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ACOUSTICAL ANALYSIS REPORT

101 COAST MIXED USE
Solana Beach, CA

PREPARED FOR:

Architects Hanna Gabriel Wells
1955 Bacon Street
San Diego, California 92107

AAI Report 2216
March 28, 2012

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ATTACHMENT "A" – ROOFTOP EQUIPMENT

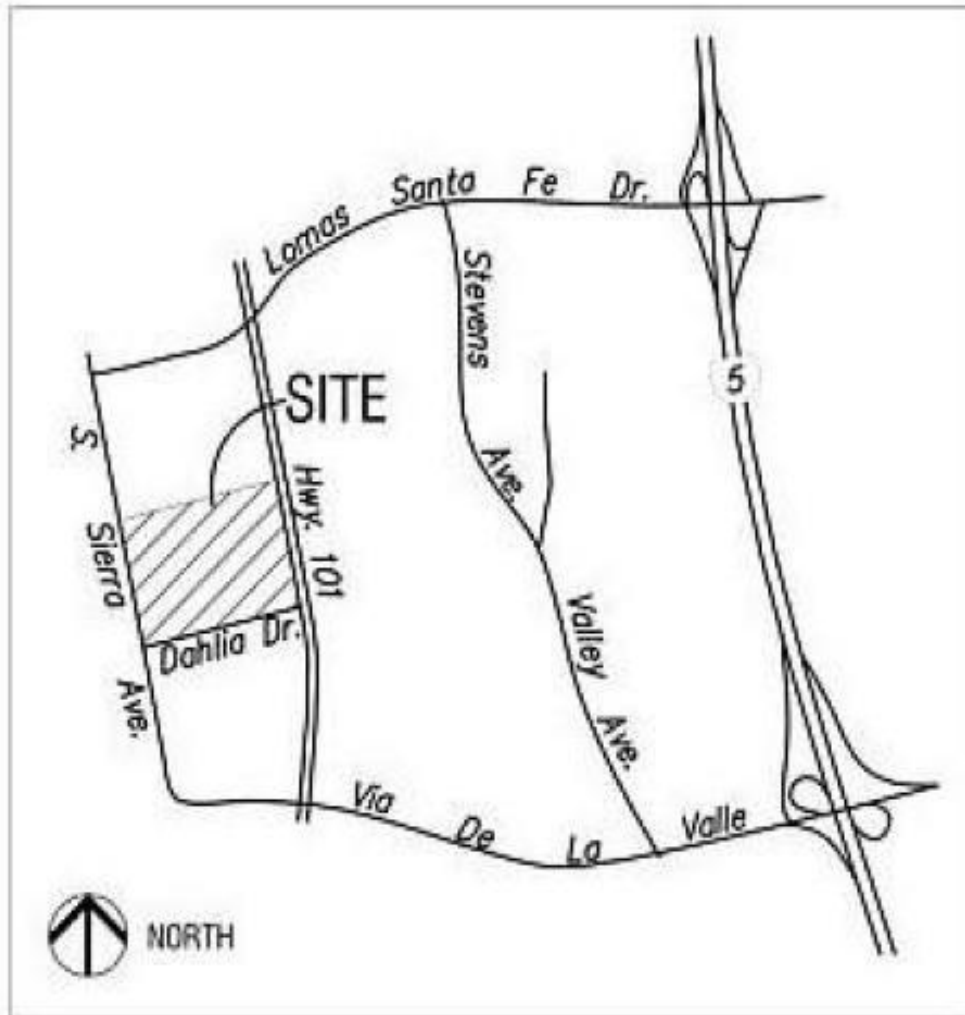
1.0 INTRODUCTION:

This Acoustical Analysis Report provides an assessment of the noise impacts associated with on-site sources at the proposed 101 Coast Mixed-Use project. The proposed project is a mixed-use residential and retail/commercial development located within the City of Solana Beach, California. The project site is located at the northwest corner of Highway 101 and Dahlia Drive intersection (Figure 1).

Existing land uses in the immediate vicinity of project site include residential, restaurant and office/commercial. The existing noise levels impacting the site & vicinity uses stem primarily from vehicular traffic. Noise levels relating to railroad tracks located east of Highway 101 and an existing loading dock to the north of the site (i.e., at CVS/Pharmacy) also contribute to ambient sound levels.

This report was prepared as a part of project's approval process to address the noise impacts upon existing land uses in the immediate vicinity from on-site sources. On-site sources of potential significance are rooftop equipment and an enclosed loading dock. Parking for the project is underground. Therefore, parking-related noise impacts would be insignificant.

This Acoustical Analysis is based upon noise surveys conducted by ABC Acoustics Inc (AAI) and information provided by the project's mechanical engineer (MA Engineers). It also makes use of the architectural plans prepared for the project by Architects HGW (February 21, 2012).



