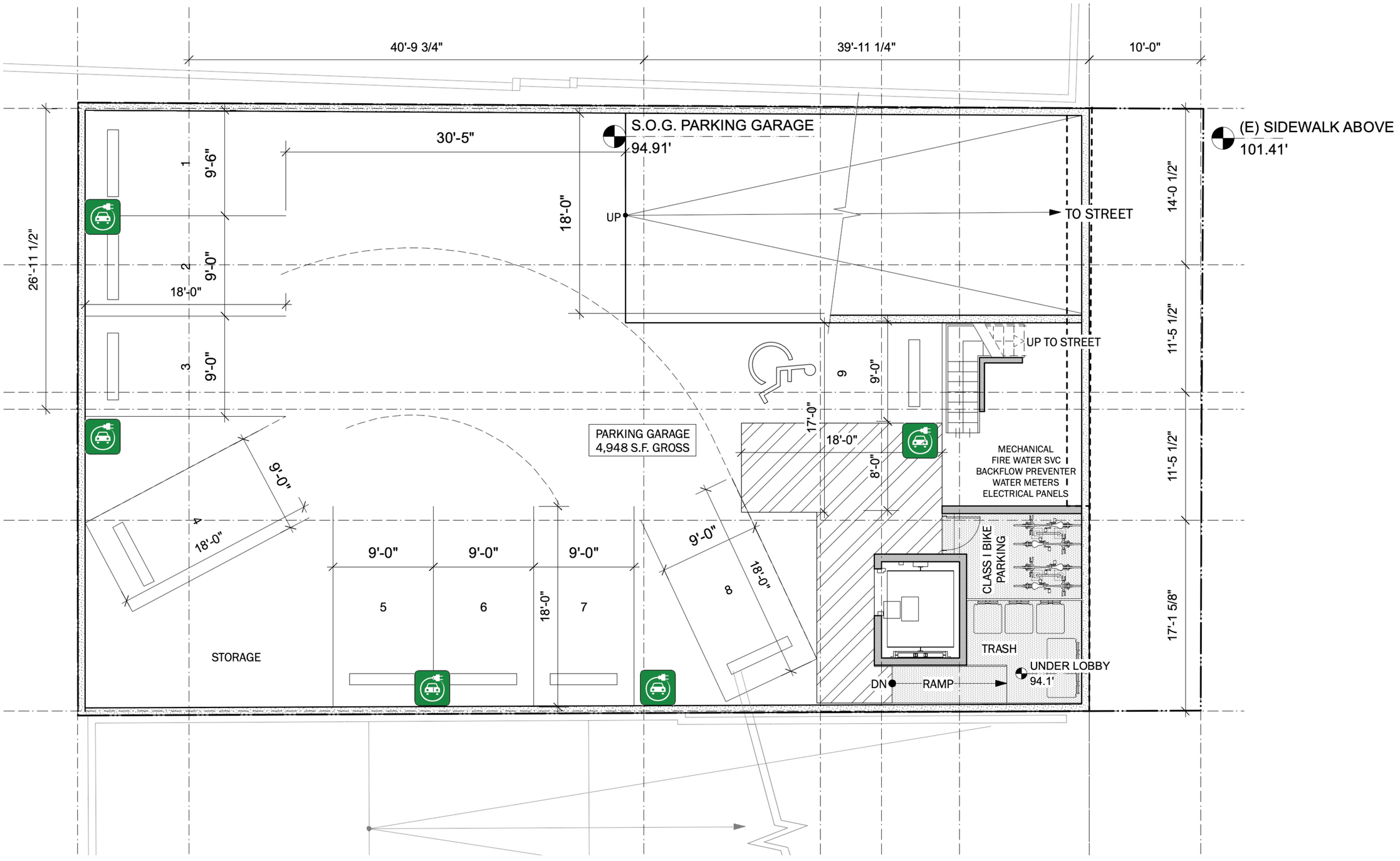

0 2 4 8'

1/4" = 1'-0" at full size (36 x 24")

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440 FIRST ST

Los Altos, California

Garage / Basement Plan **A-0**

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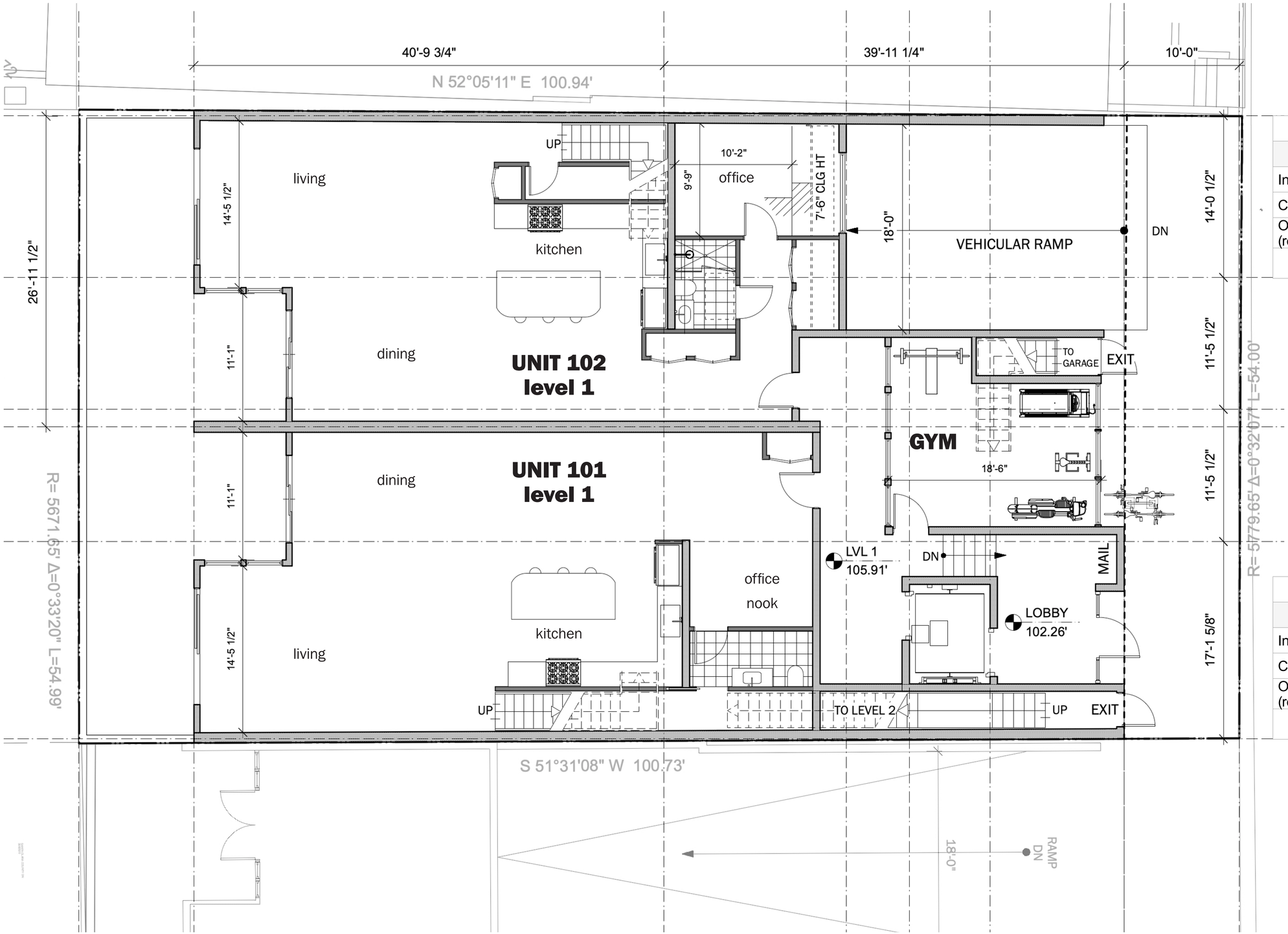

GROSS FLOOR AREAS UNIT 101			
Zone	Level 1	Level 2	Total
Interior	1,384 sf	1,905	**3,289 sf***
Covered Deck	89 sf	200 sf	289 sf
Open Deck (rear yard setback)	270 sf		270 sf
TOTAL GROSS RESIDENTIAL AREA			3,848 sf

GROSS FLOOR AREAS UNIT 102			
Zone	Level 1	Level 2	Total
Interior	1,394 sf	1,695	**3,089 sf***
Covered Deck	89 sf	130 sf	219 sf
Open Deck (rear yard setback)	270 sf		270 sf
TOTAL GROSS RESIDENTIAL AREA			3,578 sf

0 2 4 8'

1/4" = 1'-0" at full size (36 x 24")

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Los Altos, California

Ground Floor Plan **A-1**

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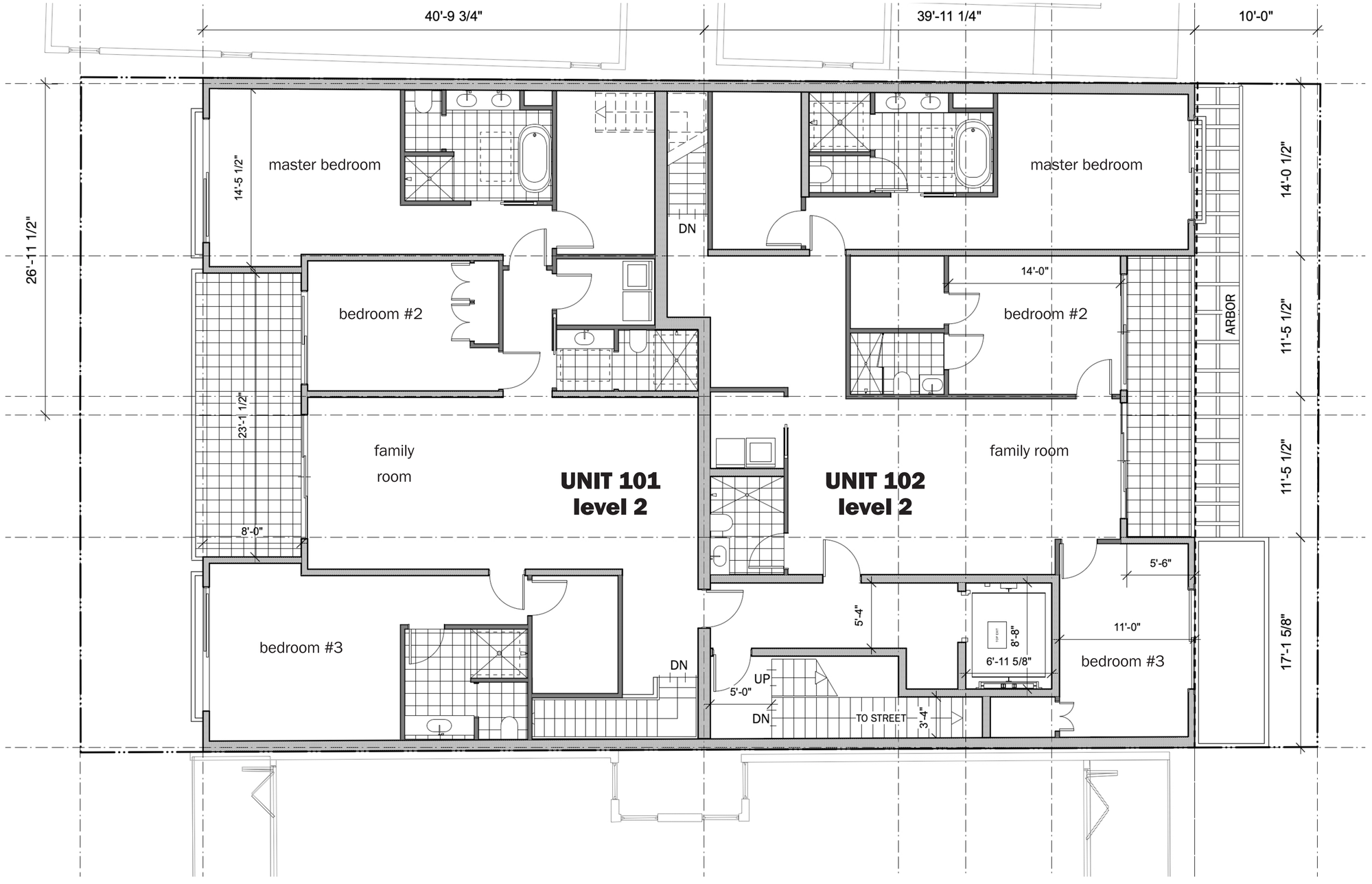

0 2 4 8'

1/4" = 1'-0" at full size (36 x 24")

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2nd Floor Plans **A-2**

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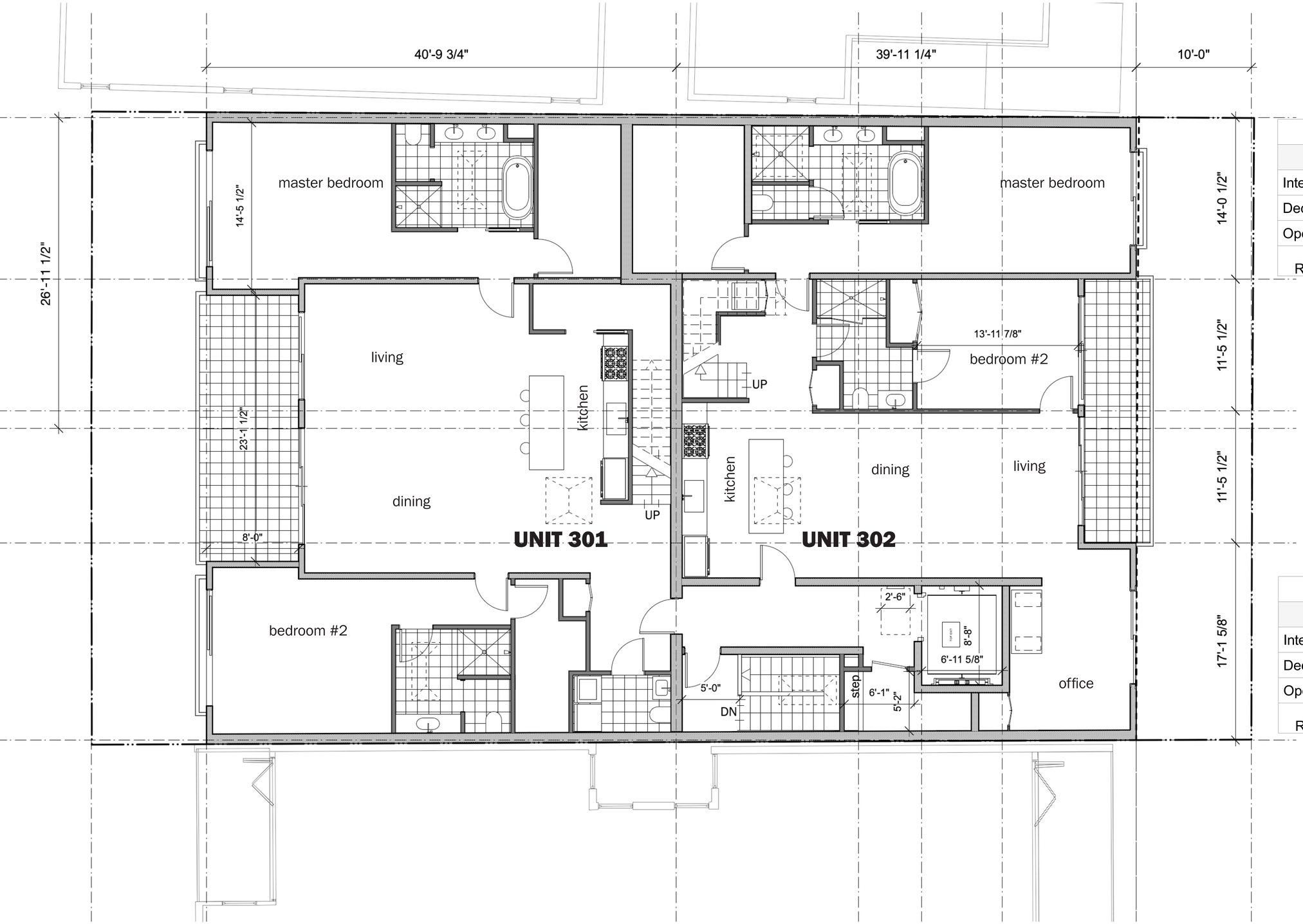

GROSS FLOOR AREAS UNIT 301			
Zone	Level 3	Roof	Total
Interior	2,048 sf		**1,985 sf**
Deck w/ trellis Lvl 3	200 sf		200 sf
Open Deck (roof)		366 sf	366 sf
TOTAL GROSS RESIDENTIAL AREA			2,551 sf

GROSS FLOOR AREAS UNIT 302			
Zone	Level 3	Roof	Total
Interior	1,681 sf		**1,743 sf**
Deck w/ trellis Lvl 3	133 sf		133 sf
Open Deck (roof)		360 sf	360 sf
TOTAL GROSS RESIDENTIAL AREA			2,236 sf

0 2 4 8'

1/4" = 1'-0" at full size (36 x 24")

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3rd Floor Plans **A-3**

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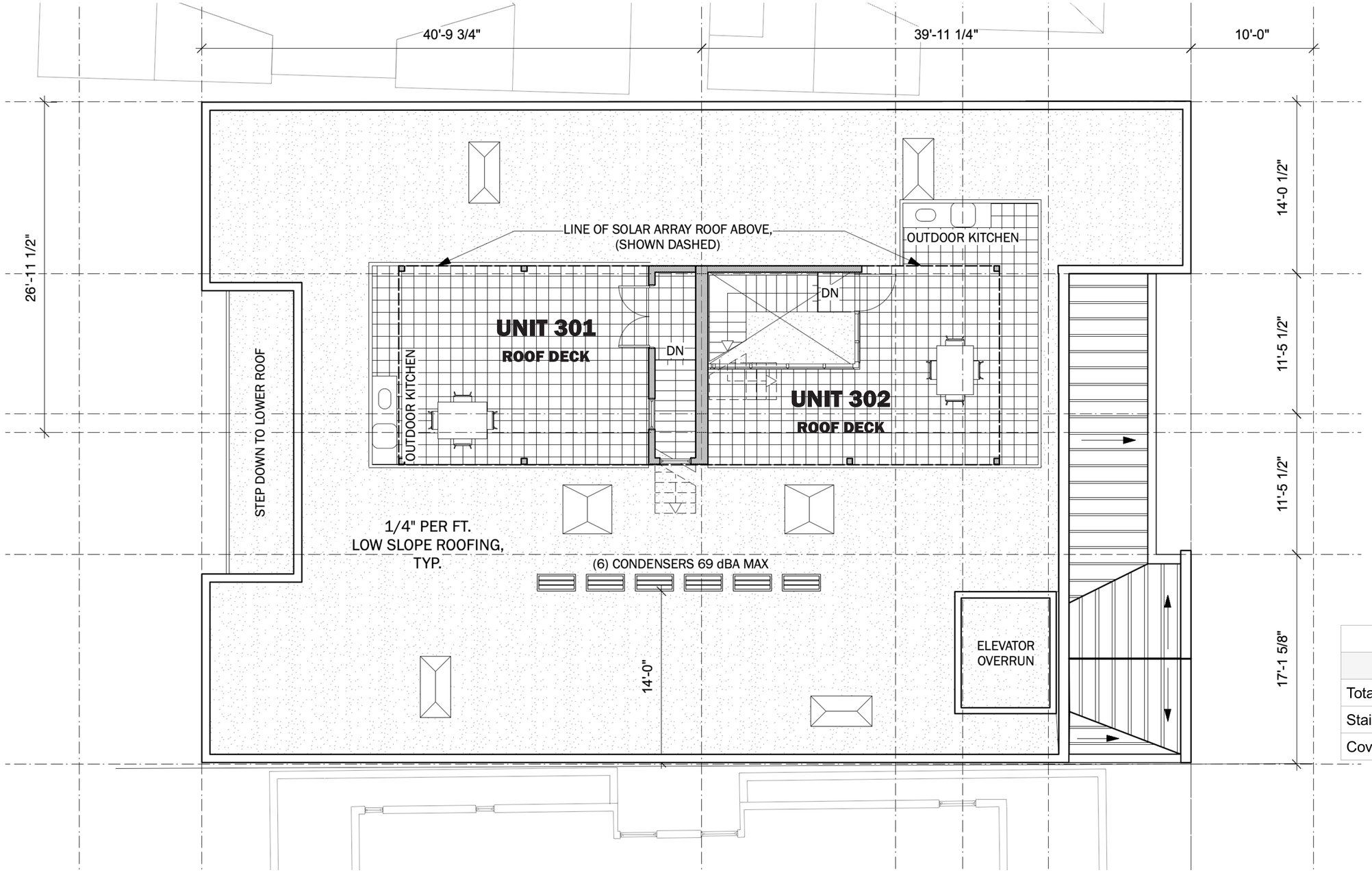

ROOF AREAS			
	Area	% OF TOTAL	
Total Roof Area	4,246 sf		-
Stairwell and Elevator	263 sf		7%
Covered Roof Area	617 sf		15%

0 2 4 8'

1/4" = 1'-0" at full size (36 x 24")

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4th Floor Roof Deck Plan **A-4**

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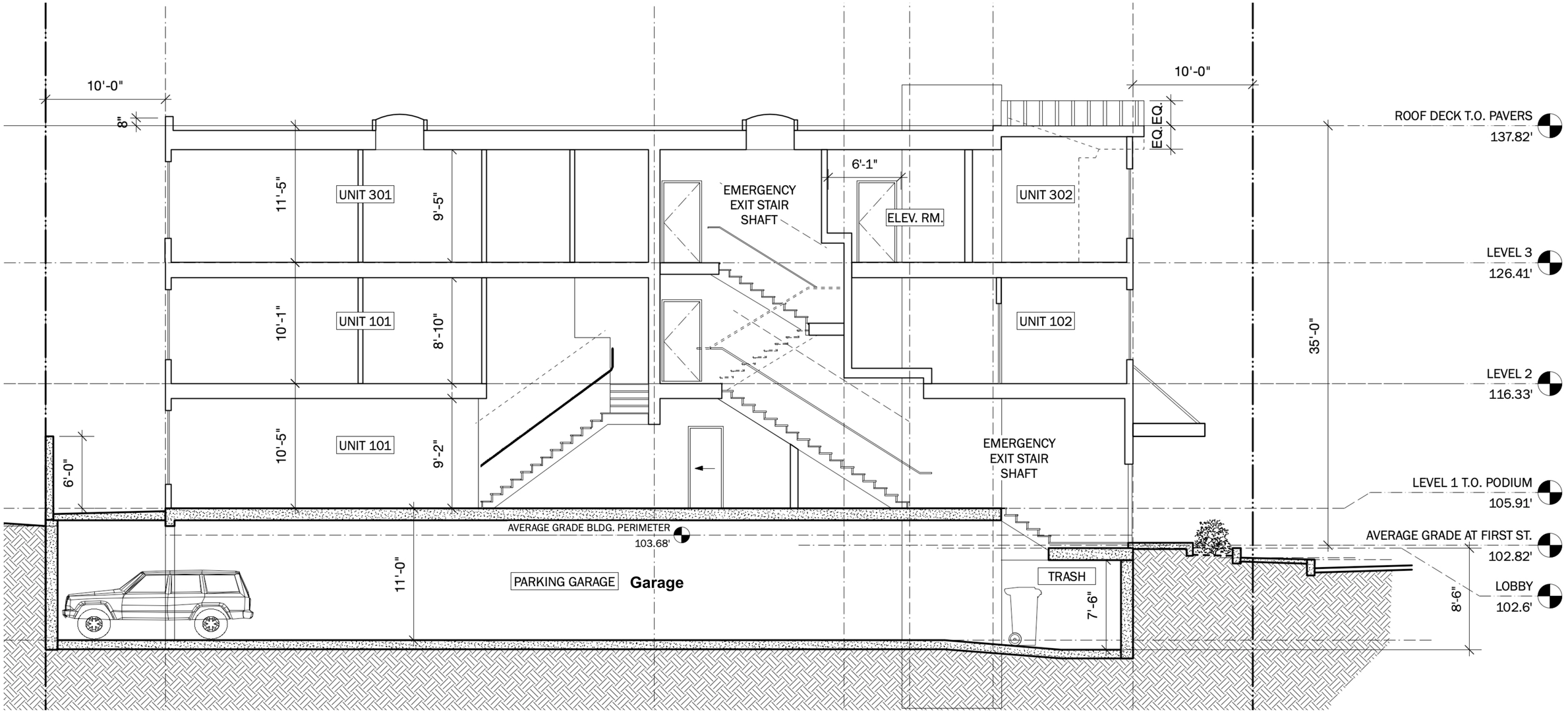

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1/8" = 1'-0" at full size (36 x 24")

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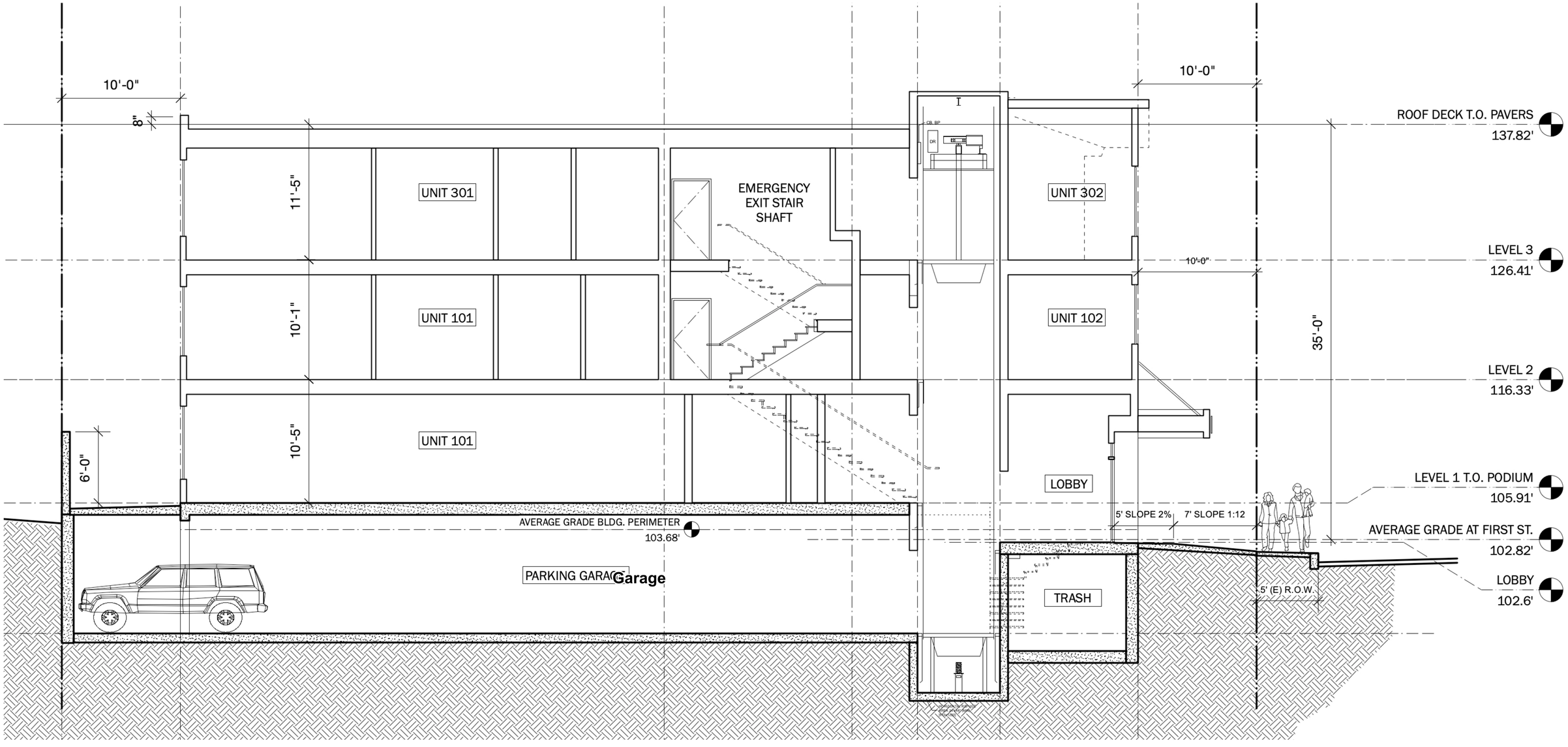
Los Altos, California

Section at Exit Stair **A-9**

Planning Application Re-Submittal - Nov 23rd 2020



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1/8" = 1'-0" at full size (36 x 24")

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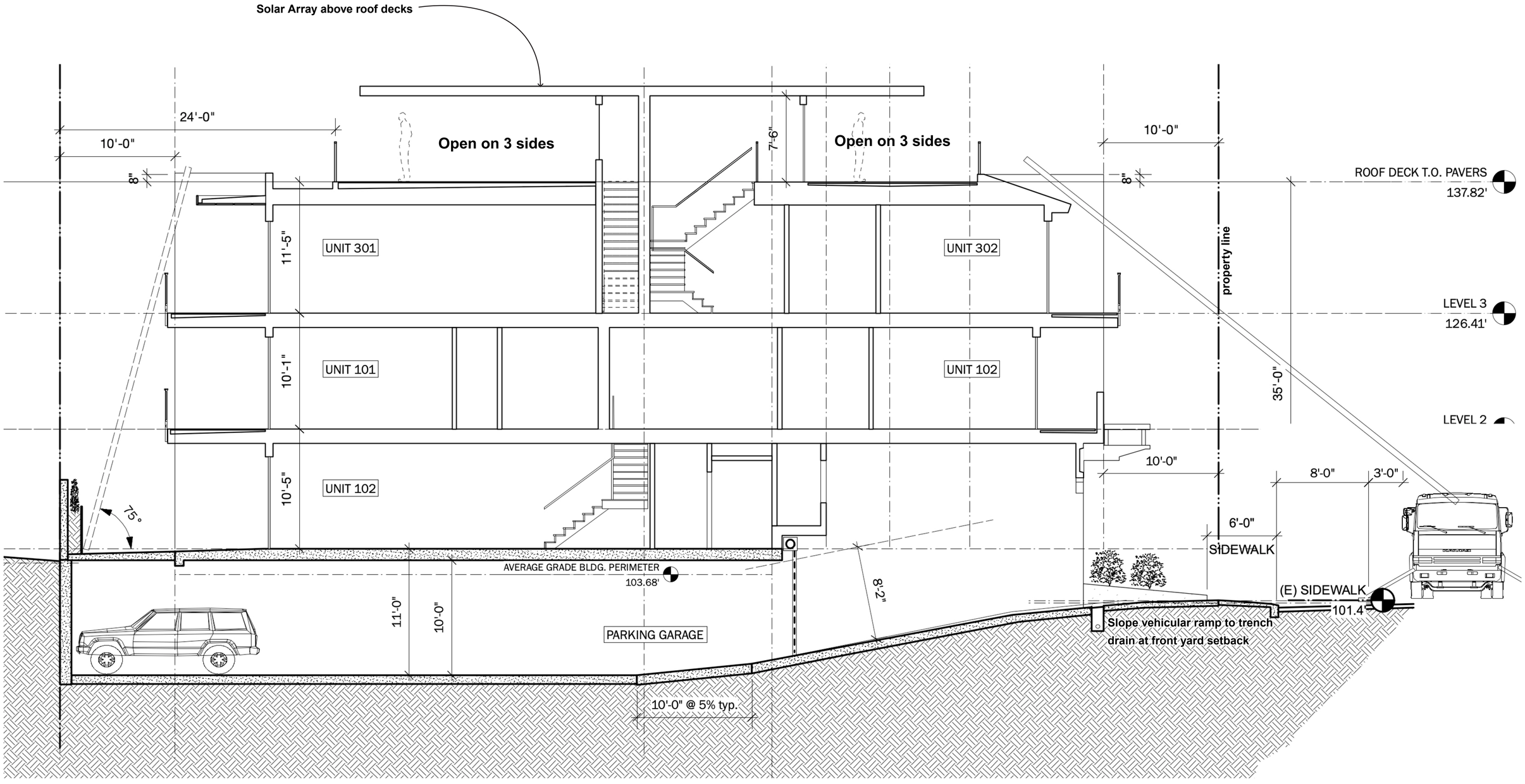
Los Altos, California

Section at Elevator Shaft **A-10**

Planning Application Re-Submittal - Nov 23rd 2020



0 4 8 16'

1/8" = 1'-0" at full size (36 x 24")

PLATFORM
architecture / planning / research

440 FIRST ST

Los Altos, California

Section at Garage Entry Ramp **A-11**

Planning Application Re-Submittal - Nov 23rd 2020

Appendix B

Roadway Construction Noise Model (RCNM) Results

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 11/19/2020
Case Description: 20-10505 440 1st Street - Grading

**** Receptor #1 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Multi-Family Residential	Residential	80.0	55.0	55.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	30.0	0.0
Excavator	No	40		80.7	30.0	0.0
Front End Loader	No	40		79.1	30.0	0.0

Results

Equipment	Calculated (dBA) Lmax	Calculated (dBA) Leq	Noise Limits (dBA) Day Lmax	Noise Limits (dBA) Day Leq	Noise Limits (dBA) Evening Lmax	Noise Limits (dBA) Evening Leq	Noise Limits (dBA) Night Lmax	Noise Limits (dBA) Night Leq	Noise Limit Exceedance (dBA) Day Lmax	Noise Limit Exceedance (dBA) Day Leq	Noise Limit Exceedance (dBA) Evening Lmax	Noise Limit Exceedance (dBA) Evening Leq	Noise Limit Exceedance (dBA) Night Lmax	Noise Limit Exceedance (dBA) Night Leq
Auger Drill Rig	88.8	81.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	85.1	81.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	83.5	79.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	88.8	85.7	N/A	N/A	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
Saint Nicholas Catholic Church	Residential	75.0	50.0	50.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)

Auger Drill Rig	No	20	84.4	280.0	0.0
Excavator	No	40	80.7	280.0	0.0
Front End Loader	No	40	79.1	280.0	0.0

Results

	Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
	Calculated (dBA)		Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig	69.4	62.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	65.7	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	64.1	60.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	69.4	66.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Single-Family Residence	Residential	75.0	50.0	50.0

Equipment

Description	Impact Device	Spec Usage (%)	Actual Lmax (dBA)	Receptor Lmax (dBA)	Estimated Distance (feet)	Shielding (dBA)
Auger Drill Rig	No	20	84.4	310.0		0.0
Excavator	No	40	80.7	310.0		0.0
Front End Loader	No	40	79.1	310.0		0.0

Results

	Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
	Calculated (dBA)		Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig	68.5	61.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	64.9	60.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	63.3	59.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Total	68.5	65.4	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

**** Receptor #4 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Commercial Downtown	Commercial	85.0	60.0	60.0

Equipment

Description	Impact Device	Spec Usage (%)	Actual Lmax (dBA)	Receptor Lmax (dBA)	Estimated Distance (feet)	Shielding (dBA)
Auger Drill Rig	No	20	84.4	30.0	0.0	
Excavator	No	40	80.7	30.0	0.0	
Front End Loader	No	40	79.1	30.0	0.0	

Results

	Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
	Calculated (dBA)		Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig	88.8	81.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	85.1	81.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	83.5	79.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	88.8	85.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Barrier Calculations

Input Variables	
Reference Noise Level (dBA)	86
Reference Distance (ft)	30
Site Conditions *(Choice: Hard or Soft)*	Hard

Output Calculations

Distance from Barrier to Source (ft)	Distance from Barrier to Receiver (ft)	Distance from Source to Receiver (ft)	Height of Source (ft)	Height of Wall (ft)	Height of Receiver (ft)	Noise Level Reduction (dBA)	Unabated Noise Level (dBA)	Resultant Noise Level (dBA)
20	10	30	10	16	5	19.89	86	66.11

Appendix C

Manufacturers' Specifications

286B (2 - 5 Ton)
EVOLUTION® 2-STAGE HEAT PUMP
WITH PURON® REFRIGERANT

Product Data

Puron EVOLUTION® SYSTEM

Bryant's heat pumps with Puron® refrigerant provide a collection of features unmatched by any other family of equipment. The 286B has been designed utilizing Bryant's Puron® refrigerant. The environmentally sound refrigerant allows consumers to make a responsible decision in the protection of the earth's ozone layer.

This product has been designed and manufactured to meet Energy Star® criteria for energy efficiency when matched with appropriate coil components. Refer to the combination ratings in the Product Data for system combinations that meet Energy Star® guidelines.