Source: Architects HGW

No Scale

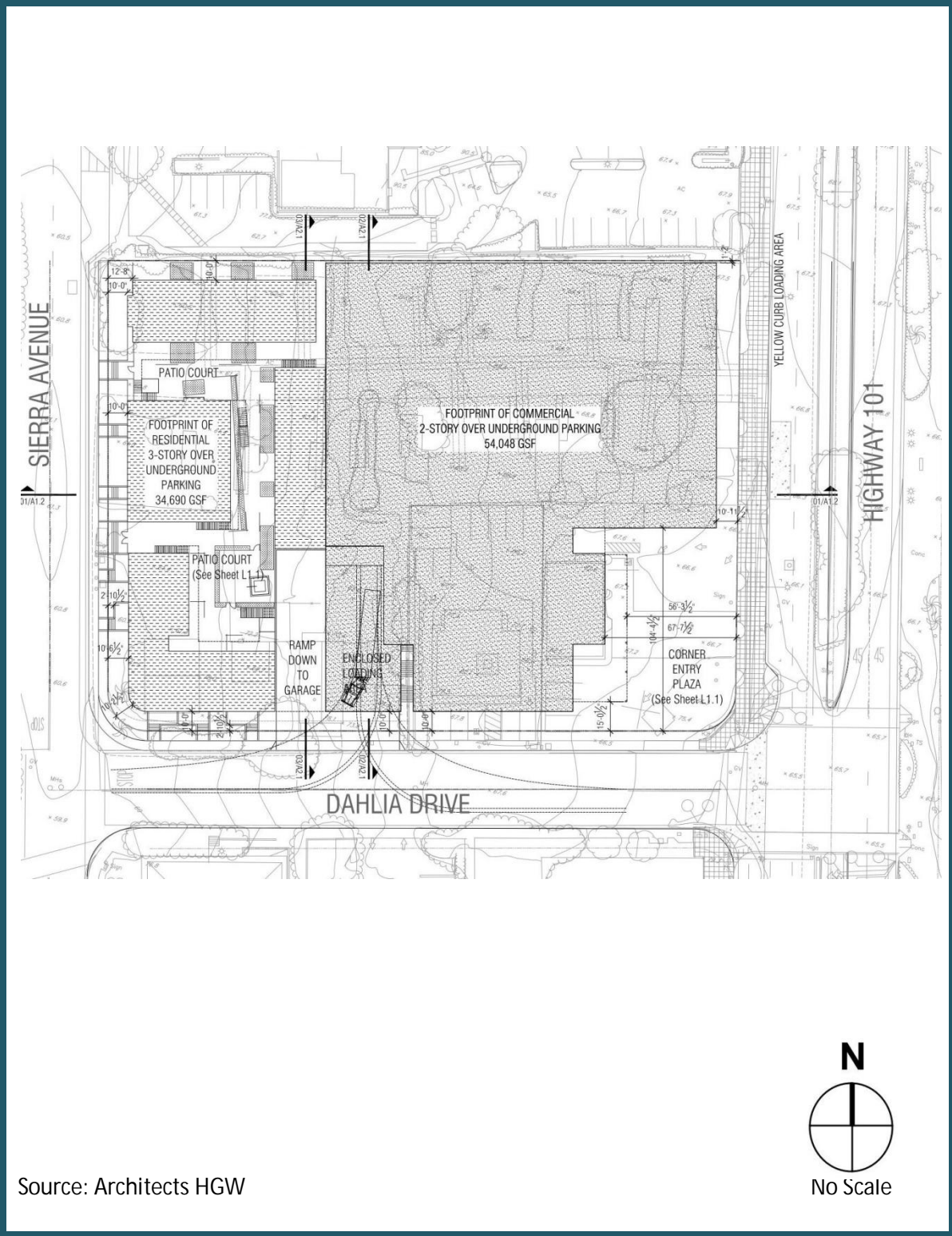
2.0 PROJECT SITE DESCRIPTION:

The proposed 101 Coast Mixed-Use project site is bound by Highway 101 to the east, Dahlia Drive to the South and Sierra Avenue to the West. A restaurant (Nobu) and a CVS/Pharmacy are located on the property abutting the north side. A site plan for the project is presented in Figure 2.

The site itself is flat and approximately 83,000 square feet. The proposed project would place 36 attached dwelling units and approximately 54,000 s.f. of office/commercial space on the site. Improvements would be accommodated within 2-and 3-story buildings over a 2-level below grade parking structure.