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

INDUSTRY LEADING FEATURES / BENEFITS

Energy Efficiency

- 13.7 - 17.2 SEER / 11.2- 13.3 EER / 8.0 - 9.5 HSPF
- Microtube Technology™ refrigeration system
- Indoor air quality accessories available

Sound

- Sound level as low as 68 dBA
- Quiet mount split post compressor grommets
- Compressor sound hood
- 8 pole PSC ball bearing outdoor condenser fan motor

Comfort

- System supports Evolution® Control or standard 2-stage thermostat controls

Reliability

- Puron® refrigerant - environmentally sound, won't deplete the ozone layer and low lifetime service cost.
- Front-seating service valves
- 2-stage scroll compressor
- Internal pressure relief valve
- Internal thermal overload
- High pressure switch
- Loss of charge switch
- Filter drier
- Balanced refrigeration system for maximum reliability
- Crankcase heater standard

Controls and Diagnostics

- Evolution™ Control or 2-Stage Thermostat
- 2 control wires to outdoor unit with Evolution® Control (serial numbers 3112E and newer).
- Utility Interface Connection
- Enhanced diagnostics capability with Evolution® Control
- Energy Tracking capability with the Evolution® Connex™ Wall Control w/software version 13 or later
  (Energy Tracking has the ability to monitor and estimate the energy consumption of your Evolution® system.)

Durability

DuraGuard Plus™ protection package:

- Solid, Durable sheet metal construction
- Steel louver coil guard
- Baked-on, complete outer coverage, powder paint

Applications

- Long-line - up to 250 feet (76.2 m) total equivalent length, up to 200 feet (60.96 m) condenser above evaporator, or up to 80 ft. (24.38 m) evaporator above condenser (See Longline Guide for more information.)
- Low ambient cooling (down to 0°F / -17.8°C) with approved low ambient accessory kits or complete Evolution® system.

MODEL NUMBER NOMENCLATURE

1	2	3	4	5	6	7	8	9	10	11	12	14
N	N	N	A	A/N	N	N	N	N	A/N	A/N	N	A
2	**8**	**6**	**B**	**N**	**A**	**0**	**3**	**6**	**0**	**0**	**0**	**A**
Product Family	Tier	SEER	Major Series	Voltage	Variations	Cooling Capacity			Open	Open	Open	Series
2=HP	8= Evolution Series	6 = 16 SEER	B=Puron	N= 208–230–1 or 208/230–1	A = Standard				0=Not Defined	0=Not Defined	0=Not Defined	A = Original Series

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ENERGY STAR

This product has been designed and manufactured to meet Energy Star® criteria for energy efficiency when matched with appropriate coil components. However, proper refrigerant charge and proper air flow are critical to achieve rated capacity and efficiency. Installation of this product should follow all manufacturing refrigerant charging and air flow instructions. **Failure to confirm proper charge and air flow may reduce energy efficiency and shorten equipment life.**

STANDARD FEATURES

FEATURES	024–E	036–C	048–B	060–C
Puron Refrigerant	X	X	X	X
Maximum SEER Rating*	17.2	17.0	16.5	16.0
2 control wires to outdoor unit with Evolution Control (serial numbers 3112E and newer)	X	X	X	X
2–Stage Scroll Compressor	X	X	X	X
Louvered Coil Guard	X	X	X	X
Field Installed Filter Drier	X	X	X	X
Front Seating Service Valves	X	X	X	X
Internal Pressure Relief Valve	X	X	X	X
Long Line capability	X	X	X	X
Loss of Charge Switch	X	X	X	X
High Pressure Switch	X	X	X	X
Crankcase Heater	X	X	X	X
Low ambient cooling down to 0°F capability with Evolution Control or Approved Kits	X	X	X	X
Utility Interface Connections	X	X	X	X
Enhanced Diagnostics with Evolution Control	X	X	X	X
Energy Tracking Capability with the Evolution® Connex™ Wall Control (requires software version 13 or later)	X	X	X	X
Sound Blanket	X	X	X	X

* With approved combinations
X = Standard

PHYSICAL DATA

Model	286BNA			
UNIT SIZE SERIES	24–E	36–C	48–B	60–C
Operating Weight lb (kg)	266 (121)	287 (130)	319 (145)	341 (155)
Shipping Weight lb (kg)	309 (140)	330 (150)	362 (164)	386 (175)
Compressor Type	Ultratech® Scroll			
REFRIGERANT	Puron® (R–410A)			
Control	TXV (Puron Hard Shutoff)			
Charge lb (kg)	13.07 (5.93)	13.70 (6.21)	13.73 (6.23)	14.78 (6.70)
Outdoor Htg Piston #	46	55	61	67
COND FAN	Propeller Type, Direct Drive			
Air Discharge	Vertical			
Air Qty (CFM)	3200	3200	4350	5000
Motor HP	1/12	1/12	1/4	1/4
Motor RPM	800	800	825	825
COND COIL				
Face Area (Sq ft)	25.2	25.2	25.2	30.18
Fins per In.	20	20	20	20
Rows	2	2	2	2
Circuits	8	8	8	10
VALVE CONNECT. (In. ID)				
Vapor	3/4	7/8	7/8	7/8
Liquid	3/8			
REFRIGERANT TUBES (In. OD)				
Rated Vapor*	3/4	7/8	1–1/8	1–1/8
Max Liquid Line	3/8			

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

Note: See unit Installation Instruction for proper installation.

VAPOR LINE SIZING AND COOLING CAPACITY LOSS

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

Unit Nominal Size (Btuh)	Maximum Liquid Line Diameters (In. OD)	Vapor Line Diameters (In.) OD	Cooling Capacity Loss (%) Total Equivalent Line Length ft. (m)								
			Standard Application		Long Line Application Requires Accessories						
			26–50 (7.9–15.2)	51–80 (15.5–24.4)	81–100 (24.7–30.5)	101–125 (30.8–38.1)	126–150 (38.4–45.7)	151–175 (46.0–50.3)	176–200 (53.6–60.0)	201–225 (61.3–68.6)	226–250 (68.9–76.2)
24,000 2–Stage HP with Puron	3/8	5/8	0	1	1	2	3	3	4	4	5
		3/4	0	1	1	1	1	1	1	1	1
36,000 2–Stage HP with Puron	3/8	5/8	1	2	4	5	6	7	9	10	11
		3/4	0	0	1	1	2	2	3	3	4
		7/8	0	0	—	—	—	—	—	—	—
48,000 2–Stage HP with Puron	3/8	3/4	1	2	2	3	4	5	6	7	7
		7/8	0	1	1	2	2	2	3	3	4
		1–1/8	0	0	—	—	—	—	—	—	—
60,000 2–Stage HP with Puron	3/8	3/4	1	2	4	5	6	8	9	10	11
		7/8	0	1	2	2	3	4	4	5	5
		1–1/8	0	0	—	—	—	—	—	—	—

Standard Length = 80 ft. (24.4 m) or less total equivalent length

Applications in this area are long line. Accessories are required as shown recommended on Long Line Application Guidelines

Applications in this area may have height restrictions that limit allowable total equivalent length, when outdoor unit is below indoor unit.

— Applications in this area are not recommended due to insufficient oil return.

REFRIGERANT PIPING LENGTH LIMITATIONS

Maximum Line Lengths:

The maximum allowable total equivalent length for heat pumps varies depending on the vertical separation. See the tables below for allowable lengths depending on whether the outdoor unit is on the same level, above or below the outdoor unit.

Maximum Line Lengths for Heat Pump Applications

	MAXIMUM ACTUAL LENGTH ft (m)	MAXIMUM EQUIVALENT LENGTH† ft (m)	MAXIMUM VERTICAL SEPARATION ft (m)
Units on equal level	200 (61)	250 (76.2)	N/A
Outdoor unit ABOVE indoor unit	200 (61)	250 (76.2)	200 (61)
Outdoor unit BELOW indoor unit	See Table *'Maximum Total Equivalent Length: Outdoor Unit BELOW Indoor Unit'*		

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

Maximum Total Equivalent Length† - Outdoor Unit BELOW Indoor Unit

Size	Liquid Line Diameter w/ TXV	HP with Puron® Refrigerant – Maximum Total Equivalent Length† Vertical Separation ft (m) Outdoor unit BELOW indoor unit;						
		0–20 (0 – 6.1)	21–30 (6.4 – 9.1)	31–40 (9.4 – 12.2)	41–50 (12.5 – 15.2)	51–60 (15.5 – 18.3)	61–70 (18.6 – 21.3)	71–80 (21.6 – 24.4)
024 HP with Puron	3/8	250*	250*	250*	250*	250*	250*	250*
036 HP with Puron	3/8	250*	250*	250*	250*	250*	250*	250*
048 HP with Puron	3/8	250*	250*	250*	250*	230	160	– –
060 HP with Puron	3/8	250*	225*	190	150	110	– –	– –

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

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

– – = outside acceptable range

LONG LINE APPLICATIONS

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

For Heat Pump systems, the chart below shows when an application is considered Long Line. Beyond these lengths, long line accessories are required:

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

Liquid Line Size	Units On Same Level	Outdoor Below Indoor	Outdoor Above Indoor
3/8	80 (24.4)	20 (6.1) vertical or 80 (24.4) total	80 (24.4)

Note: See Long Line Guideline for details

ACCESSORIES

KIT NUMBER	KIT NAME	024−E	036−C	048−B	060−C
KHALS0401LLS	SOLENOID VALVE	X	X	X	X
KSAHS2501AAA†	HARD START KIT	X	X		
KSAHS2801AAA†	HARD START KIT			X	X
KSASF0101AAA	SUPPORT FEET	X	X	X	X
KSAFT0101AAA	FREEZE THERMOSTAT	X	X	X	X
KSALA0301410	LOW AMBIENT PRESSURE SWITCH	X	X	X	X
KHAIR0201AAA	ISOLATION RELAY	X	X	X	X

x = Accessory S = Standard

† Not backward compatible to previous series.

ACCESSORY CONTROLS

CONTROL	DESCRIPTION
SYSTXBBECC01−A	Evolution® Connex™ Control with Wi−Fi®
SYSTXBBECN01	Evolution® Connex™ Control (non−Wi−Fi®)
SYSTXBBECW01	Evolution® Connex™ Control with Wi−Fi® Bundle
SYSTXBB4ZC01	Evolution® 4−Zone Damper Control Module (Wall−mounted control for a four−zone system.)
SYSTXBBSMS01	Evolution® Smart Sensor (Optional wall control used to monitor temperature and/or fan control in an individual zone.)
SYSTXBBRRS01	Evolution® Remote Room Sensor (Monitors temperature in an individual zone.)
SYSTXBBRWF01	Evolution® Remote Access Module, Broadband Wi−Fi® Wireless
SYSTXBBRCT01	Evolution® Remote Access Module, Broadband Cat−5 Wired
SYSTXBBNIM01	Evolution® Network Interface Module (Connects Heat Recovery and Energy Recovery Ventilators on non−zoning applications.)

ACCESSORY USAGE GUIDELINE

Accessory	Required for Low Ambient Cooling Applications Utilizing 2−Stage Thermostat on 16 SEER Models Only (Below 55° F / 12.8° C)	Required for Low Ambient Cooling Applications Utilizing UI (Below 55° F / 12.8° C)	Required for Long Line Applications*	Required for Sea Coast Applications (within 2 miles/3.2 km)
Compressor Start Assist Capacitor and Relay	No	No	No	No
Crankcase Heater	Yes (standard on some units)	Yes (standard on some units)	Yes (standard on some units)	No
Evaporator Freeze Thermostat	Yes (kit required)	Standard with Evolution Control (no kit required)	No	No
Isolation Relay	Yes (kit required)	Standard with Evolution Control (no kit required)	No	No
Liquid Line Solenoid Valve	No	No	No	No
Low−Ambient Pressure Switch	Yes (kit required)	Standard with Evolution Control (no kit required)	See Residential Piping and Long Line Guideline	No
Puron Refrigerant Balance Port Hard Shutoff TXV	Yes (standard w/factory approved indoor unit)	Yes (standard w/factory approved indoor unit)	Yes (standard w/factory approved indoor unit)	Yes (standard w/factory approved indoor unit)
Support Feet	Recommended	Recommended	No	Recommended

* For tubing set lengths between 80 and 200 ft. (24.38 and 60.96 m) horizontal or 20 ft. (6.10 m) vertical differential (total equivalent length), refer to the Residential Piping and Long Line Guideline

Accessory Description and Usage (Listed Alphabetically)

1. Compressor Start Assist - Capacitor and Relay

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

Usage Guideline:

Not required on this unit since compressor always starts unloaded.

Available if required by local codes.

2. Crankcase Heater

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

Usage Guideline:

Required in low ambient cooling applications.

Required in long line applications.

3. Evaporator Freeze Thermostat

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

Usage Guideline:

Required when low ambient kit has been added.

4. Isolation Relay

An SPDT relay which switches the low ambient controller out of the outdoor fan motor circuit when the heat pump switches to heating mode.

Usage Guideline:

Required in all heat pumps where low ambient kit has been added.

5. Low-Ambient Pressure Switch

A long life pressure switch which is mounted to outdoor unit service valve. It is designed to cycle the outdoor fan motor in order to maintain head pressure within normal operating limits. The control will maintain working head pressure at low-ambient temperatures down to 0°F (-17.8°C) when properly installed.

Usage Guideline:

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

Suggested in all commercial applications.

6. Liquid-Line Solenoid Valve (LLS)

An electrically operated shutoff valve which stops and starts refrigerant liquid flow in response to compressor operation. It is to be installed at the outdoor unit to control refrigerant off cycle migration in the heating mode.

Usage Guideline:

An LLS is required in all long line heat pump applications to control refrigerant off cycle migration in the heating mode. See Long Line Guideline.

Suggested for all commercial applications.

7. Thermostatic Expansion Valve (TXV) Bi-Flow

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

Usage Guideline:

Accessory required to meet AHRI rating and system reliability, where indoor not equipped.

Required in all heat pump applications designed with Puron refrigerant.

ELECTRICAL DATA

UNIT SIZE – SERIES	V/PH	OPER VOLTS*		COMPR		FAN	MCA	MIN WIRE SIZE†	MIN WIRE SIZE†	MAX LENGTH ft (m)‡	MAX LENGTH ft (m)‡	MAX FUSE* * or CKT BRK AMPS
		MAX	MIN	LRA	RLA	FLA		60°C	75°C	60°C	75°C	
24 – E	208 – 230/1	253	197	58.3	12.5	0.6	16.2	14	14	48 (14.8)	46 (14.1)	25
36 – C				83.0	18.5	0.6	23.7	12	12	52 (16.0)	50 (15.3)	40
48 – B				104.0	22.8	1.3	29.8	10	10	67 (20.4)	63 (19.4)	50
60 – C				152.9	28.8	1.5	37.5	8	8	82 (25.2)	78 (24.0)	60

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

† If wire is applied at ambient greater than 30°C, consult table 310 – 16 of the NEC (NFPA 70). The ampacity of non – metallic – sheathed cable (NM), trade name ROMEX, shall be that of 60°C conditions, per the NEC (NFPA 70) Article 336 – 26. If other than uncoated (no – plated), 60 or 75°C insulation, copper wire (solid wire for 10 AWG or smaller, stranded wire for larger than 10 AWG) is used, consult applicable tables of the NEC (NFPA 70).

‡ Length shown is as measured 1 way along wire path between unit and service panel for voltage drop not to exceed 2%.

** Time – Delay fuse.

FLA – Full Load Amps

LRA – Locked Rotor Amps

MCA – Minimum Circuit Amps

RLA – Rated Load Amps

NOTE: Control circuit is 24 – V on all units and requires external power source. Copper wire must be used from service disconnect to unit.
All motors/compressors contain internal overload protection.
Complies with 2010 requirements of ASHRAE Standards 90.1

SOUND POWER LEVEL (dBA)

UNIT SIZE – SERIES	STANDARD RATING (dBA)	TYPICAL OCTAVE BAND SPECTRUM (dBA, without tone adjustment)						
		125	250	500	1000	2000	4000	8000
24 – E	72 – High Stage	52.0	55.0	62.0	67.5	60.5	57.5	51.5
	68 – Low Stage	51.0	55.5	61.5	63.5	60.5	58.0	50.5
36 – C	73 – High Stage	51.5	55.5	62.0	69.0	60.0	57.5	50.0
	70 – Low Stage	51.5	56.0	61.5	65.5	59.5	58.0	50.5
48 – B	72 – High Stage	53.0	60.0	66.5	66.5	61.0	58.0	50.5
	71 – Low Stage	53.0	60.0	66.5	64.0	61.0	59.0	52.0
60 – C	72 – High Stage	53.0	61.0	65.0	67.0	63.0	61.0	57.0
	72 – Low Stage	52.0	60.5	65.5	66.5	63.5	61.0	55.0

NOTE: Tested in compliance with AHRI 270 – 2008 but not listed with AHRI.

* Low stage tested at 82°F ((27.8°C) outdoor temperature.