Existing land uses in the immediate vicinity of the site include the "See Scape Shores" and "Solana Beach Tennis Club" residential complexes to the west, across from Sierra Avenue. Other uses abutting the site include Nobu Restaurant and a CVS pharmacy to the immediate north and office building and a bank to the south. Highway 101 which is the primary source of existing noise in the area runs along the eastern property line.

Existing noise levels impacting the area stem from vehicular traffic along area roadways, railroad traffic, loading activities at CVS/Pharmacy and an occasional overfly. Existing ambient noise levels are dominated by Highway 101.



Source: Architects HGW

ABC Acoustics Inc (AAI)	101 COAST MIXED-USE – SITE PLAN	Figure 2
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3.0 APPLICABLE STANDARDS:

Sound limits for stationary (point) sources are normally included in the Noise Ordinance of a regulating agency. The City of Solana Beach, in Chapter 7.34 of the City's Municipal Codes (SBMC) has established a set of guidelines which include hourly sound limits for various stationary sources (such as roof-top mechanical equipment). Section 7.34.040 of SBMC includes average hourly sound level (Leqh) limits which are established for various land zones.

Units of sound levels are expressed as decibels (dB) and the "A"-weighted scale is used because it closely approximates the perception of loudness by humans. In this report, dB refers to dB-A unless otherwise indicated.

The hourly average sound limit (Leqh) for residential zones in Solana Beach is 50 dB during daytime hours (i.e., 7 am to 10 pm) and 45 dB during nighttime hours (i.e., 10 pm and 7 am). Similarly, the sound limit for office/commercial zones is 60 and 55 dB.

As indicated in Subsection "C" of Section 7.34.030 of SBMC, "the sound level limit at a location on a boundary between two zoning districts is the arithmetic mean of the respective limits for the two districts".

Noise impacts upon project from external sources as well as sound/impact rating of common partitions at residential portion of project are beyond the scope of this report and shall be addressed as the project progresses.

4.0 NOISE ANALYSIS TECHNIQUE:

This acoustical analysis report is based on noise measurements conducted by ABC Acoustics & rooftop equipment data provided by project's mechanical engineer (MA Engineering).

Ambient noise levels at the project site and abutting land uses were monitored during nighttime hours on March 20, 2012. To establish ambient levels, nighttime measurements were used to present a worst-case scenario.

Noise levels were also measured at a similar existing loading dock during unloading activities. Results of the noise measurements were then used in conjunction with the equipment data provided by MA Engineering to assess the project-related impacts upon land uses in the area.

Noise measurements were conducted using a calibrated Brüel and Kjær (B&K) hand-held analyzer Type 2250 which is equipped with a Type 1 Precision Integrating Sound Level Meter. Units of measurement are expressed as decibels (dB) and the "A"-weighted noise scale is used because it closely approximates the perception of loudness by humans.

5.0 PROJECT-RELATED NOISE IMPACTS:

Nighttime average noise levels at the land uses in the immediate vicinity of project site range between 55 and 66 dB. During the hours of 8 and 11 pm, the ambient noise levels were measured to be 58 dB Leq along the west side of Sierra Avenue (i.e., at residential uses to the west), 60-66 dB Leq along the south side of Dahlia Drive and 55 dB Leq at 5' inside the Restaurant/Retail property to the north (with minimal traffic in the parking lot).

As previously indicated, the primary sources of on-site noise with potentially significant impacts on existing land uses in the area would be rooftop equipment and the enclosed loading dock.

5.1 Rooftop Equipment Noise Impacts:

According to MA Engineering, the largest pieces of equipment on the roof would be 3-5 HVAC units similar to T/YSC060E3 5-Ton models manufactured by Trane. There would also be 2 or 3 1-Ton refrigeration units for the commercial uses as well as 1-Ton or smaller HVAC units for the residential uses. Equipment data is presented in Attachment "A" of this report. As presented in Attachment "A", the 1-Ton units are relatively small and produce substantially less noise.

The project includes 2 rooftop Equipment Wells which would house the equipment. To present a worst-case scenario, this report assumes that 5 5-Ton HVAC units would be located within either equipment well. Noise levels due to equipment operation were calculated at varying distances from the edge of each well (Table 1). As presented in Table 1, the cumulative unattenuated noise levels due to roof-top equipment would be approximately 59 dB at 40 feet and 48 dB at 150 feet.

The project design includes walls (parapet) around each equipment well. If these walls are tall enough to (just) block the line-of-sight from the equipment to receivers they would provide for 5 dB noise screening. The resulting "attenuated" noise impacts would be 54 and 43 dB at 40 and 150 feet, respectively. Since the existing residential units to the west of project are located at over 150 feet from the closest equipment well, noise impacts would be 43 or less. Similarly, if all rooftop equipment are located at 15 feet or more of the northern property line the resulting noise impacts at the Nobu Restaurant to the north and offices to the south would be at 55 dB or less.