CHARGING SUBCOOLING (TXV-TYPE EXPANSION DEVICE)

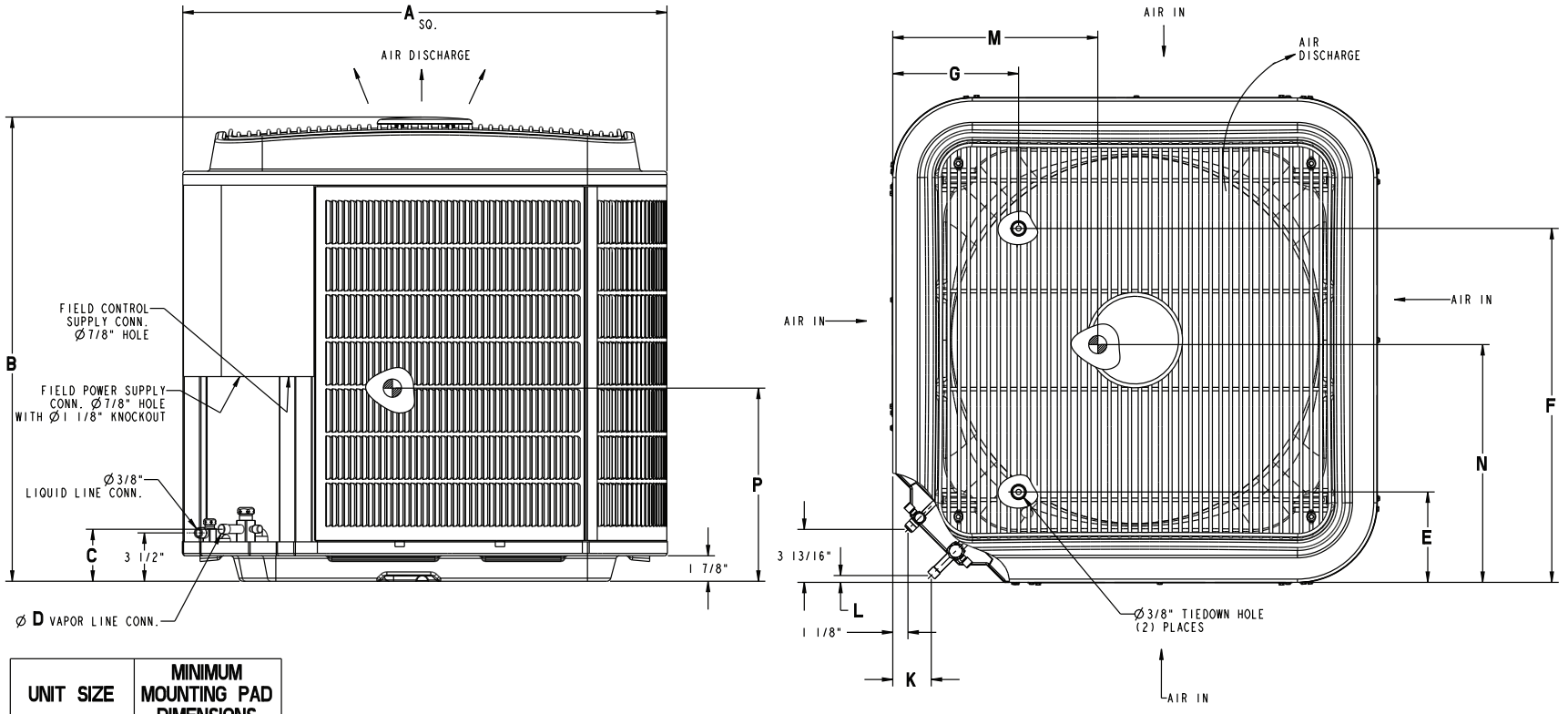
UNIT SIZE – SERIES	REQUIRED SUBCOOLING °F (°C)
286BNA024 – E	10 (5.6)
286BNA036 – C	13 (7.2)
286BNA048 – B	12 (6.7)
286BNA060 – C	11 (6.1)

DIMENSIONS (ENGLISH)

UNIT	SERIES	ELECTRICAL CHARACTERISTICS				A	B	C	D	E	F	G	K	L	M	N	P	OPERATING WEIGHT (lbs)	SHIPPING WEIGHT (lbs)	SHIPPING DIMENSIONS (L x W x H)
286B024A	E	X	O	O	O	35"	40 1/4"	3 3/4"	3/4"	6 9/16"	28 7/16"	9 1/8"	2 13/16"	1/2"	17 1/4"	18	18	266	309	36 1/8" X 39 1/4" X 46 1/8"
286B036A	C	X	O	O	O	35"	40 1/4"	3 7/8"	7/8"	6 9/16"	28 7/16"	9 1/8"	2 15/16"	5/8"	17"	18 1/2"	18 3/4"	287	330	36 1/8" X 39 1/4" X 46 1/8"
286B048A	B	X	O	O	O	35"	40 1/4"	3 7/8"	7/8"	6 9/16"	28 7/16"	9 1/8"	2 15/16"	5/8"	17 1/2"	18 1/4"	20"	319	362	36 1/8" X 39 1/4" X 46 1/8"
286B060A	C	X	O	O	O	35"	47 1/16"	3 7/8"	7/8"	6 9/16"	28 7/16"	9 1/8"	2 15/16"	5/8"	16 1/2"	17 1/8"	21"	341	386	36 1/8" X 39 1/4" X 50 13/16"

208-230-1-60	208/230-3-60	460-3-60	575-3-60

X = YES
O = NO

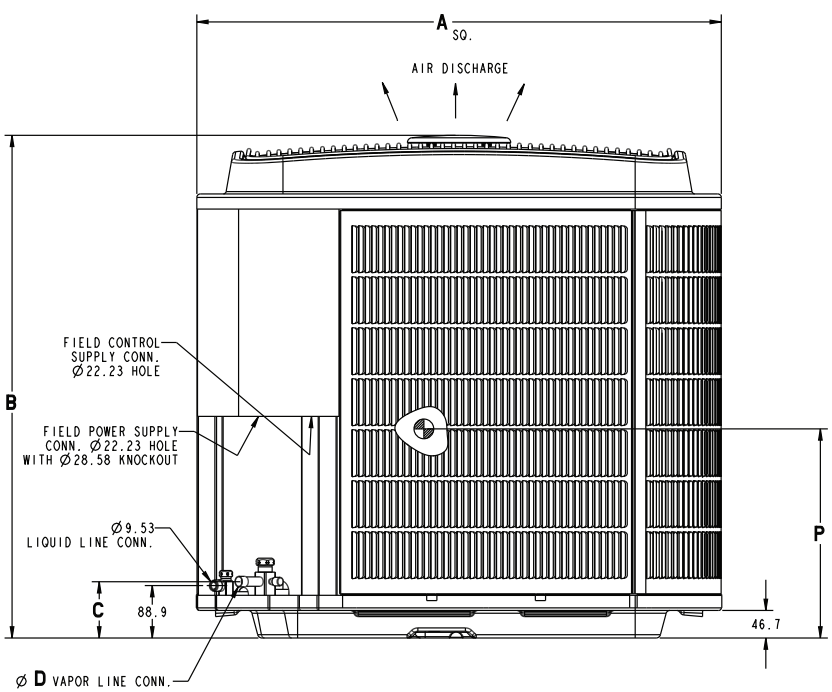


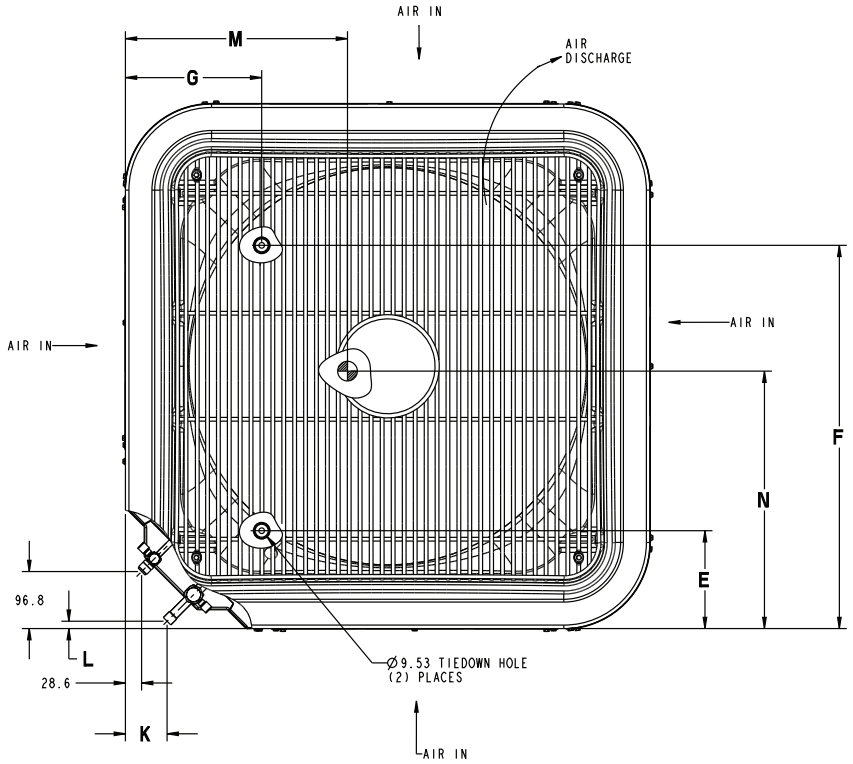
UNIT SIZE	MINIMUM MOUNTING PAD DIMENSIONS
-	26" X 26"
-	31 1/2" X 31 1/2"
24,36,48,60	35" X 35"

DIMENSIONS (SI)

UNIT	SERIES	ELECTRICAL CHARACTERISTICS				A	B	C	D	E	F	G	K	L	M	N	P	OPERATING WEIGHT (Kgs)	SHIPPING WEIGHT (Kgs)	SHIPPING DIMENSIONS (L x W x H)
286B024A	E	X	O	O	O	889.0	1022.9	95.6	19.1	166.1	722.8	231.3	70.9	12.8	438.2	457.2	457.2	120.7	140.2	917.7 X 997.7 X 1172.2
286B036A	C	X	O	O	O	889.0	1022.9	97.9	22.2	166.1	722.8	231.3	74.5	16.3	431.8	469.9	476.3	130.2	149.7	917.7 X 997.7 X 1172.2
286B048A	B	X	O	O	O	889.0	1022.9	97.9	22.2	166.1	722.8	231.3	74.5	16.3	444.5	463.9	508.0	144.7	164.2	917.7 X 997.7 X 1172.2
286B060A	C	X	O	O	O	889.0	1195.7	97.9	22.2	166.1	722.8	231.3	74.5	16.3	419.1	435.0	533.4	154.7	175.1	917.7 X 997.7 X 1290.3
		208-230-1-60	208/230-3-60	460-3-60	575-3-60															

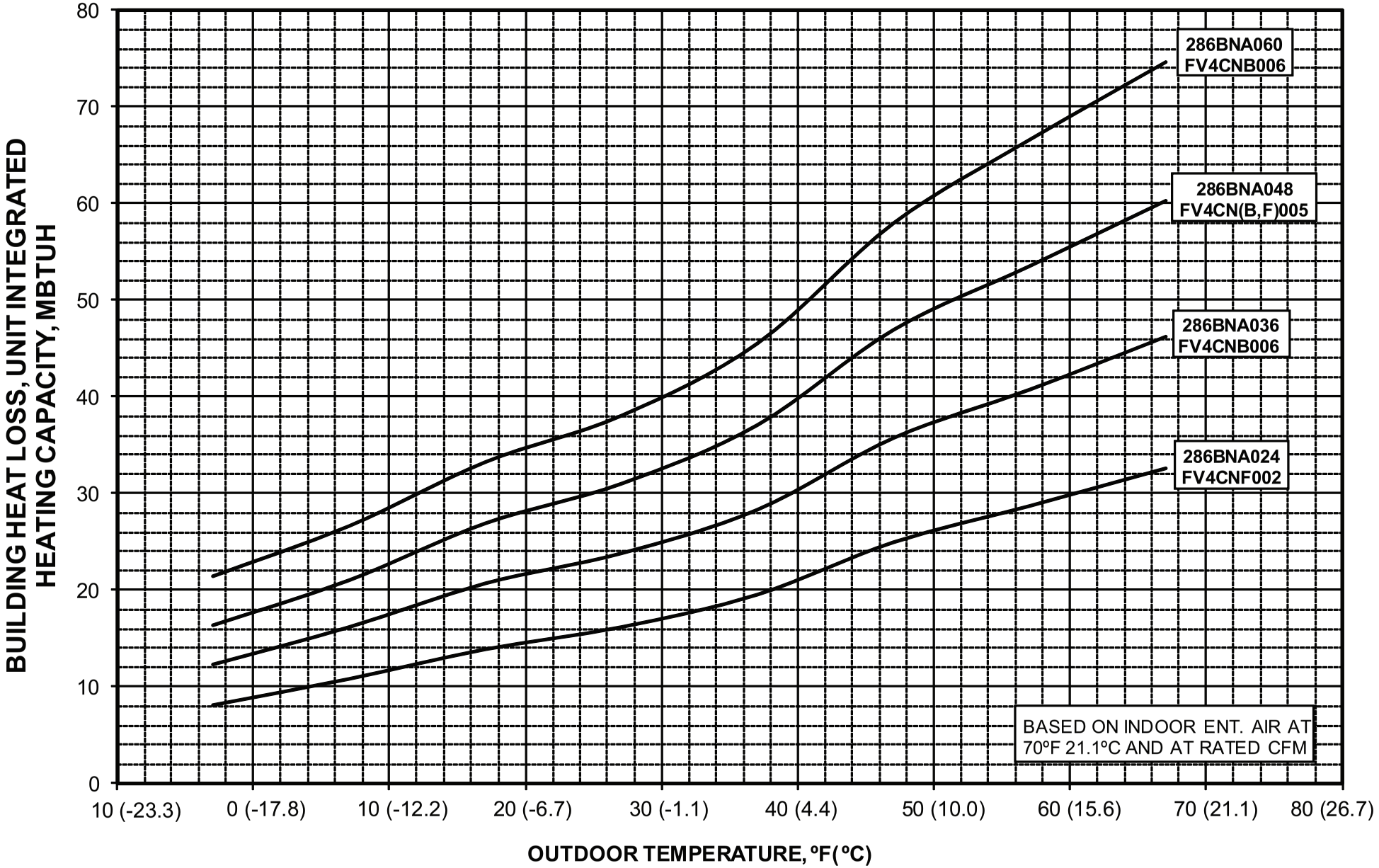
X = YES
O = NO



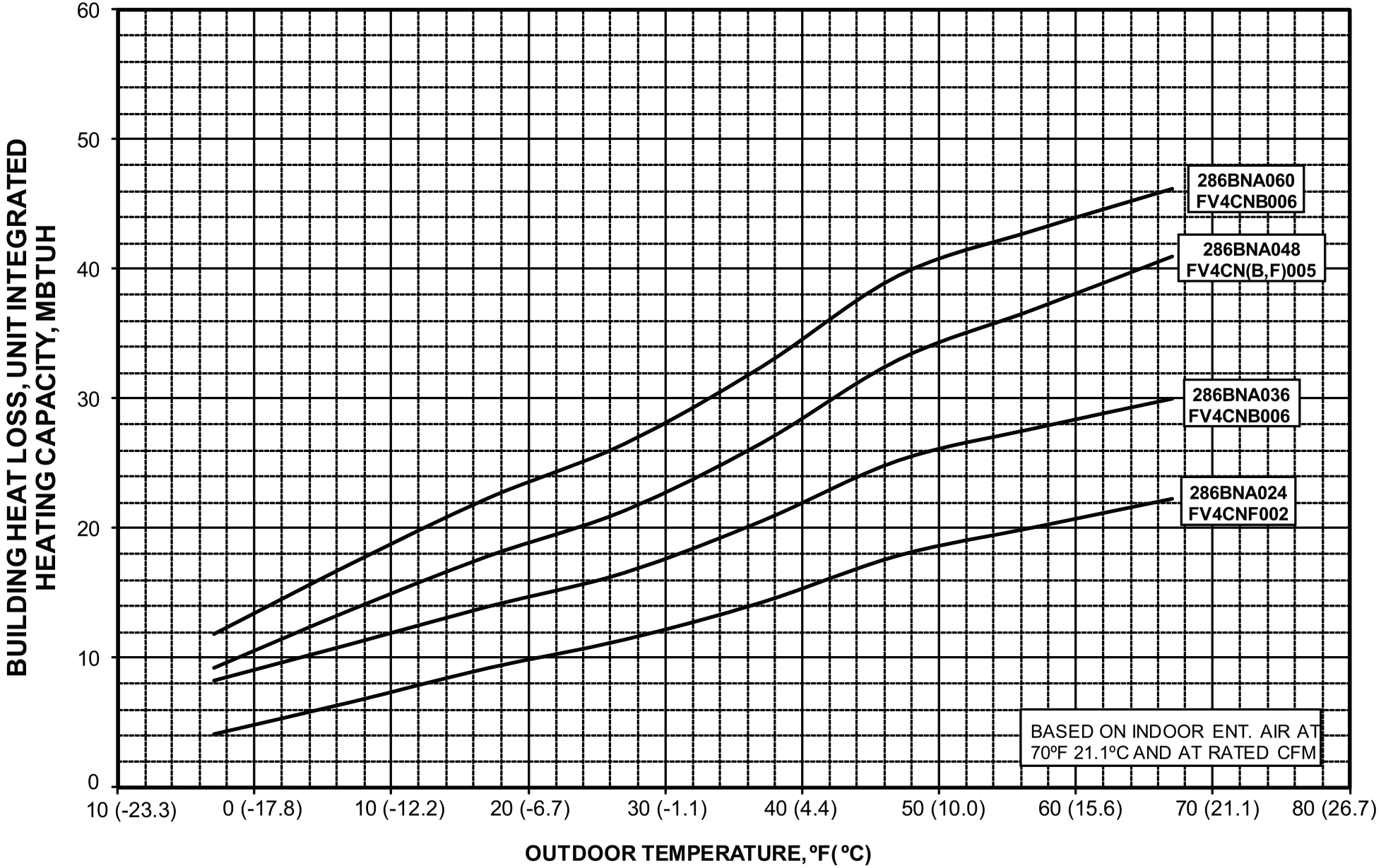


UNIT SIZE	MINIMUM MOUNTING PAD DIMENSIONS
-	660.4 X 660.4
-	800.1 X 800.1
24,36,48,60	889.0 X 889.0

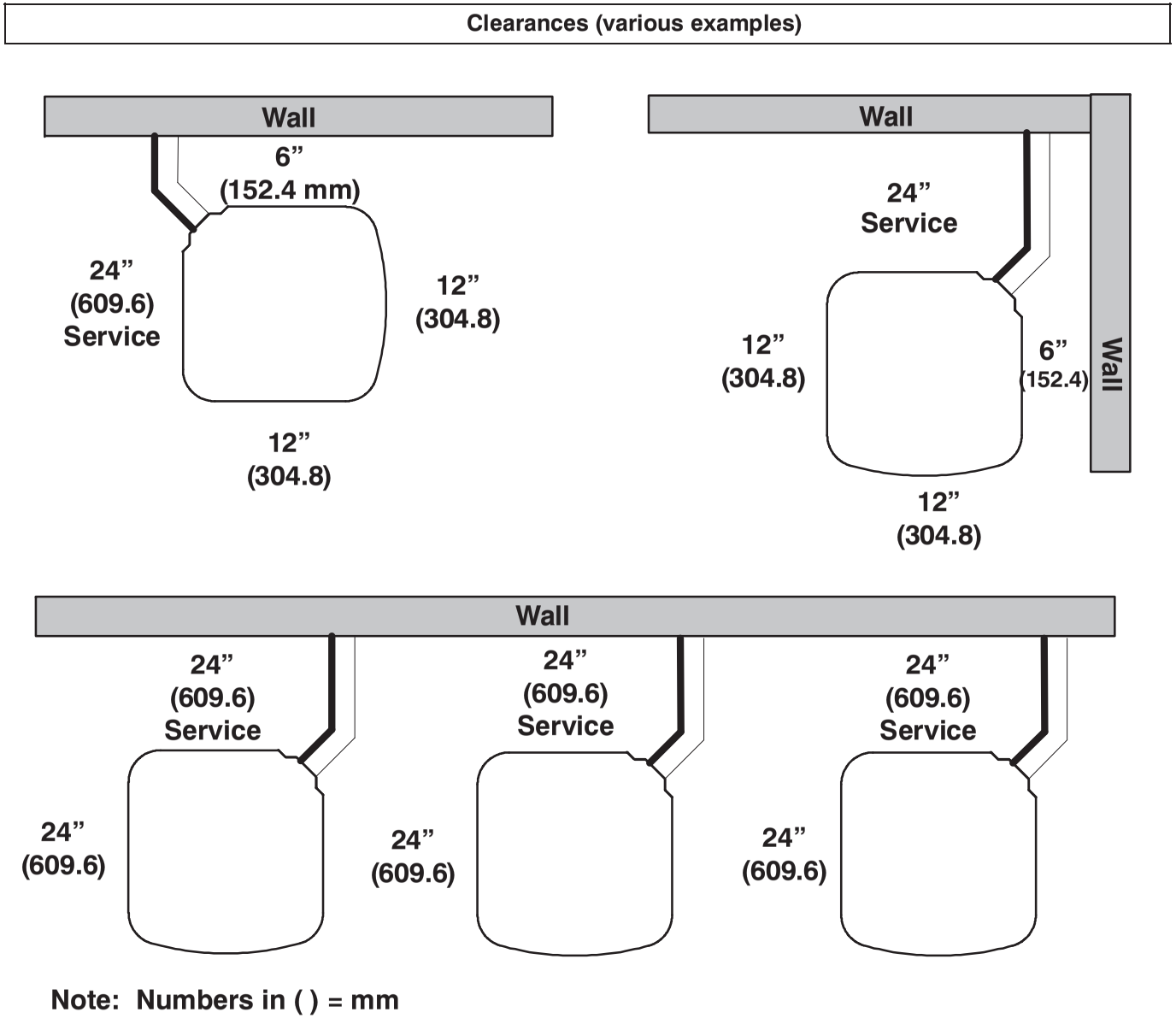
BALANCE POINT WORKSHEET - HIGH STAGE



BALANCE POINT WORKSHEET - LOW STAGE



CLEARANCES



IMPORTANT: When installing multiple units in an alcove, roof well, or partially enclosed area, ensure there is adequate ventilation to prevent re-circulation of discharge air.

TESTED AHRI COMBINATION RATINGS*

NOTE: Ratings contained in this document are subject to change at any time.

For AHRI ratings certificates, please refer to the AHRI directory www.ahridirectory.org
Additional ratings and system combinations can be accessed via the Bryant database at: www.MyBryantRatings.com

For performance data at specific application &/or design conditions with various indoor unit combinations, the equipment performance calculator can be accessed at : http://rpmob.wrightsoft.com/

Model Number	Coil Model Number	Furnace Model Number	Cooling Capacity	Cooling				Heating				
				EER	SEER	ID CFM		High Temp		HSPF	Low Temp	
						High	Low	Capacity 47°F (8°C)	COP		Capacity 17°F (–8°C)	COP
286BNA024****E	FV4CNF002		24,000	13.0	17.0	700	560	25,000	3.90	9.0	15,300	2.74
286BNA036****C*	FV4CNB006		36,400	13.3	17.0	1050	840	35,800	4.06	9.5	22,600	3.00
286BNA048****B	FV4CN(B,F)005		47,000	12.5	16.0	1400	1120	47,000	3.68	9.0	29,200	2.72
286BNA060****C	FV4CNB006		56,500	12.5	16.0	1750	1400	58,000	3.72	9.0	36,000	2.76

* Ratings are net values reflecting the effects of circulating fan heat. Supplemental electric heat is not included. Ratings are based on:
Cooling Standard: 80°F (27°C) db 67°F (19°C) wb indoor entering air temperature and 95°F (35°C) db air entering outdoor unit.
High–Temp Heating Standard: 70°F (21°C) db indoor entering air temperature and 47°F (8°C) db 43°F (6°C) wb air entering outdoor unit.
Low–Temp Heating Standard: 70°F (21°C) db indoor entering air temperature and 17°F (–8°C) db 15°F (–9°C) wb air entering outdoor unit.
EER — Energy Efficiency Ratio
SEER — Seasonal Energy Efficiency Ratio
COP — Coefficient of Performance
HSPF — Heating Seasonal Performance Factor

DETAILED COOLING CAPACITIES#

EVAPORATOR AIR		CONDENSER ENTERING AIR TEMPERATURES °F (°C)																	
		75 (23.9)			85 (29.4)			95 (35)			105 (40.6)			115 (46.1)			125 (51.7)		
CFM	EWB °F (°C)	Capacity MBtuh		Total Sys. KW**	Capacity MBtuh		Total Sys. KW**	Capacity MBtuh		Total Sys. KW**	Capacity MBtuh		Total Sys. KW**	Capacity MBtuh		Total Sys. KW**	Capacity MBtuh		Total Sys. KW**
		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡	
286BNA024****E Outdoor Section With FV4CNF002 Indoor Section – HIGH																			
600	57 (13.9)	22.47	22.47	1.42	21.26	21.26	1.60	20.00	20.00	1.81	18.69	18.69	2.06	17.34	17.34	2.35	15.96	15.96	2.72
	62 (16.7)	24.04	20.32	1.43	22.54	19.39	1.61	20.99	18.43	1.82	19.39	17.45	2.06	17.77	16.44	2.36	16.14	15.39	2.72
	63 (17.2)††	24.52	16.88	1.43	22.99	16.03	1.61	21.40	15.16	1.82	19.77	14.27	2.06	18.10	13.37	2.36	16.39	12.47	2.72
	67 (19.4)	26.60	17.58	1.44	24.94	16.71	1.62	23.23	15.82	1.83	21.47	14.92	2.07	19.68	14.02	2.37	17.86	13.10	2.73
	72 (22.2)	29.45	14.67	1.46	27.62	13.88	1.64	25.73	13.07	1.84	23.80	12.26	2.09	21.84	11.45	2.38	19.84	10.63	2.74
650	57 (13.9)	23.20	23.20	1.43	21.94	21.94	1.61	20.62	20.62	1.82	19.26	19.26	2.07	17.86	17.86	2.36	16.42	16.42	2.73
	62 (16.7)	24.52	21.24	1.44	22.98	20.27	1.62	21.39	19.27	1.82	19.75	18.25	2.07	18.11	17.18	2.37	16.46	16.46	2.73
	63 (17.2)††	25.01	17.53	1.44	23.43	16.66	1.62	21.79	15.76	1.83	20.11	14.85	2.07	18.40	13.93	2.37	16.65	13.00	2.73
	67 (19.4)	27.11	18.28	1.45	25.41	17.38	1.63	23.64	16.47	1.84	21.83	15.54	2.08	20.00	14.61	2.38	18.13	13.67	2.74
	72 (22.2)	30.01	15.16	1.47	28.12	14.35	1.65	26.17	13.52	1.85	24.19	12.70	2.10	22.17	11.86	2.39	20.13	11.01	2.74
700	57 (13.9)	23.88	23.88	1.44	22.56	22.56	1.62	21.20	21.20	1.83	19.78	19.78	2.08	18.33	18.33	2.37	16.84	16.84	2.74
	62 (16.7)	24.95	22.13	1.45	23.38	21.12	1.63	21.74	20.08	1.83	20.08	19.01	2.08	18.42	18.27	2.37	16.87	16.87	2.74
	63 (17.2)††	25.44	18.16	1.45	23.82	17.27	1.63	22.14	16.35	1.84	20.41	15.41	2.08	18.65	14.47	2.38	16.87	13.52	2.74
	67 (19.4)	27.57	18.95	1.46	25.81	18.03	1.64	24.00	17.09	1.85	22.15	16.14	2.09	20.27	15.19	2.39	18.36	14.23	2.74
	72 (22.2)	30.50	15.64	1.48	28.55	14.80	1.65	26.55	13.96	1.86	24.52	13.11	2.10	22.46	12.24	2.40	20.38	11.37	2.75
800	57 (13.9)	25.06	25.06	1.46	23.66	23.66	1.64	22.20	22.20	1.85	20.69	20.69	2.09	19.15	19.15	2.39	17.57	17.57	2.75
	62 (16.7)	25.69	23.81	1.46	24.06	22.72	1.64	22.38	21.57	1.85	20.73	20.73	2.10	19.18	19.18	2.39	17.60	17.60	2.75
	63 (17.2)††	26.15	19.37	1.47	24.45	18.44	1.65	22.69	17.47	1.85	20.90	16.49	2.10	19.08	15.51	2.39	17.23	14.51	2.75
	67 (19.4)	28.31	20.24	1.48	26.48	19.28	1.66	24.59	18.30	1.86	22.66	17.31	2.11	20.71	16.31	2.40	18.74	15.30	2.76
	72 (22.2)	31.29	16.52	1.49	29.26	15.64	1.67	27.18	14.75	1.87	25.08	13.85	2.12	22.94	12.95	2.41	20.79	12.04	2.77
286BNA024****E Outdoor Section With FV4CNF002 Indoor Section – LOW																			
480	57 (13.9)	17.40	17.40	1.02	16.19	16.19	1.19	14.92	14.92	1.39	13.64	13.64	1.62	12.37	12.37	1.89	11.13	11.13	2.20
	62 (16.7)	18.34	16.19	1.02	16.89	15.05	1.19	15.38	13.92	1.39	13.87	12.77	1.62	12.43	12.34	1.89	11.15	11.15	2.20
	63 (17.2)††	18.71	13.35	1.01	17.22	12.36	1.18	15.67	11.36	1.38	14.11	10.38	1.62	12.58	9.42	1.89	11.11	8.51	2.20
	67 (19.4)	20.36	13.94	1.00	18.74	12.92	1.17	17.07	11.90	1.37	15.40	10.90	1.60	13.77	9.91	1.88	12.20	8.98	2.19
	72 (22.2)	22.60	11.57	0.98	20.80	10.66	1.15	18.96	9.76	1.35	17.13	8.89	1.59	15.35	8.03	1.86	13.64	7.21	2.19
520	57 (13.9)	17.97	17.97	1.02	16.71	16.71	1.19	15.39	15.39	1.39	14.05	14.05	1.62	12.74	12.74	1.89	11.45	11.45	2.20
	62 (16.7)	18.72	16.93	1.02	17.22	15.75	1.19	15.68	14.56	1.39	14.15	13.34	1.62	12.76	12.76	1.89	11.47	11.47	2.20
	63 (17.2)††	19.08	13.89	1.01	17.54	12.86	1.19	15.95	11.83	1.39	14.35	10.82	1.62	12.79	9.83	1.89	11.28	8.88	2.20
	67 (19.4)	20.75	14.52	1.00	19.07	13.46	1.17	17.36	12.41	1.37	15.65	11.37	1.61	13.98	10.37	1.88	12.37	9.39	2.20
	72 (22.2)	23.02	11.97	0.98	21.16	11.04	1.15	19.27	10.11	1.35	17.40	9.21	1.59	15.58	8.32	1.87	13.83	7.48	2.19
560	57 (13.9)	18.49	18.49	1.02	17.17	17.17	1.19	15.81	15.81	1.39	14.43	14.43	1.62	13.07	13.07	1.89	11.74	11.74	2.21
	62 (16.7)	19.05	17.65	1.02	17.51	16.42	1.19	15.96	15.15	1.39	14.46	14.46	1.62	13.09	13.09	1.89	11.76	11.76	2.21
	63 (17.2)††	19.40	14.41	1.02	17.81	13.35	1.19	16.19	12.29	1.39	14.55	11.24	1.62	12.96	10.23	1.89	11.43	9.24	2.21
	67 (19.4)	21.08	15.07	1.00	19.37	13.99	1.17	17.61	12.90	1.37	15.87	11.83	1.61	14.16	10.80	1.88	12.52	9.80	2.20
	72 (22.2)	23.38	12.35	0.98	21.47	11.41	1.15	19.54	10.45	1.35	17.63	9.50	1.59	15.78	8.60	1.87	14.00	7.73	2.20
640	57 (13.9)	19.40	19.40	1.03	18.00	18.00	1.20	16.55	16.55	1.40	15.08	15.08	1.63	13.64	13.64	1.90	12.24	12.24	2.22
	62 (16.7)	19.63	18.98	1.03	18.07	17.96	1.20	16.57	16.57	1.40	15.11	15.11	1.63	13.67	13.67	1.90	12.26	12.26	2.22
	63 (17.2)††	19.92	15.40	1.03	18.26	14.29	1.20	16.58	13.16	1.40	14.89	12.06	1.63	13.25	10.97	1.91	11.67	9.93	2.22
	67 (19.4)	21.63	16.14	1.01	19.84	14.99	1.18	18.02	13.84	1.38	16.21	12.71	1.62	14.45	11.61	1.90	12.77	10.55	2.22
	72 (22.2)	23.96	13.07	0.99	21.98	12.06	1.16	19.98	11.05	1.36	18.01	10.06	1.60	16.09	9.12	1.88	14.25	8.22	2.21

See notes on pg. 17

DETAILED COOLING CAPACITIES# CONTINUED

EVAPORATOR AIR		CONDENSER ENTERING AIR TEMPERATURES °F (°C)																	
		75 (23.9)			85 (29.4)			95 (35)			105 (40.6)			115 (46.1)			125 (51.7)		
CFM	EWB °F (°C)	Capacity MBtuh		Total Sys. KW**	Capacity MBtuh		Total Sys. KW**	Capacity MBtuh		Total Sys. KW**	Capacity MBtuh		Total Sys. KW**	Capacity MBtuh		Total Sys. KW**	Capacity MBtuh		Total Sys. KW**
		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡	
286BNA036**C* Outdoor Section With FV4CNB006 Indoor Section – HIGH**																			
900	57 (13.9)	33.59	33.59	2.10	32.13	32.13	2.36	30.60	30.60	2.67	28.98	28.98	3.03	27.24	27.24	3.44	25.34	25.34	3.90
	62 (16.7)	35.79	30.52	2.13	33.92	29.55	2.38	31.98	28.55	2.68	29.95	27.51	3.03	27.78	26.41	3.44	25.47	25.23	3.91
	63 (17.2)††	36.56	25.27	2.13	34.65	24.34	2.39	32.68	23.39	2.69	30.59	22.40	3.04	28.37	21.35	3.44	25.95	20.24	3.91
	67 (19.4)	39.56	26.24	2.16	37.50	25.30	2.41	35.38	24.34	2.71	33.12	23.34	3.06	30.72	22.28	3.47	28.13	21.16	3.93
	72 (22.2)	43.66	21.83	2.21	41.43	20.94	2.45	39.09	20.03	2.74	36.62	19.09	3.09	34.00	18.05	3.50	31.17	16.98	3.96
975	57 (13.9)	34.66	34.66	2.12	33.12	33.12	2.38	31.53	31.53	2.69	29.83	29.83	3.04	28.02	28.02	3.45	26.04	26.04	3.92
	62 (16.7)	36.45	31.93	2.14	34.52	30.93	2.39	32.54	29.91	2.69	30.44	28.83	3.05	28.25	27.68	3.45	26.08	26.08	3.92
	63 (17.2)††	37.23	26.25	2.15	35.26	25.31	2.40	33.22	24.33	2.70	31.07	23.32	3.05	28.78	22.25	3.46	26.30	21.12	3.92
	67 (19.4)	40.24	27.28	2.18	38.13	26.33	2.43	35.92	25.34	2.72	33.61	24.32	3.07	31.14	23.24	3.48	28.48	22.10	3.95
	72 (22.2)	44.40	22.51	2.22	42.08	21.60	2.46	39.68	20.67	2.76	37.15	19.70	3.10	34.44	18.66	3.51	31.56	17.58	3.98
1050	57 (13.9)	35.64	35.64	2.14	34.03	34.03	2.40	32.38	32.38	2.70	30.61	30.61	3.06	28.73	28.73	3.47	26.66	26.66	3.94
	62 (16.7)	37.04	33.31	2.16	35.06	32.28	2.41	33.03	31.22	2.71	30.91	30.11	3.06	28.77	28.77	3.47	26.70	26.70	3.94
	63 (17.2)††	37.80	27.21	2.16	35.78	26.24	2.41	33.69	25.26	2.71	31.48	24.22	3.07	29.13	23.13	3.47	26.60	21.97	3.94
	67 (19.4)	40.84	28.30	2.20	38.66	27.32	2.44	36.40	26.32	2.74	34.03	25.28	3.09	31.49	24.18	3.49	28.79	23.03	3.96
	72 (22.2)	45.03	23.16	2.24	42.65	22.24	2.48	40.20	21.29	2.77	37.60	20.30	3.12	34.83	19.26	3.52	31.88	18.16	3.99
1200	57 (13.9)	37.35	37.35	2.18	35.63	35.63	2.43	33.86	33.86	2.74	31.97	31.97	3.09	29.94	29.94	3.50	27.74	27.74	3.97
	62 (16.7)	38.04	35.95	2.19	36.01	34.85	2.44	33.95	33.86	2.74	32.02	32.02	3.09	29.98	29.98	3.50	27.78	27.78	3.97
	63 (17.2)††	38.75	29.06	2.19	36.63	28.06	2.44	34.43	27.03	2.74	32.13	25.96	3.09	29.69	24.84	3.50	27.07	23.64	3.96
	67 (19.4)	41.80	30.27	2.23	39.53	29.26	2.47	37.17	28.23	2.76	34.71	27.15	3.11	32.08	26.02	3.52	29.28	24.82	3.99
	72 (22.2)	46.06	24.41	2.27	43.58	23.47	2.51	41.01	22.49	2.80	38.32	21.48	3.15	35.44	20.41	3.55	32.39	19.28	4.02
286BNA036**C* Outdoor Section With FV4CNB006 Indoor Section – LOW**																			
720	57 (13.9)	25.97	25.97	1.44	24.13	24.13	1.73	22.32	22.32	2.06	20.47	20.47	2.46	18.58	18.58	2.93	16.64	16.64	3.49
	62 (16.7)	27.04	24.32	1.44	24.89	22.65	1.72	22.77	21.00	2.06	20.65	19.36	2.46	18.62	18.62	2.93	16.67	16.67	3.49
	63 (17.2)††	27.62	19.90	1.43	25.41	18.43	1.72	23.23	17.00	2.05	21.04	15.58	2.46	18.80	14.16	2.93	16.53	12.76	3.49
	67 (19.4)	30.03	20.80	1.41	27.65	19.26	1.70	25.29	17.79	2.04	22.92	16.32	2.44	20.50	14.87	2.91	18.05	13.43	3.47
	72 (22.2)	33.45	17.17	1.38	30.80	15.82	1.67	28.18	14.50	2.01	25.56	13.21	2.41	22.91	11.93	2.88	20.21	10.66	3.44
780	57 (13.9)	26.78	26.78	1.44	24.87	24.87	1.72	22.98	22.98	2.06	21.07	21.07	2.46	19.11	19.11	2.93	17.10	17.10	3.49
	62 (16.7)	27.53	25.51	1.44	25.33	23.77	1.72	23.18	22.04	2.06	21.11	21.11	2.46	19.14	19.14	2.93	17.13	17.13	3.49
	63 (17.2)††	28.09	20.73	1.43	25.83	19.21	1.72	23.59	17.73	2.06	21.34	16.26	2.46	19.06	14.80	2.94	16.73	13.35	3.50
	67 (19.4)	30.55	21.66	1.41	28.10	20.10	1.70	25.67	18.57	2.04	23.25	17.06	2.44	20.78	15.56	2.91	18.28	14.07	3.47
	72 (22.2)	34.02	17.75	1.39	31.29	16.36	1.68	28.60	15.01	2.02	25.92	13.69	2.42	23.21	12.37	2.89	20.45	11.08	3.44
840	57 (13.9)	27.53	27.53	1.44	25.56	25.56	1.72	23.60	23.60	2.06	21.61	21.61	2.46	19.59	19.59	2.93	17.51	17.51	3.49
	62 (16.7)	27.98	26.67	1.44	25.76	24.84	1.72	23.64	23.64	2.06	21.65	21.65	2.46	19.63	19.63	2.93	17.54	17.54	3.49
	63 (17.2)††	28.51	21.54	1.43	26.20	19.98	1.72	23.91	18.45	2.06	21.61	16.93	2.46	19.29	15.43	2.94	16.92	13.93	3.50
	67 (19.4)	31.00	22.53	1.41	28.48	20.92	1.70	26.01	19.34	2.04	23.53	17.78	2.44	21.02	16.24	2.92	18.47	14.70	3.47
	72 (22.2)	34.49	18.31	1.39	31.71	16.89	1.68	28.96	15.51	2.02	26.22	14.15	2.42	23.45	12.81	2.89	20.65	11.48	3.44
960	57 (13.9)	28.86	28.86	1.44	26.76	26.76	1.73	24.68	24.68	2.06	22.57	22.57	2.46	20.43	20.43	2.94	18.24	18.24	3.49
	62 (16.7)	28.91	28.91	1.44	26.80	26.80	1.73	24.72	24.72	2.06	22.61	22.61	2.46	20.47	20.47	2.94	18.27	18.27	3.49
	63 (17.2)††	29.20	23.11	1.44	26.80	21.46	1.73	24.44	19.85	2.07	22.06	18.24	2.47	19.67	16.65	2.95	17.25	15.06	3.51
	67 (19.4)	31.73	24.22	1.42	29.12	22.52	1.71	26.56	20.85	2.05	23.99	19.19	2.45	21.42	17.56	2.92	18.80	15.93	3.48
	72 (22.2)	35.28	19.40	1.39	32.39	17.92	1.68	29.55	16.47	2.02	26.71	15.05	2.42	23.87	13.65	2.90	20.98	12.26	3.45