TABLE 1

ROOFTOP EQUIPMENT NOISE LEVELS
101 COAST MIXED USE
CITY OF SOLANA BEACH, CALIFORNIA

No.	Equipment	Noise Levels (dB)				Barrier Reduction (dB)	Attenuated Noise @150' (dB)
		@5'	@40'	@100'	@150'		
1	1 5-Tons	70	52	45	41	5	36
2	5 5-Tons	77	59	52	48	5	43
3	5 5-Tons + 3 1-Ton Units	77	59	52	48	5	43

Notes:

- Based on sound power data for Trane 5 – Ton type T/YSC060E1.
- Noise barrier shall be tall enough to block the line-of-sight from equipment to receivers.

5.2 Loading Dock Noise Impacts:

Noise levels during loading activities at a similar loading dock were measured to be 78 dB Leq at 5 feet outside the roll up door, when the door was open, and 54 dB Leq with the door closed (i.e., the door provided for a noise transmission loss of 24 dB).

Noise impacts from the loading dock at 101 Coast Mixed Use would be substantially lower at existing land uses due to increased distances. Normal roll up doors (with no openings or gaps) provide for 20-25 dB noise reduction. No additional noise reduction would be necessary.

6.0 CONDITIONS OF DEVELOPMENT AND MITIGATION:

The following acoustical treatment recommendations would reduce all noise impacts from on-site noise sources at 101 Coast Mixed Use to acceptable levels at the existing land uses in the area.

- 1) Construct the wall around each rooftop "Equipment Well" tall enough to obstruct the line-of-sight from equipment to receivers within existing land uses in the area. Taller walls provide for more noise screening.
- 2) Place all rooftop equipment at 15 feet or more of northern property line.
- 3) Use a front door with a Sound Transmission Class (STC) of 25 or higher for the loading dock.

The above acoustical treatment measures, if properly incorporated, would reduce all noise impacts from on-site noise sources at 101 Coast Mixed Use to acceptable levels at the existing land uses in the area.

7.0 CERTIFICATION:

The findings and recommendations presented in this report are based on available information at the time of analysis. They represent a true and factual analysis of the acoustical issues within the specific scope.

There are many factors involved in actual acoustical performance of a project; unless if ABC Acoustics Inc (AAI) is involved from conceptual design to completion of the project, AAI is not, and could not be held, liable for final results of any recommendations or implementation of such recommendations.

ABC Acoustics Inc (AAI)

Sharo T. Sanavi

Sharo T. Sanavi
Principal

8.0 REFERENCES CITED:

Architects Hanna Gabriel Wells

2012 Architectural Plans for 101 Coast Mixed-Use Project.

MA Engineering

2012 Roof Top Mechanical Equipment Data

Solana Beach, City of

2008 Noise Element.

2008 Noise Abatement and Control; SBMC Chapter 7.34



ATTACHMENT “A”
ROOFTOP EQUIPMENT DATA



Product Catalog

Packaged Rooftop Air Conditioners Precedent™ — Cooling and Gas/Electric 3 – 10 Tons — 60 Hz





General Data

Table 1. General data - 3-4 tons - standard efficiency

	3 Tons		4 Tons	
	T/YSC036E1	T/YSC036E3,4,W	T/YSC048E1	T/YSC048E3,4,W
Cooling Performance^(a)				
Gross Cooling Capacity	35,620	37,150	49,210	49,450
EER/SEER ^(b)	11.5/13.0	11.2/13.0	11.1/13.0	10.9/13.0
Nominal cfm/ARI Rated cfm	1,200/1,200	1,200/1,200	1,600/1,600	1,600/1,600
ARI Net Cooling Capacity	35,000	35,800	48,000	48,000
System Power (kW)	3.04	3.20	4.32	4.39
Compressor				
Number/Type	1/Scroll	1/Scroll	1/Scroll	1/Scroll
Sound				
Outdoor Sound Rating (dB) ^(c)	81	81	82	82
Outdoor Coil - Type				
Tube Size (in.) OD	Lanced	Lanced	Lanced	Lanced
Face Area (sq. ft.)	0.3125	0.3125	0.3125	0.3125
Rows/FPI	10.96	9.59	10.96	10.96
	2/16	2/16	2/16	2/16
Indoor Coil - Type				
Tube Size (in.)	Lanced	Lanced	Lanced	Lanced
Face Area (sq. ft.)	0.3125	0.3125	0.3125	0.3125
Rows/FPI	7.71	7.71	7.71	7.71
Refrigerant Control	3/16	3/16	4/16	4/16
Drain Connection Number/Size (in.)	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve	Thermal Expansion Valve
	1¾ NPT	1¾ NPT	1¾ NPT	1¾ NPT
Outdoor Fan - Type				
Number Used/Diameter (in.)	Propeller	Propeller	Propeller	Propeller
Drive Type/No. Speeds	1/22	1/22	1/22	1/22
cfm	Direct/1	Direct/1	Direct/1	Direct/1
Motor hp	3,466	3,375	3,411	3,403
Motor rpm	0.33	0.33	0.33	0.33
	1,075	1,075	1,075	1,075
Indoor Fan - Type (Standard)				
Number Used/Diameter (in.)/Width (in.)	FC Centrifugal	FC Centrifugal	FC Centrifugal	FC Centrifugal
Drive Type/No. Speeds/RPM	1/11x11	1/11x11	1/11x11	1/11x11
Number Motors	Direct/5 ^(d)	Belt/Variable/1,750	Direct/5 ^(d)	Belt/Variable/1,750
Motor hp	1	1	1	1
Motor Frame Size	0.75	1.0	1.0	1.0
	48	56	48	56
Filters^(e)				
Type Furnished	Throwaway	Throwaway	Throwaway	Throwaway
Number Size Recommended	(2) 20x30x2	(2) 20x30x2	(2) 20x30x2	(2) 20x30x2
Refrigerant Charge^(f)				
Pounds of R-410A	6.3	6.0	7.4	7.4