See notes on pg. 17

DETAILED COOLING CAPACITIES# CONTINUED

EVAPORATOR AIR		CONDENSER ENTERING AIR TEMPERATURES °F (°C)																	
		75 (23.9)			85 (29.4)			95 (35)			105 (40.6)			115 (46.1)			125 (51.7)		
CFM	EWB °F (°C)	Capacity MBtuh		Total Sys. KW**	Capacity MBtuh		Total Sys. KW**	Capacity MBtuh		Total Sys. KW**	Capacity MBtuh		Total Sys. KW**	Capacity MBtuh		Total Sys. KW**	Capacity MBtuh		Total Sys. KW**
		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡	
286BNA048**B Outdoor Section With FV4CN(B,F)005 Indoor Section – HIGH**																			
1200	57 (13.9)	42.70	42.70	2.91	41.39	41.39	3.26	39.86	39.86	3.66	38.17	38.17	4.13	36.35	36.35	4.69	34.44	34.44	5.34
	62 (16.7)	45.46	39.41	2.92	43.68	38.56	3.27	41.63	37.58	3.67	39.40	36.53	4.14	37.07	35.41	4.69	34.69	34.21	5.35
	63 (17.2)††	46.41	32.56	2.93	44.59	31.70	3.28	42.48	30.72	3.68	40.18	29.67	4.15	37.76	28.58	4.70	35.25	27.48	5.35
	67 (19.4)	50.09	33.77	2.95	48.12	32.90	3.30	45.85	31.92	3.70	43.40	30.88	4.18	40.80	29.80	4.74	38.11	28.70	5.40
	72 (22.2)	55.10	27.96	2.98	52.90	27.06	3.33	50.43	26.08	3.74	47.76	25.04	4.22	44.93	23.95	4.78	41.99	22.85	5.45
1300	57 (13.9)	43.94	43.94	2.94	42.57	42.57	3.29	40.96	40.96	3.69	39.18	39.18	4.16	37.28	37.28	4.72	35.28	35.28	5.38
	62 (16.7)	46.21	41.13	2.95	44.38	40.25	3.30	42.26	39.25	3.70	39.98	38.15	4.17	37.61	36.96	4.72	35.34	35.34	5.38
	63 (17.2)††	47.15	33.75	2.96	45.26	32.87	3.31	43.09	31.87	3.71	40.71	30.81	4.18	38.22	29.71	4.73	35.64	28.59	5.38
	67 (19.4)	50.86	35.03	2.98	48.81	34.14	3.33	46.48	33.15	3.73	43.94	32.10	4.21	41.27	31.01	4.77	38.51	29.90	5.43
	72 (22.2)	55.89	28.74	3.00	53.62	27.84	3.36	51.07	26.84	3.77	48.32	25.79	4.25	45.41	24.70	4.81	42.39	23.58	5.48
1400	57 (13.9)	45.06	45.06	2.97	43.63	43.63	3.32	41.94	41.94	3.72	40.09	40.09	4.19	38.12	38.12	4.75	36.04	36.04	5.42
	62 (16.7)	46.88	42.78	2.98	44.98	41.87	3.33	42.83	40.84	3.73	40.51	39.67	4.20	38.18	38.18	4.75	36.09	36.09	5.42
	63 (17.2)††	47.79	34.89	2.98	45.84	34.00	3.33	43.60	32.99	3.73	41.16	31.92	4.20	38.61	30.81	4.76	35.98	29.67	5.41
	67 (19.4)	51.52	36.24	3.00	49.40	35.35	3.35	47.00	34.35	3.76	44.39	33.28	4.23	41.67	32.19	4.79	38.84	31.06	5.46
	72 (22.2)	56.57	29.50	3.03	54.24	28.58	3.38	51.61	27.58	3.79	48.79	26.52	4.27	45.81	25.41	4.84	42.73	24.30	5.51
1600	57 (13.9)	47.01	47.01	3.02	45.45	45.45	3.38	43.64	43.64	3.78	41.65	41.65	4.26	39.54	39.54	4.82	37.32	37.32	5.48
	62 (16.7)	48.00	45.88	3.03	46.04	44.90	3.38	43.86	43.45	3.78	41.71	41.71	4.26	39.60	39.60	4.82	37.36	37.36	5.49
	63 (17.2)††	48.82	37.08	3.03	46.76	36.17	3.38	44.42	35.15	3.79	41.88	34.05	4.26	39.24	32.91	4.81	36.51	31.74	5.47
	67 (19.4)	52.57	38.58	3.05	50.34	37.67	3.41	47.82	36.66	3.81	45.12	35.57	4.29	42.28	34.45	4.85	39.37	33.30	5.51
	72 (22.2)	57.65	30.93	3.08	55.20	30.01	3.43	52.47	28.99	3.85	49.53	27.91	4.33	46.44	26.80	4.90	43.25	25.67	5.57
286BNA048**B Outdoor Section With FV4CN(B,F)005 Indoor Section – LOW**																			
960	57 (13.9)	33.65	33.65	1.99	30.83	30.83	2.34	27.95	27.95	2.75	25.05	25.05	3.21	22.16	22.16	3.75	19.33	19.33	4.36
	62 (16.7)	35.08	31.64	1.98	31.83	29.19	2.33	28.52	26.72	2.74	25.24	24.22	3.21	22.20	22.20	3.74	19.36	19.36	4.36
	63 (17.2)††	35.83	25.87	1.98	32.50	23.75	2.33	29.09	21.61	2.74	25.67	19.49	3.20	22.29	17.41	3.74	18.99	15.39	4.37
	67 (19.4)	38.99	27.02	1.95	35.42	24.85	2.30	31.77	22.66	2.71	28.12	20.50	3.18	24.49	18.37	3.72	20.96	16.30	4.34
	72 (22.2)	43.33	22.27	1.92	39.42	20.37	2.27	35.44	18.46	2.68	31.46	16.57	3.15	27.50	14.72	3.69	23.63	12.93	4.31
1040	57 (13.9)	34.67	34.67	2.00	31.75	31.75	2.35	28.77	28.77	2.75	25.77	25.77	3.21	22.79	22.79	3.75	19.87	19.87	4.37
	62 (16.7)	35.69	33.12	1.99	32.38	30.56	2.34	29.03	27.96	2.75	25.82	25.82	3.21	22.83	22.83	3.75	19.90	19.90	4.37
	63 (17.2)††	36.41	26.91	1.98	33.00	24.72	2.34	29.53	22.52	2.74	26.04	20.33	3.21	22.60	18.19	3.75	19.24	16.10	4.38
	67 (19.4)	39.61	28.13	1.96	35.95	25.88	2.31	32.23	23.63	2.72	28.49	21.39	3.19	24.81	19.20	3.73	21.21	17.07	4.35
	72 (22.2)	44.00	22.98	1.93	40.00	21.03	2.28	35.94	19.08	2.69	31.87	17.14	3.16	27.85	15.25	3.70	23.90	13.41	4.32
1120	57 (13.9)	35.59	35.59	2.00	32.58	32.58	2.35	29.51	29.51	2.75	26.43	26.43	3.22	23.36	23.36	3.76	20.35	20.35	4.38
	62 (16.7)	36.25	34.53	2.00	32.90	31.86	2.35	29.57	29.57	2.75	26.47	26.47	3.22	23.40	23.40	3.76	20.38	20.38	4.37
	63 (17.2)††	36.91	27.91	1.99	33.44	25.66	2.35	29.91	23.39	2.75	26.37	21.15	3.22	22.86	18.93	3.76	19.46	16.78	4.39
	67 (19.4)	40.13	29.21	1.97	36.41	26.89	2.32	32.62	24.57	2.73	28.82	22.27	3.20	25.08	20.01	3.74	21.43	17.81	4.36
	72 (22.2)	44.57	23.67	1.93	40.50	21.67	2.29	36.36	19.67	2.70	32.23	17.70	3.17	28.14	15.76	3.71	24.13	13.88	4.33
1280	57 (13.9)	37.21	37.21	2.01	34.04	34.04	2.36	30.81	30.81	2.77	27.57	27.57	3.23	24.35	24.35	3.77	21.18	21.18	4.39
	62 (16.7)	37.28	37.28	2.01	34.09	34.09	2.36	30.86	30.86	2.77	27.62	27.62	3.23	24.38	24.38	3.77	21.21	21.21	4.39
	63 (17.2)††	37.74	29.85	2.01	34.16	27.47	2.36	30.54	25.09	2.77	26.89	22.71	3.24	23.31	20.37	3.78	19.84	18.07	4.41
	67 (19.4)	40.98	31.28	1.98	37.14	28.84	2.34	33.25	26.39	2.75	29.36	23.96	3.22	25.52	21.56	3.76	21.80	19.22	4.38
	72 (22.2)	45.50	24.98	1.95	41.30	22.90	2.31	37.06	20.82	2.72	32.80	18.76	3.19	28.59	16.75	3.73	24.49	14.79	4.35

See notes on pg. 17

DETAILED COOLING CAPACITIES# CONTINUED

EVAPORATOR AIR		CONDENSER ENTERING AIR TEMPERATURES °F (°C)																	
		75 (23.9)			85 (29.4)			95 (35)			105 (40.6)			115 (46.1)			125 (51.7)		
CFM	EWB °F (°C)	Capacity MBtuh		Total Sys. KW**	Capacity MBtuh		Total Sys. KW**	Capacity MBtuh		Total Sys. KW**	Capacity MBtuh		Total Sys. KW**	Capacity MBtuh		Total Sys. KW**	Capacity MBtuh		Total Sys. KW**
		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡		Total	Sens‡	
286BNA060*C Outdoor Section With FV4CNB006 Indoor Section – HIGH**																			
1500	57 (13.9)	51.61	51.61	3.56	49.90	49.90	3.94	48.10	48.10	4.37	46.09	46.09	4.87	43.74	43.74	5.44	40.97	40.97	6.09
	62 (16.7)	54.77	49.03	3.59	52.50	47.37	3.96	50.12	45.69	4.39	47.51	43.92	4.88	44.55	42.00	5.45	41.19	39.81	6.09
	63 (17.2)††	55.96	40.39	3.60	53.60	38.83	3.97	51.15	37.26	4.40	48.45	35.61	4.89	45.37	33.84	5.46	41.83	31.92	6.10
	67 (19.4)	60.55	41.97	3.65	57.92	40.35	4.01	55.18	38.71	4.44	52.18	37.01	4.93	48.79	35.19	5.50	44.94	33.24	6.14
	72 (22.2)	66.85	34.72	3.71	63.83	33.13	4.07	60.69	31.53	4.49	57.28	29.87	4.99	53.46	28.12	5.55	49.17	26.24	6.19
1625	57 (13.9)	53.11	53.11	3.61	51.30	51.30	3.98	49.40	49.40	4.41	47.27	47.27	4.91	44.79	44.79	5.49	41.89	41.89	6.14
	62 (16.7)	55.69	51.18	3.64	53.31	49.45	4.00	50.86	47.70	4.43	48.17	45.86	4.92	45.16	43.80	5.49	41.95	41.95	6.14
	63 (17.2)††	56.85	41.87	3.65	54.40	40.27	4.01	51.85	38.66	4.44	49.04	36.96	4.93	45.87	35.16	5.50	42.23	33.19	6.14
	67 (19.4)	61.48	43.55	3.69	58.74	41.88	4.05	55.90	40.20	4.48	52.79	38.46	4.97	49.30	36.60	5.54	45.33	34.61	6.18
	72 (22.2)	67.83	35.71	3.75	64.70	34.08	4.11	61.44	32.45	4.54	57.91	30.76	5.03	53.98	28.97	5.59	49.57	27.06	6.23
1750	57 (13.9)	54.46	54.46	3.66	52.57	52.57	4.03	50.56	50.56	4.46	48.32	48.32	4.96	45.73	45.73	5.53	42.70	42.70	6.18
	62 (16.7)	56.48	53.25	3.68	54.04	51.45	4.04	51.52	49.63	4.47	48.77	47.65	4.96	45.80	45.80	5.53	42.76	42.76	6.19
	63 (17.2)††	57.62	43.31	3.69	55.08	41.67	4.05	52.43	40.01	4.48	49.55	38.28	4.97	46.29	36.43	5.54	42.57	34.43	6.18
	67 (19.4)	62.27	45.08	3.73	59.45	43.37	4.10	56.50	41.65	4.52	53.30	39.87	5.01	49.72	37.98	5.58	45.66	35.94	6.22
	72 (22.2)	68.68	36.66	3.80	65.44	35.01	4.16	62.06	33.34	4.58	58.44	31.62	5.07	54.40	29.80	5.63	49.90	27.87	6.27
2000	57 (13.9)	56.83	56.83	3.75	54.75	54.75	4.12	52.55	52.55	4.55	50.11	50.11	5.05	47.32	47.32	5.62	44.06	44.06	6.27
	62 (16.7)	57.84	57.13	3.76	55.30	55.14	4.12	52.69	52.60	4.55	50.18	50.18	5.05	47.37	47.37	5.62	44.11	44.11	6.27
	63 (17.2)††	58.85	46.05	3.77	56.15	44.33	4.13	53.37	42.61	4.56	50.34	40.81	5.05	46.95	38.88	5.62	43.11	36.80	6.26
	67 (19.4)	63.55	48.03	3.81	60.55	46.24	4.18	57.45	44.45	4.60	54.09	42.59	5.09	50.35	40.62	5.66	46.16	38.50	6.30
	72 (22.2)	70.02	38.47	3.88	66.60	36.76	4.24	63.06	35.04	4.66	59.25	33.26	5.15	55.05	31.39	5.71	50.39	29.42	6.35
286BNA060*C Outdoor Section With FV4CNB006 Indoor Section – LOW**																			
1200	57 (13.9)	41.27	41.27	2.45	36.79	36.79	2.83	32.29	32.29	3.27	27.87	27.87	3.78	23.62	23.62	4.35	19.59	19.59	5.01
	62 (16.7)	42.97	39.35	2.43	37.92	36.10	2.82	32.87	32.82	3.27	28.01	27.79	3.78	23.66	23.66	4.35	19.62	19.62	5.01
	63 (17.2)††	43.88	32.14	2.43	38.70	29.32	2.82	33.52	26.49	3.26	28.48	23.70	3.77	23.68	21.00	4.35	19.20	18.40	5.02
	67 (19.4)	47.49	33.46	2.40	41.89	30.56	2.79	36.33	27.67	3.24	30.92	24.82	3.75	25.76	22.04	4.33	20.94	19.38	4.99
	72 (22.2)	52.45	27.41	2.36	46.29	24.87	2.75	40.20	22.34	3.20	34.27	19.86	3.71	28.63	17.46	4.29	23.33	15.17	4.95
1300	57 (13.9)	42.46	42.46	2.45	37.83	37.83	2.84	33.17	33.17	3.28	28.61	28.61	3.79	24.22	24.22	4.36	20.06	20.06	5.02
	62 (16.7)	43.67	41.17	2.45	38.51	37.77	2.84	33.41	34.32	3.28	28.66	28.66	3.79	24.26	24.26	4.36	20.09	20.09	5.02
	63 (17.2)††	44.54	33.40	2.44	39.25	30.50	2.83	33.97	27.58	3.28	28.84	24.71	3.79	23.96	21.92	4.37	19.40	19.23	5.03
	67 (19.4)	48.17	34.81	2.41	42.46	31.82	2.80	36.79	28.84	3.25	31.28	25.89	3.76	26.04	23.03	4.34	21.15	20.28	5.00
	72 (22.2)	53.17	28.25	2.37	46.90	25.66	2.76	40.68	23.07	3.21	34.65	20.53	3.72	28.91	18.07	4.30	23.53	15.72	4.97
1400	57 (13.9)	43.54	43.54	2.46	38.76	38.76	2.85	33.97	33.97	3.29	29.28	29.28	3.80	24.76	24.76	4.38	20.49	20.49	5.03
	62 (16.7)	44.29	42.90	2.46	39.07	39.35	2.85	34.02	34.02	3.29	29.32	29.32	3.80	24.80	24.80	4.38	20.52	20.52	5.03
	63 (17.2)††	45.11	34.63	2.45	39.72	31.64	2.84	34.35	28.64	3.29	29.15	25.69	3.80	24.19	22.80	4.38	19.59	20.03	5.05
	67 (19.4)	48.75	36.12	2.42	42.95	33.05	2.81	37.18	29.97	3.26	31.59	26.94	3.77	26.28	24.00	4.36	21.33	21.15	5.02
	72 (22.2)	53.79	29.08	2.38	47.41	26.42	2.77	41.08	23.77	3.22	34.97	21.18	3.74	29.15	18.67	4.32	23.71	16.27	4.98
1600	57 (13.9)	45.41	45.41	2.48	40.37	40.37	2.87	35.34	35.34	3.31	30.42	30.42	3.82	25.69	25.69	4.40	21.22	21.22	5.06
	62 (16.7)	45.49	45.49	2.48	40.43	40.43	2.87	35.39	35.39	3.31	30.46	30.46	3.82	25.72	25.72	4.40	21.24	21.24	5.06
	63 (17.2)††	46.03	37.00	2.48	40.48	33.85	2.87	34.98	30.69	3.32	29.64	27.56	3.83	24.58	24.51	4.42	19.90	21.53	5.08
	67 (19.4)	49.70	38.66	2.45	43.72	35.42	2.84	37.82	32.17	3.29	32.09	28.97	3.80	26.67	25.85	4.39	21.63	22.81	5.05
	72 (22.2)	54.77	30.65	2.41	48.21	27.89	2.80	41.73	25.13	3.25	35.47	22.44	3.76	29.52	19.83	4.35	23.96	17.33	5.01

† Total and sensible capacities are net capacities. Blower motor heat has been subtracted.