continued on next page



General Data

Table 1. General data - 3-4 tons - standard efficiency (continued)

	3 Tons		4 Tons	
	T/YSC036E1	T/YSC036E3,4,W	T/YSC048E1	T/YSC048E3,4,W
Heating Performance^(g)				
(Gas/Electric Only)				
Heating Input				
Low Heat Input (Btu)	60,000	60,000	60,000	60,000
Mid Heat Input (Btu)	80,000	80,000	80,000	80,000
High Heat Input (Btu)	120,000	120,000	120,000	120,000
Heating Output				
Low Heat Input (Btu)	48,000	48,000	49,000	48,000
Mid Heat Input (Btu)	65,000	64,000	65,000	64,000
High Heat Input (Btu)	96,000	96,000	96,000	96,000
AFUE%^(h)				
Low Heat Input (Btu)	78	80	79	80
Mid Heat Input (Btu)	78	80	79	80
High Heat Input (Btu)	78	80	79	80
Steady State Efficiency%				
Low Heat Input (Btu)	80	80	81	80
Mid Heat Input (Btu)	81	80	81	80
High Heat Input (Btu)	80	80	80	80
No. Burners				
Low Heat Input (Btu)	2	2	2	2
Mid Heat Input (Btu)	2	2	2	2
High Heat Input (Btu)	3	3	3	3
No. Stages				
Low Heat Input (Btu)	1	1	1	1
Mid Heat Input (Btu)	1	1	1	1
High Heat Input (Btu)	1	1	1	1
Gas Supply Line Pressure				
Natural (minimum/maximum)	4.5/14.0	4.5/14.0	4.5/14.0	4.5/14.0
LP (minimum/maximum)	11.0/14.0	11.0/14.0	11.0/14.0	11.0/14.0
Gas Connection Pipe Size (in)				
Low Heat	1/2	1/2	1/2	1/2
Mid Heat	1/2	1/2	1/2	1/2
High Heat	1/2	1/2	1/2	1/2

(a) Cooling performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. ARI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Units are certified in accordance with the Unitary Air-Conditioner Equipment certification program, which is based on ARI Standard 210/240.

(b) EER and/or SEER are rated at ARI conditions and in accordance with DOE test procedures.

(c) Outdoor Sound Rating shown is tested in accordance with ARI Standard 270. For additional information refer to [Table 141, p. 179](#).

(d) For multispeed direct drive rpm TSC values, reference [Table 31, p. 73](#). For multispeed direct drive rpm YSC (low & medium gas heat) values reference [Table 32, p. 74](#). For multispeed direct drive rpm YSC (high gas heat) values reference [Table 33, p. 75](#).

(e) Optional 2" MERV 7 and MERV 13 filters also available.

(f) Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.

(g) Heating performance limit settings and rating data were established and approved under laboratory test conditions using American National Standards Institute standards. Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level. Applicable to Gas/Electric units only.

(h) AFUE is rated in accordance with DOE test procedures.

Table 2. General data - 5 tons - standard efficiency

	5 Tons	
	T/YSC060E1	T/YSC060E3,4,W
Cooling Performance^(a)		
Gross Cooling Capacity	59,900	62,270
EER/SEER ^(b)	11.0/13.0	11.0/13.0
Nominal cfm/ARI Rated cfm	2,000/2,000	2,000/2,000
ARI Net Cooling Capacity	58,000	60,000
System Power (kW)	5.25	5.46
Compressor		
Number/Type	1/Scroll	1/Scroll
Sound		
Outdoor Sound Rating (dB) ^(c)	82	82
Outdoor Coil - Type	Lanced	Lanced
Tube Size (in.)	0.3125	0.3125
Face Area (sq. ft.)	10.96	10.96
Rows/FPI	3/16	3/16
Indoor Coil - Type	Lanced	Lanced
Tube Size (in.)	0.3125	0.3125
Face Area (sq. ft.)	7.71	7.71
Rows/FPI	4/16	4/16
Refrigerant Control	Thermal Expansion Valve	Thermal Expansion Valve
Drain Connection Number/Size (in.)	1 $\frac{3}{4}$ NPT	1 $\frac{3}{4}$ NPT
Outdoor Fan - Type	Propeller	Propeller
Number Used/Diameter (in.)	1/22	1/22
Drive Type/No. Speeds	Direct/1	Direct/1
cfm	3,271	3,245
Number Motors/hp	0.40	0.40
Motor rpm	1,075	1,075
Indoor Fan - Type (Standard)	FC Centrifugal	FC Centrifugal
Number Used/Diameter (in.)/Width (in.)	1/11x11	1/11x11
Drive Type/No. Speeds/rpm	Direct/5 ^(d)	Belt/Variable/1,750
Motor hp	1.0	1.0
Motor Frame Size	48	56
Filters^(e)		
Type Furnished	Throwaway	Throwaway
Number Size Recommended	(2) 20x30x2	(2)20x30x2
Refrigerant Charge ^(f)		
Pounds of R-410A	9.5	9.4

continued on next page



General Data

Table 2. General data - 5 tons - standard efficiency (continued)

	5 Tons	
	T/YSC060E1	T/YSC060E3,4,W
Heating Performance^(g)		
(Gas/Electric Only)		
Heating Input		
Low Heat Input (Btu)	60,000	60,000
Mid Heat Input (Btu)	80,000	80,000
High Heat Input (Btu)	130,000	130,000
Heating Output		
Low Heat Input (Btu)	48,000	48,000
Mid Heat Input (Btu)	65,000	64,000
High Heat Input (Btu)	104,000	104,000
AFUE%^(h)		
Low Heat Input (Btu)	78	80
Mid Heat Input (Btu)	79	80
High Heat Input (Btu)	78	80
Steady State Efficiency%		
Low Heat Input (Btu)	80	80
Mid Heat Input (Btu)	81	80
High Heat Input (Btu)	80	80
No. Burners		
Low Heat Input (Btu)	2	2
Mid Heat Input (Btu)	2	2
High Heat Input (Btu)	3	3
No. Stages		
Low Heat Input (Btu)	1	1
Mid Heat Input (Btu)	1	1
High Heat Input (Btu)	1	1
Gas Supply Line Pressure		
Natural (minimum/maximum)	4.5/14.0	4.5/14.0
LP (minimum/maximum)	11.0/14.0	11.0/14.0
Gas Connection Pipe Size (in)		
Low Heat	1/2	1/2
Mid Heat	1/2	1/2
High Heat	1/2	1/2

(a) Cooling performance is rated at 95°F ambient, 80°F entering dry bulb, 67°F entering wet bulb. Gross capacity does not include the effect of fan motor heat. ARI capacity is net and includes the effect of fan motor heat. Units are suitable for operation to ±20% of nominal cfm. Units are certified in accordance with the Unitary Air-Conditioner Equipment certification program, which is based on ARI Standard 210/240.

(b) EER and/or SEER are rated at ARI conditions and in accordance with DOE test procedures.

(c) Outdoor Sound Rating shown is tested in accordance with ARI Standard 270. For additional information refer to [Table 141, p. 179](#).

(d) For multispeed direct drive rpm TSC values, reference [Table 31, p. 73](#). For multispeed direct drive rpm YSC (low & medium gas heat) values reference [Table 32, p. 74](#). For multispeed direct drive rpm YSC (high gas heat) values reference [Table 33, p. 75](#).

(e) Optional 2" MERV 7 and MERV 13 filters also available.

(f) Refrigerant charge is an approximate value. For a more precise value, see unit nameplate and service instructions.

(g) Heating performance limit settings and rating data were established and approved under laboratory test conditions using American National Standards Institute standards. Ratings shown are for elevations up to 2000 feet. For elevations above 2000 feet, ratings should be reduced at the rate of 4% for each 1000 feet above sea level. Applicable to Gas/Electric units only.

(h) AFUE is rated in accordance with DOE test procedures.