‡ Sensible capacities shown are based on 80°F (27°C) entering air at the indoor coil. For sensible capacities at other than 80°F (27°C), deduct 835 Btuh (245 kW) per 1000 CFM (480 L/S) of indoor coil air for each degree below 80°F (27°C), or add 835 Btuh (245 kW) per 1000 CFM (480 L/S) of indoor coil air per degree above 80°F (27°C).

** System kw is total of indoor and outdoor unit kilowatts.

†† At TVA rating indoor condition (75°F edb/63°F ewb). All other indoor air temperatures are at 80°F edb.

Detailed cooling capacities are based on indoor and outdoor unit at the same elevation per AHRI standard 210/240–08. If additional tubing length and/or indoor unit is located above outdoor unit, a slight variation in capacity may occur.

NOTE: When the required data falls between the published data, interpolation may be performed. Extrapolation is not an acceptable practice.

EWB — Entering Wet Bulb

HEAT PUMP HEATING PERFORMANCE

INDOOR AIR		OUTDOOR COIL ENTERING AIR TEMPERATURES ° F (° C)																							
		−3 (−19.4)			7 (−13.9)			17 (−8.3)			27 (−2.8)			37 (2.8)			47 (8.3)			57 (13.9)			67 (19.4)		
EDB ° F (° C)	CFM	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†
		Total	Integ‡		Total	Integ‡		Total	Integ‡		Total	Integ‡		Total	Integ‡		Total	Integ‡		Total	Integ‡		Total	Integ‡	
286BNA024**E Outdoor Section With FV4CNF002 Indoor Section — HIGH**																									
65 (18.3)	600	9.13	8.40	1.36	12.06	11.08	1.47	15.38	14.02	1.60	18.36	16.30	1.73	21.55	19.61	1.88	24.98	24.98	2.06	28.66	28.66	2.27	32.46	32.46	2.53
	650	9.21	8.47	1.36	12.17	11.18	1.46	15.50	14.13	1.58	18.52	16.45	1.71	21.78	19.82	1.86	25.25	25.25	2.03	28.99	28.99	2.23	32.87	32.87	2.47
	700	9.29	8.54	1.35	12.28	11.29	1.45	15.61	14.23	1.57	18.67	16.58	1.69	21.97	19.99	1.83	25.50	25.50	2.00	29.29	29.29	2.19	33.22	33.22	2.43
	800	9.42	8.67	1.35	12.47	11.46	1.44	15.79	14.40	1.55	18.92	16.80	1.67	22.30	20.29	1.80	25.92	25.92	1.95	29.78	29.78	2.14	33.75	33.75	2.36
70 (21.1)	600	8.73	8.03	1.43	11.61	10.67	1.54	15.05	13.72	1.67	17.97	15.96	1.81	21.11	19.21	1.96	24.49	24.49	2.15	28.12	28.12	2.37	31.91	31.91	2.64
	650	8.81	8.10	1.43	11.73	10.78	1.53	15.18	13.84	1.66	18.14	16.11	1.79	21.33	19.41	1.94	24.76	24.76	2.11	28.44	28.44	2.32	32.28	32.28	2.57
	700	8.89	8.18	1.42	11.85	10.89	1.52	15.29	13.94	1.64	18.29	16.24	1.77	21.53	19.59	1.91	25.00	25.00	2.08	28.74	28.74	2.28	32.62	32.62	2.53
	800	9.04	8.32	1.42	12.04	11.06	1.51	15.48	14.11	1.62	18.54	16.46	1.74	21.85	19.88	1.88	25.40	25.40	2.04	29.21	29.21	2.22	33.15	33.15	2.46
75 (23.9)	600	8.26	7.60	1.50	11.14	10.23	1.61	14.66	13.37	1.75	17.59	15.62	1.89	20.68	18.81	2.05	24.01	24.01	2.24	27.59	27.59	2.46	31.35	31.35	2.75
	650	8.34	7.67	1.49	11.25	10.34	1.60	14.81	13.50	1.73	17.75	15.76	1.86	20.89	19.01	2.02	24.27	24.27	2.20	27.90	27.90	2.41	31.71	31.71	2.68
	700	8.43	7.76	1.49	11.37	10.45	1.59	14.93	13.61	1.72	17.90	15.89	1.85	21.07	19.18	1.99	24.50	24.50	2.17	28.19	28.19	2.37	32.03	32.03	2.63
	800	8.59	7.90	1.49	11.57	10.63	1.58	15.14	13.80	1.70	18.14	16.11	1.82	21.39	19.47	1.96	24.89	24.89	2.12	28.66	28.66	2.31	32.55	32.55	2.56
286BNA024**E Outdoor Section With FV4CNF002 Indoor Section — LOW**																									
65 (18.3)	480	4.29	3.94	1.03	7.46	6.85	1.14	10.33	9.42	1.23	13.01	11.56	1.31	15.75	14.33	1.39	17.90	17.90	1.47	20.02	20.02	1.55	22.13	22.13	1.66
	520	4.33	3.98	1.03	7.54	6.93	1.13	10.48	9.55	1.22	13.24	11.76	1.29	15.95	14.52	1.37	18.14	18.14	1.44	20.30	20.30	1.51	22.46	22.46	1.61
	560	4.38	4.03	1.03	7.66	7.04	1.13	10.61	9.67	1.21	13.47	11.96	1.28	16.13	14.68	1.35	18.36	18.36	1.41	20.57	20.57	1.48	22.77	22.77	1.57
	640	4.48	4.12	1.04	7.82	7.18	1.13	10.81	9.86	1.20	14.03	12.46	1.27	16.42	14.94	1.32	18.73	18.73	1.38	21.02	21.02	1.44	23.29	23.29	1.51
70 (21.1)	480	4.36	4.01	1.11	6.96	6.40	1.20	9.80	8.94	1.29	12.46	11.07	1.37	15.34	13.96	1.46	17.45	17.45	1.54	19.56	19.56	1.63	21.66	21.66	1.74
	520	4.41	4.06	1.11	7.07	6.50	1.20	9.96	9.08	1.28	12.66	11.25	1.36	15.53	14.13	1.44	17.69	17.69	1.51	19.84	19.84	1.59	21.98	21.98	1.69
	560	4.47	4.12	1.11	7.17	6.59	1.19	10.10	9.21	1.27	12.84	11.41	1.35	15.69	14.28	1.42	17.90	17.90	1.48	20.09	20.09	1.56	22.27	22.27	1.65
	640	4.59	4.22	1.12	7.35	6.75	1.19	10.34	9.43	1.27	13.16	11.69	1.33	16.00	14.56	1.40	18.27	18.27	1.45	20.52	20.52	1.51	22.77	22.77	1.59
75 (23.9)	480	4.10	3.77	1.18	6.39	5.87	1.26	9.23	8.41	1.35	11.89	10.56	1.44	14.87	13.53	1.53	17.02	17.02	1.61	19.10	19.10	1.71	21.20	21.20	1.83
	520	4.17	3.84	1.18	6.49	5.96	1.26	9.39	8.56	1.35	12.09	10.73	1.42	15.08	13.72	1.51	17.24	17.24	1.58	19.37	19.37	1.67	21.50	21.50	1.78
	560	4.24	3.90	1.18	6.59	6.06	1.26	9.53	8.69	1.34	12.26	10.89	1.41	15.27	13.89	1.49	17.44	17.44	1.56	19.61	19.61	1.64	21.78	21.78	1.74
	640	4.37	4.02	1.19	6.78	6.23	1.26	9.76	8.90	1.33	12.60	11.19	1.40	15.56	14.16	1.47	17.80	17.80	1.52	20.03	20.03	1.59	22.26	22.26	1.68

See notes on pg. 21

HEAT PUMP HEATING PERFORMANCE CONTINUED

INDOOR AIR		OUTDOOR COIL ENTERING AIR TEMPERATURES ° F (° C)																							
		−3 (−19.4)			7 (−13.9)			17 (−8.3)			27 (−2.8)			37 (2.8)			47 (8.3)			57 (13.9)			67 (19.4)		
EDB ° F (° C)	CFM	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†
		Total	Integ‡		Total	Integ‡		Total	Integ‡		Total	Integ‡		Total	Integ‡		Total	Integ‡		Total	Integ‡		Total	Integ‡	
286BNA036**C* Outdoor Section With FV4CNB006 Indoor Section – HIGH**																									
65 (18.3)	900	13.75	12.65	1.90	17.91	16.46	2.01	22.88	20.87	2.15	26.93	23.92	2.28	31.23	28.42	2.42	35.79	35.79	2.60	40.74	40.74	2.81	46.22	46.22	3.03
	975	13.88	12.77	1.90	18.06	16.60	2.00	23.03	21.00	2.13	27.11	24.08	2.25	31.46	28.63	2.38	36.10	36.10	2.55	41.16	41.16	2.75	46.68	46.68	2.94
	1050	13.99	12.87	1.90	18.20	16.72	1.99	23.16	21.12	2.11	27.27	24.22	2.22	31.66	28.81	2.35	36.37	36.37	2.51	41.52	41.52	2.71	46.97	46.97	2.88
	1200	14.18	13.05	1.89	18.44	16.94	1.98	23.36	21.30	2.09	27.54	24.46	2.19	32.02	29.14	2.31	36.81	36.81	2.46	42.09	42.09	2.61	47.10	47.10	2.79
70 (21.1)	900	13.21	12.15	2.00	17.38	15.97	2.11	21.98	20.04	2.25	26.55	23.58	2.39	30.75	27.99	2.54	35.23	35.23	2.72	40.04	40.04	2.93	45.39	45.39	3.18
	975	13.33	12.26	1.99	17.52	16.10	2.10	22.62	20.63	2.24	26.72	23.73	2.36	30.98	28.19	2.50	35.54	35.54	2.67	40.45	40.45	2.87	45.96	45.96	3.08
	1050	13.44	12.36	1.99	17.66	16.23	2.09	22.76	20.75	2.22	26.87	23.86	2.34	31.18	28.38	2.47	35.80	35.80	2.63	40.80	40.80	2.83	46.28	46.28	3.01
	1200	13.63	12.54	1.99	17.89	16.44	2.08	22.99	20.96	2.20	27.13	24.09	2.30	31.52	28.69	2.42	36.23	36.23	2.57	41.38	41.38	2.73	46.54	46.54	2.92
75 (23.9)	900	12.66	11.65	2.10	16.83	15.47	2.22	21.26	19.38	2.35	26.16	23.24	2.52	30.29	27.56	2.67	34.68	34.68	2.85	39.35	39.35	3.07	44.58	44.58	3.33
	975	12.77	11.75	2.09	16.98	15.60	2.21	21.45	19.56	2.33	26.31	23.37	2.48	30.51	27.76	2.63	34.98	34.98	2.80	39.75	39.75	3.01	45.14	45.14	3.22
	1050	12.88	11.85	2.09	17.11	15.72	2.20	21.63	19.72	2.32	26.46	23.50	2.46	30.70	27.94	2.59	35.24	35.24	2.76	40.09	40.09	2.96	45.55	45.55	3.15
	1200	13.05	12.01	2.09	17.31	15.91	2.19	21.92	19.98	2.30	26.72	23.73	2.42	31.04	28.24	2.55	35.66	35.66	2.70	40.65	40.65	2.88	45.91	45.91	3.05
286BNA036**C* Outdoor Section With FV4CNB006 Indoor Section – LOW**																									
65 (18.3)	720	9.56	8.80	1.68	12.50	11.49	1.68	15.65	14.27	1.69	18.88	16.77	1.70	22.67	20.63	1.75	25.24	25.24	1.79	27.66	27.66	1.83	29.86	29.86	1.90
	780	9.69	8.91	1.68	12.65	11.62	1.67	15.82	14.42	1.67	19.08	16.95	1.69	22.85	20.80	1.73	25.45	25.45	1.75	27.93	27.93	1.79	30.18	30.18	1.84
	840	9.80	9.01	1.68	12.78	11.74	1.67	15.97	14.56	1.66	19.26	17.11	1.67	23.02	20.95	1.70	25.64	25.64	1.72	28.16	28.16	1.75	30.46	30.46	1.80
	960	9.97	9.17	1.68	13.00	11.94	1.66	16.23	14.80	1.65	19.57	17.38	1.65	23.28	21.19	1.67	25.95	25.95	1.67	28.55	28.55	1.69	30.92	30.92	1.72
70 (21.1)	720	8.75	8.05	1.75	11.78	10.83	1.75	14.99	13.67	1.76	18.26	16.22	1.79	21.73	19.77	1.83	24.82	24.82	1.88	27.20	27.20	1.94	29.37	29.37	2.00
	780	8.86	8.15	1.75	11.92	10.96	1.74	15.16	13.82	1.75	18.47	16.41	1.77	22.39	20.38	1.82	25.02	25.02	1.85	27.46	27.46	1.89	29.68	29.68	1.95
	840	8.96	8.25	1.75	12.05	11.07	1.74	15.30	13.95	1.74	18.65	16.56	1.75	22.56	20.53	1.79	25.20	25.20	1.81	27.69	27.69	1.85	29.95	29.95	1.90
	960	9.14	8.41	1.75	12.26	11.27	1.73	15.56	14.18	1.73	18.93	16.81	1.73	22.84	20.79	1.76	25.51	25.51	1.77	28.07	28.07	1.79	30.41	30.41	1.82
75 (23.9)	720	7.89	7.26	1.82	11.03	10.14	1.83	14.31	13.05	1.84	17.64	15.67	1.87	20.94	19.06	1.92	24.42	24.42	1.99	26.74	26.74	2.04	28.85	28.85	2.11
	780	7.99	7.35	1.82	11.17	10.26	1.82	14.47	13.20	1.83	17.84	15.84	1.86	21.19	19.29	1.89	24.62	24.62	1.95	26.99	26.99	1.99	29.17	29.17	2.05
	840	8.09	7.44	1.82	11.29	10.37	1.82	14.62	13.33	1.82	18.01	16.00	1.84	21.44	19.51	1.87	24.79	24.79	1.92	27.22	27.22	1.95	29.44	29.44	2.00
	960	8.25	7.59	1.82	11.44	10.51	1.81	14.82	13.51	1.81	18.25	16.21	1.82	21.76	19.80	1.83	25.07	25.07	1.86	27.59	27.59	1.89	29.89	29.89	1.93