Figure 13. Cooling and gas/electric - 6, 7½ (single) tons standard efficiency, 4-5 tons high efficiency

Note: All dimensions are in inches/millimeters.

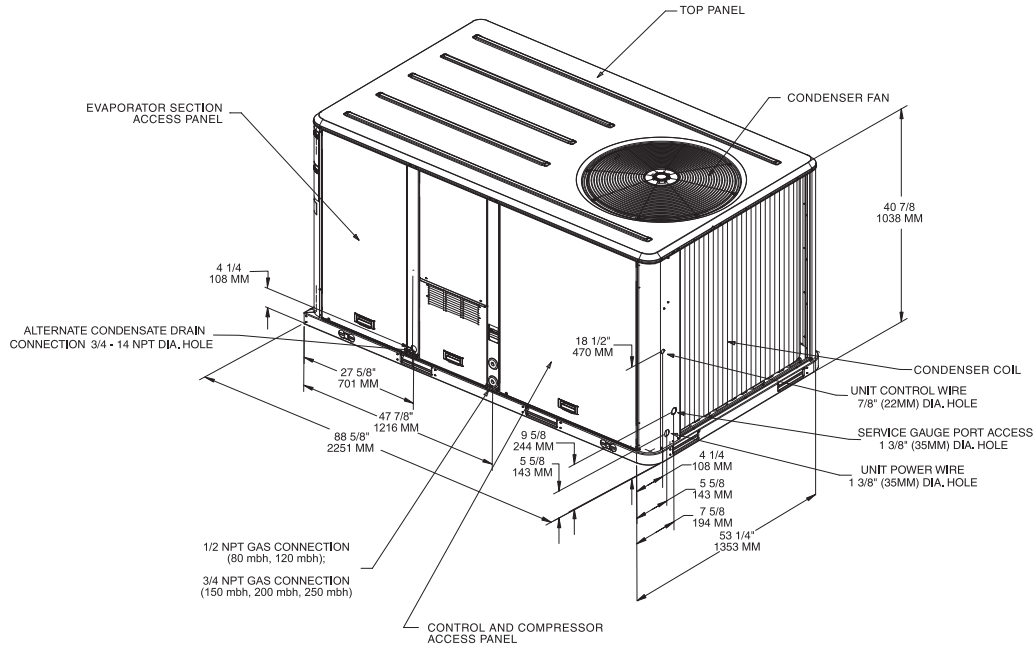
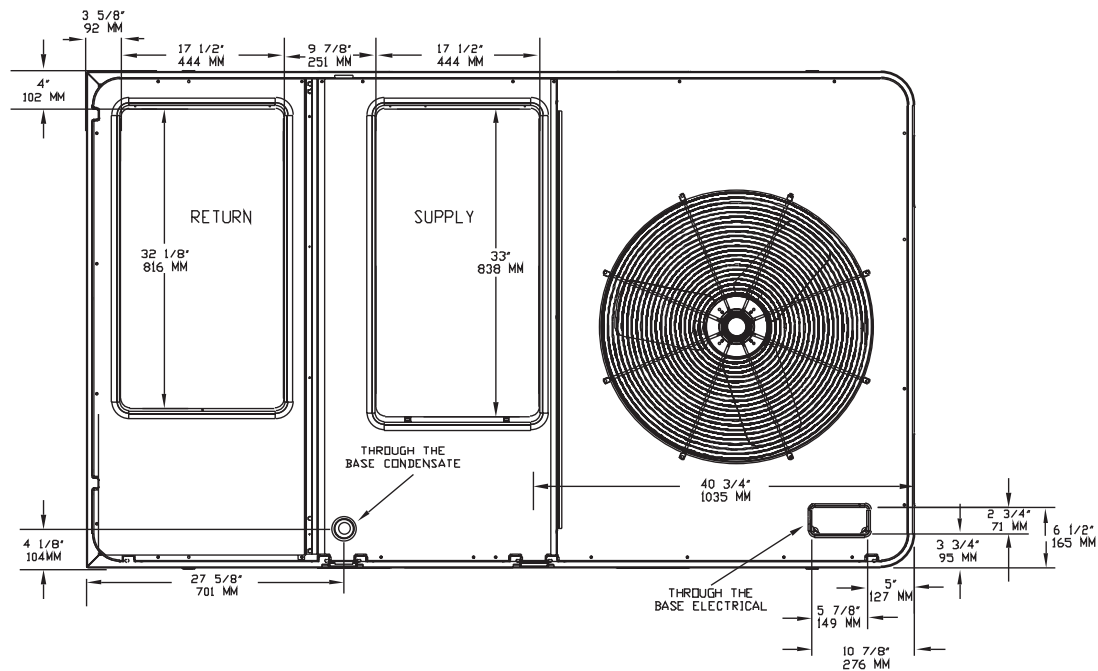


Figure 14. Cooling and gas/electric - 6, 7½ (single) tons standard efficiency, 4-5 tons high efficiency downflow airflow supply/return - through the base utilities

Note: All dimensions are in inches/millimeters.





EDUS 391005 - R2

R-410A

Engineering Data



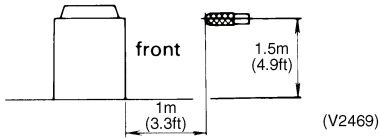
REYQ-P(B)
3 phase
460V, 60Hz

DAIKIN AC (AMERICAS), INC.

9. Sound Levels

Overall

		dBA				dBA	
Model	Power Supply	60Hz/460V		Model	Power Supply	60Hz/460V	
REYQ72PYDN		58		REYQ216PBYD		62	
REYQ96PYDN		58		REYQ240PBYD		63	
REYQ120PYDN		60		REYQ264PBYD		62	
REYQ144PBYD		60		REYQ288PBYD		63	
REYQ168PBYD		61		REYQ312PBYD		64	
REYQ192PBYD		62		REYQ336PBYD		64	



Note:

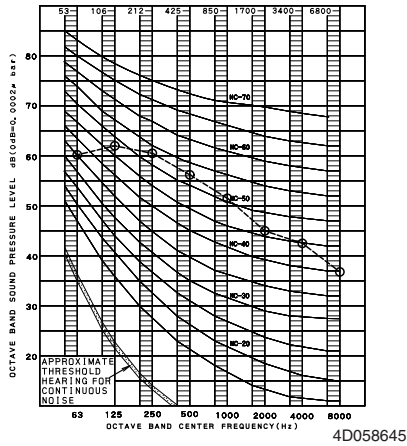
Sound level:

Anechoic chamber conversion value, measured at a point 3.3ft in front of the unit at a height of 4.9ft.

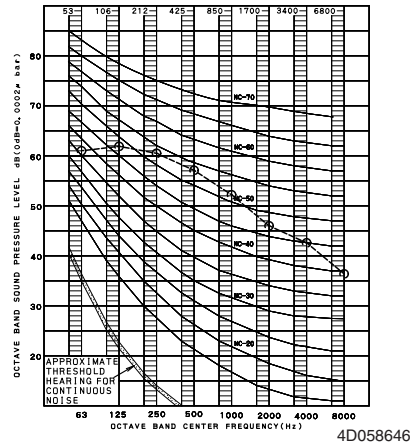
During actual operation, these values are normally somewhat higher as a result of ambient conditions.

Octave Band Level

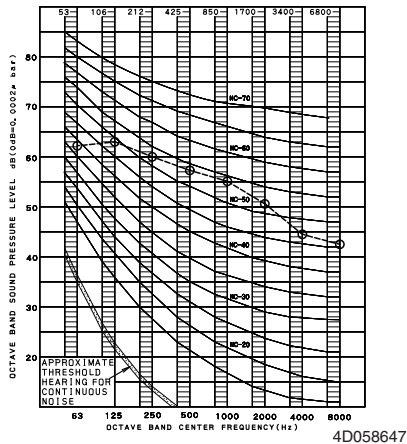
REYQ72PYDN



REYQ96PYDN

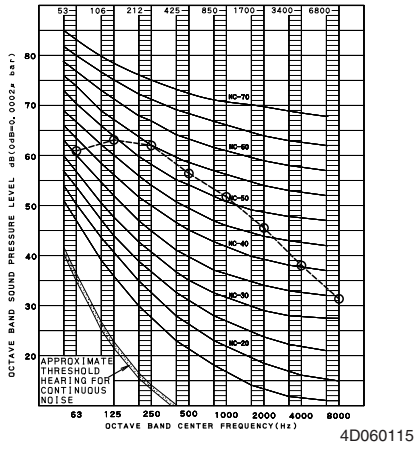


REYQ120PYDN

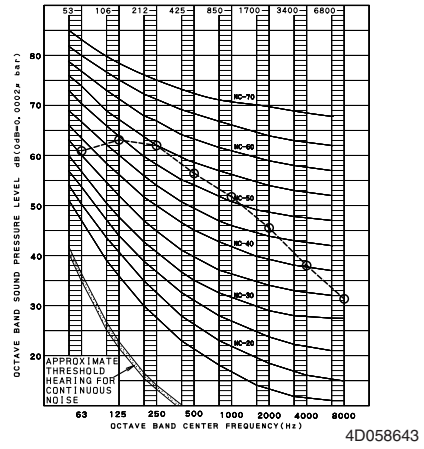


Octave Band Level

REMQ72PBYD



REMQ96PBYD



REMQ120PBYD