See notes on pg. 21

HEAT PUMP HEATING PERFORMANCE CONTINUED

INDOOR AIR		OUTDOOR COIL ENTERING AIR TEMPERATURES ° F (° C)																							
		–3 (–19.4)			7 (–13.9)			17 (–8.3)			27 (–2.8)			37 (2.8)			47 (8.3)			57 (13.9)			67 (19.4)		
EDB ° F (° C)	CFM	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†
		Total	Integ‡		Total	Integ‡		Total	Integ‡		Total	Integ‡		Total	Integ‡		Total	Integ‡		Total	Integ‡		Total	Integ‡	
286BNA048**B Outdoor Section With FV4CN(B,F)005 Indoor Section– HIGH**																									
65 (18.3)	1200	17.97	16.53	2.66	23.15	21.27	2.84	29.65	27.03	3.08	35.05	31.13	3.29	40.86	37.19	3.54	47.00	47.00	3.82	53.46	53.46	4.15	60.50	60.50	4.46
	1300	18.06	16.61	2.65	23.28	21.39	2.83	29.83	27.19	3.06	35.29	31.35	3.27	41.21	37.50	3.50	47.42	47.42	3.77	54.04	54.04	4.07	60.92	60.92	4.37
	1400	18.16	16.70	2.65	23.41	21.51	2.83	29.97	27.33	3.04	35.51	31.53	3.25	41.51	37.77	3.48	47.81	47.81	3.74	54.58	54.58	4.01	61.21	61.21	4.31
	1600	18.34	16.88	2.66	23.67	21.75	2.83	30.22	27.56	3.03	35.87	31.86	3.22	42.01	38.23	3.45	48.45	48.45	3.69	55.23	55.23	3.92	61.47	61.47	4.22
70 (21.1)	1200	17.65	16.24	2.82	22.65	20.81	3.00	29.20	26.63	3.23	34.52	30.66	3.45	40.17	36.56	3.69	46.20	46.20	3.98	52.55	52.55	4.32	59.63	59.63	4.65
	1300	17.75	16.33	2.82	22.80	20.95	2.99	29.41	26.81	3.21	34.77	30.88	3.42	40.52	36.87	3.66	46.62	46.62	3.93	53.06	53.06	4.25	60.01	60.01	4.56
	1400	17.87	16.44	2.82	22.97	21.10	2.99	29.59	26.98	3.20	34.99	31.08	3.40	40.82	37.15	3.63	47.00	47.00	3.90	53.59	53.59	4.18	60.34	60.34	4.49
	1600	18.11	16.66	2.83	23.27	21.38	2.99	29.91	27.27	3.19	35.38	31.42	3.38	41.34	37.62	3.60	47.64	47.64	3.85	54.36	54.36	4.09	60.66	60.66	4.39
75 (23.9)	1200	17.13	15.76	2.99	22.03	20.25	3.16	27.68	25.23	3.36	33.94	30.15	3.61	39.48	35.93	3.86	45.41	45.41	4.16	51.70	51.70	4.51	58.75	58.75	4.85
	1300	17.26	15.88	2.99	22.20	20.40	3.15	27.91	25.45	3.34	34.20	30.37	3.58	39.82	36.23	3.82	45.82	45.82	4.11	52.16	52.16	4.44	59.15	59.15	4.75
	1400	17.40	16.01	2.99	22.38	20.57	3.14	28.16	25.67	3.33	34.43	30.58	3.56	40.12	36.51	3.79	46.19	46.19	4.07	52.61	52.61	4.37	59.46	59.46	4.68
	1600	17.67	16.25	3.00	22.71	20.87	3.15	28.66	26.13	3.33	34.84	30.94	3.54	40.64	36.98	3.76	46.82	46.82	4.01	53.46	53.46	4.27	59.84	59.84	4.58
286BNA048**B Outdoor Section With FV4CN(B,F)005 Indoor Section– LOW**																									
65 (18.3)	960	10.75	9.89	2.21	15.52	14.27	2.28	20.06	18.29	2.35	24.42	21.69	2.42	29.36	26.71	2.53	33.07	33.07	2.61	36.89	36.89	2.72	40.84	40.84	2.87
	1040	10.91	10.03	2.22	15.72	14.45	2.28	20.30	18.50	2.34	24.72	21.96	2.40	29.61	26.94	2.49	33.39	33.39	2.57	37.30	37.30	2.67	41.32	41.32	2.80
	1120	11.03	10.15	2.22	15.89	14.60	2.28	20.50	18.69	2.33	24.98	22.18	2.39	29.85	27.16	2.47	33.67	33.67	2.53	37.64	37.64	2.62	41.76	41.76	2.73
	1280	11.26	10.36	2.23	16.19	14.88	2.28	20.85	19.01	2.32	25.43	22.58	2.36	30.22	27.50	2.43	34.15	34.15	2.48	38.21	38.21	2.55	42.41	42.41	2.62
70 (21.1)	960	9.82	9.03	2.31	14.61	13.43	2.39	19.16	17.47	2.46	23.53	20.89	2.54	28.66	26.08	2.66	32.39	32.39	2.75	36.17	36.17	2.87	40.06	40.06	3.02
	1040	9.96	9.16	2.31	14.79	13.59	2.38	19.39	17.68	2.45	23.82	21.16	2.52	28.96	26.35	2.62	32.72	32.72	2.71	36.57	36.57	2.81	40.53	40.53	2.95
	1120	10.08	9.28	2.32	14.97	13.75	2.38	19.61	17.88	2.44	24.08	21.39	2.50	29.21	26.58	2.60	33.00	33.00	2.67	36.91	36.91	2.76	40.95	40.95	2.89
	1280	10.31	9.48	2.33	15.26	14.02	2.39	19.97	18.21	2.43	24.53	21.78	2.48	29.61	26.95	2.56	33.48	33.48	2.61	37.49	37.49	2.69	41.68	41.68	2.77
75 (23.9)	960	9.86	9.07	2.43	13.59	12.49	2.49	18.18	16.58	2.57	22.58	20.06	2.66	27.03	24.60	2.76	31.72	31.72	2.89	35.43	35.43	3.01	39.28	39.28	3.17
	1040	9.99	9.19	2.44	13.77	12.66	2.49	18.41	16.78	2.56	22.88	20.32	2.64	27.47	25.00	2.73	32.04	32.04	2.85	35.82	35.82	2.96	39.74	39.74	3.10
	1120	9.77	8.99	2.44	13.94	12.81	2.49	18.63	16.99	2.56	23.13	20.55	2.62	27.91	25.40	2.71	32.32	32.32	2.81	36.17	36.17	2.91	40.16	40.16	3.04
	1280	9.98	9.18	2.45	14.24	13.08	2.50	18.99	17.32	2.55	23.58	20.94	2.60	28.92	26.32	2.69	32.79	32.79	2.76	36.74	36.74	2.84	40.87	40.87	2.94

See notes on pg. 21

HEAT PUMP HEATING PERFORMANCE CONTINUED

INDOOR AIR		OUTDOOR COIL ENTERING AIR TEMPERATURES °F (°C)																							
		–3 (–19.4)			7 (–13.9)			17 (–8.3)			27 (–2.8)			37 (2.8)			47 (8.3)			57 (13.9)			67 (19.4)		
EDB °F (°C)	CFM	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†	Capacity MBtuh		Total Sys. KW†
		Total	Integ‡		Total	Integ‡		Total	Integ‡		Total	Integ‡		Total	Integ‡		Total	Integ‡		Total	Integ‡		Total	Integ‡	
286BNA060**C Outdoor Section With FV4CNB006 Indoor Section — HIGH**																									
65 (18.3)	1500	23.79	21.88	3.26	29.29	26.92	3.46	36.45	33.23	3.72	42.81	38.02	3.97	50.01	45.51	4.27	57.93	57.93	4.63	66.85	66.85	4.98	75.37	75.37	5.43
	1625	24.02	22.09	3.27	29.54	27.14	3.46	36.69	33.45	3.71	43.07	38.25	3.95	50.33	45.80	4.24	58.31	58.31	4.58	67.16	67.16	4.91	75.53	75.53	5.33
	1750	24.26	22.32	3.28	29.79	27.38	3.47	36.89	33.63	3.70	43.31	38.47	3.94	50.62	46.07	4.22	58.70	58.70	4.53	67.40	67.40	4.86	75.47	75.47	5.25
	2000	24.72	22.74	3.32	30.26	27.80	3.49	37.26	33.97	3.71	43.75	38.86	3.93	51.14	46.53	4.20	59.34	59.34	4.47	67.57	67.57	4.79	72.61	72.61	5.06
70 (21.1)	1500	22.84	21.01	3.40	28.50	26.19	3.61	36.04	32.86	3.88	42.34	37.61	4.15	49.45	45.00	4.46	57.25	57.25	4.83	66.02	66.02	5.19	74.43	74.43	5.65
	1625	23.07	21.22	3.41	28.74	26.41	3.61	36.27	33.07	3.87	42.61	37.84	4.13	49.77	45.29	4.43	57.63	57.63	4.78	66.38	66.38	5.11	74.67	74.67	5.55
	1750	23.30	21.44	3.42	28.99	26.64	3.62	36.48	33.26	3.87	42.85	38.06	4.11	50.06	45.55	4.40	58.00	58.00	4.74	66.64	66.64	5.06	74.68	74.68	5.47
	2000	23.75	21.85	3.46	29.44	27.06	3.64	36.85	33.60	3.88	43.28	38.44	4.11	50.57	46.02	4.38	58.68	58.68	4.67	66.90	66.90	4.99	72.84	72.84	5.30
75 (23.9)	1500	21.87	20.12	3.54	27.71	25.46	3.76	34.56	31.51	4.03	41.89	37.21	4.34	48.89	44.49	4.66	56.55	56.55	5.03	65.16	65.16	5.40	73.45	73.45	5.88
	1625	22.08	20.32	3.55	27.94	25.67	3.77	34.84	31.76	4.02	42.15	37.43	4.31	49.21	44.78	4.62	56.94	56.94	4.98	65.56	65.56	5.33	73.74	73.74	5.78
	1750	22.32	20.53	3.57	28.18	25.90	3.77	35.20	32.09	4.02	42.39	37.65	4.30	49.50	45.05	4.60	57.30	57.30	4.94	65.85	65.85	5.27	73.83	73.83	5.70
	2000	22.75	20.93	3.60	28.63	26.31	3.80	36.40	33.19	4.05	42.82	38.03	4.29	50.01	45.51	4.57	57.99	57.99	4.87	66.19	66.19	5.20	72.85	72.85	5.55
286BNA060**C Outdoor Section With FV4CNB006 Indoor Section — LOW**																									
65 (18.3)	1200	13.69	12.59	2.67	19.50	17.92	2.75	25.04	22.83	2.84	30.30	26.91	2.94	35.80	32.58	3.07	39.55	39.55	3.18	42.98	42.98	3.30	46.15	46.15	3.40
	1300	13.81	12.71	2.68	19.67	18.08	2.75	25.29	23.05	2.83	30.62	27.19	2.92	36.10	32.85	3.04	39.97	39.97	3.13	43.47	43.47	3.24	46.62	46.62	3.32
	1400	13.95	12.83	2.69	19.87	18.26	2.75	25.53	23.27	2.83	30.92	27.46	2.90	36.39	33.11	3.01	40.32	40.32	3.09	43.89	43.89	3.19	47.03	47.03	3.26
	1600	14.22	13.08	2.71	20.21	18.57	2.77	25.94	23.65	2.82	31.45	27.93	2.89	36.86	33.54	2.97	40.89	40.89	3.04	44.64	44.64	3.10	47.64	47.64	3.18
70 (21.1)	1200	12.56	11.56	2.79	18.42	16.93	2.87	23.98	21.87	2.97	29.23	25.96	3.07	35.00	31.85	3.22	38.74	38.74	3.33	42.09	42.09	3.46	45.24	45.24	3.57
	1300	12.73	11.72	2.80	18.60	17.09	2.87	24.24	22.10	2.96	29.55	26.25	3.05	35.36	32.17	3.19	39.13	39.13	3.29	42.58	42.58	3.40	45.78	45.78	3.49
	1400	12.89	11.86	2.81	18.80	17.28	2.88	24.50	22.33	2.96	29.87	26.53	3.04	35.67	32.46	3.16	39.50	39.50	3.25	43.01	43.01	3.35	46.18	46.18	3.43
	1600	13.13	12.08	2.83	19.16	17.61	2.89	24.93	22.73	2.95	30.41	27.01	3.02	36.13	32.88	3.12	40.09	40.09	3.20	43.75	43.75	3.27	46.81	46.81	3.34
75 (23.9)	1200	12.10	11.14	2.92	17.17	15.78	3.00	22.80	20.79	3.10	28.07	24.93	3.21	33.24	30.25	3.34	37.87	37.87	3.50	41.18	41.18	3.63	44.31	44.31	3.75
	1300	12.28	11.30	2.93	17.37	15.96	3.00	23.05	21.02	3.09	28.41	25.23	3.19	33.69	30.66	3.31	38.28	38.28	3.45	41.66	41.66	3.57	44.86	44.86	3.66
	1400	12.44	11.44	2.94	17.58	16.15	3.00	23.32	21.26	3.09	28.73	25.51	3.18	34.38	31.28	3.30	38.63	38.63	3.41	42.08	42.08	3.52	45.31	45.31	3.60
	1600	11.89	10.94	2.95	17.95	16.50	3.02	23.79	21.69	3.09	29.27	25.99	3.16	35.34	32.16	3.28	39.23	39.23	3.36	42.79	42.79	3.45	45.96	45.96	3.51

NOTE:

1. Multipliers for 355BAV are equal to 355(A,C)AV
2. When the required data falls between the published data, interpolation may be performed. Extrapolation is not an acceptable practice.

‡ The Btuh heating capacity values shown are net integrated values from which the defrost effect has been subtracted. The Btuh heating from supplement heaters should be added to those values to obtain total system capacity.

† The kW values include the compressor, outdoor fan motor, and indoor blower motor. The kW from supplement heaters should be added to these values to obtain total system kilowatts.

EDB — Entering Dry Bulb

GUIDE SPECIFICATIONS
GENERAL

System Description

Outdoor-mounted, air-cooled, split-system heat pump unit suitable for ground or rooftop installation. Unit consists of a hermetic compressor, an air-cooled coil, forward-swept blade propeller-type condenser fan, and a control box. Unit will discharge supply air upward as shown on contract drawings. Unit will be used in a refrigeration circuit to match up to a packaged fan coil or coil unit.

Quality Assurance

- Unit will be rated in accordance with the latest edition of AHRI Standard 240.
- Unit will be certified for capacity and efficiency, and listed in the latest AHRI directory.
- Unit construction will comply with latest edition of ASHRAE and with NEC.
- Unit will be constructed in accordance with UL standards and will carry the UL label of approval. Unit will have C-UL approval.
- Unit cabinet will be capable of withstanding Federal Test Method Standard No. 141 (Method 6061) 500-hr salt spray test.
- Air-cooled condenser coils are pressure tested and the outdoor units are leak tested.
- Unit constructed in ISO9001 approved facility.

Delivery, Storage, and Handling

- Unit will be shipped as single package only and is stored and handled per unit manufacturer's recommendations.

Warranty (for inclusion by specifying engineer)

- U.S. and Canada only.

PRODUCTS

Equipment

- Factory-assembled, single-piece, air-cooled heat pump unit. Contained within the unit enclosure is all factory wiring, piping, controls, compressor, refrigerant charge Puron® (R-410A) refrigerant, and special features required prior to field start-up.

Unit Cabinet

- Unit cabinet will be constructed of galvanized steel, bonderized, and coated with a powder coat paint.

Fans

- Condenser fan will be direct-drive propeller type, forward swept blade, discharging air upward.
- Condenser fan motors will be totally enclosed, 1-phase type with class B insulation and permanently lubricated.
- Shafts will be corrosion resistant.
- Fan blades will be statically and dynamically balanced.
- Condenser fan openings will be equipped with coated steel wire safety guards.

Compressor

- Compressor will be hermetically sealed.
- Compressor will be mounted on rubber vibration isolators.
- Compressor will be covered with a sound absorbing blanket.

Condenser Coil

- Condenser coil will be air cooled.
- Coil will be constructed of aluminum fins mechanically bonded to copper tubes which are then cleaned, dehydrated, and sealed.

Refrigeration Components

- Refrigeration circuit components will include liquid-line front-seating shutoff valve with sweat connections, vapor-line front-seating shutoff valve with sweat connections, system charge of Puron® (R-410A) refrigerant, POE compressor oil, accumulator, and reversing valve.
- Unit will be equipped with high-pressure switch, loss-of-charge switch, and filter drier for Puron® refrigerant.

Operating Characteristics

- The capacity of the unit will meet or exceed _____ Btuh at a suction temperature of _____ °F (°C). The power consumption at full load will not exceed _____ kW.
- Combination of the unit and the evaporator or fan coil unit will have a total net cooling capacity of _____ Btuh or greater at conditions of _____ CFM entering air temperature at the evaporator at _____ °F (°C) wet bulb and _____ °F (°C) dry bulb, and air entering the unit at _____ °F (°C).
- The system will have a SEER of _____ Btuh/watt or greater at DOE conditions.

Electrical Requirements

- Nominal unit electrical characteristics will be _____ v, single phase, 60 hz. The unit will be capable of satisfactory operation within voltage limits of _____ v to _____ v.
- Unit electrical power will be single point connection.
- Control circuit will be 24v.

Special Features

- Refer to section of this literature identifying accessories and descriptions for specific features and available enhancements.

SYSTEM DESIGN SUMMARY

1. Intended for outdoor installation with free air inlet and outlet. Outdoor fan external static pressure available is less than 0.01-in. wc.
2. Minimum outdoor operating air temperature without low-ambient operation accessory is 55°F (12.8°C).
3. The maximum outdoor operating ambient in cooling mode is 125°F (51.67°C) when operating voltage is 230v. For 208v applications, the maximum outdoor ambient is 120°F (48.9°C).
4. Minimum outdoor operating air temperature for heating mode is –20°F (–28.9°C).
5. Maximum outdoor operating air temperature for heating mode is 66°F (18.9°C).
6. For reliable operation, unit should be level in all horizontal planes.
7. For interconnecting refrigerant tube lengths greater than 80 ft (23.4 m) and/or elevation differences between indoor and outdoor units greater than 20 ft (6.1 m), consult Residential Piping and Longline Guideline and Service Manual available from equipment distributor.
8. If any refrigerant tubing is buried, provide a 6 in. (152.4 mm) vertical rise to the valve connections at the unit. Refrigerant tubing lengths up to 36 in. (914.4 mm) may be buried without further consideration. Do not bury refrigerant lines longer than 36 in. (914.4 mm).
9. Use only copper wire for electric connection at unit. Aluminum and clad aluminum are not acceptable for the type of connector provided.
10. Do not apply capillary tube indoor coils to these units.
11. Factory-supplied filter drier must be installed.

Edition Date: 08/15

Catalog No. PDS286B–07

Replaces: PDS286B–06

Appendix D

Vibration Analysis

Groundborne Noise and Vibration Modeling

Notes
The reference distance is measured from the nearest anticipated point of construction equipment to the nearest structure.

	Reference Level Inputs			
Equipment	**PPV_{ref} (in/sec)**	**Lv_{ref} (VdB)**	**RMS_{ref} (in/sec)**	**Reference Distance**
Caisson drilling	0.089	87	0.022	25
Loaded trucks	0.076	83	0.014	25

	Vibration Level at Receiver			
Equipment	**Distance (feet)**	**PPV_x (in/sec)**	**Lv_x (VdB)**	**RMS_x (in/sec)**
Caisson drilling	10	0.2439	96	0.061
Loaded trucks	25	0.0760	83	0.014

Source
California Department of Transportation (Caltrans). 2020. Transportation and Construction Vibration Guidance Manual. April 2020. Available at: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf. Last Updated: 5/1/2020