VISTA
ENVIRONMENTAL

April 28, 2023

Johanna Crooker
MLC Holdings, Inc.
5 Peters Canyon Road, Suite 310
Irvine, CA 92606

Subject: **County of Los Angeles – Griswold Residential Project Air Conditioning Noise Impacts to the Nearby Homes Technical Memorandum.**

Dear Ms. Crooker:

Vista Environmental has conducted this analysis to evaluate the potential air conditioning noise levels created from the air conditioning units at the proposed Griswold Residential project that consists of development of a residential community with 68 single-family homes located at the former Griswold Elementary School Site.

The project site is bounded by the Metrolink San Bernardino Line to the north, single-family homes to the west and east, and San Bernardino Road to the south. The proposed homes would be set back a minimum of 15 feet from the shared east and west property lines with the existing homes.

County of Los Angeles Air Conditioner Noise Regulations

The County of Los Angeles Municipal Code provides the following noise regulations for the proposed air conditioners.

12.08.530 Residential air-conditioning or refrigeration equipment.

Operating or permitting the operation of any air-conditioning or refrigeration equipment in such a manner as to exceed any of the following sound levels is prohibited.

Measurement Location	Units Installed Before 1-1-80 dBA	Units Installed On or After 1-1-80 dBA
Any point on neighboring property line, 5 feet above grade level, no closer than 3 feet from any wall.	60	55
Center of neighboring patio, 5 feet above grade level, no closer than 3 feet from any wall.	55	50
Outside the neighboring living area window nearest the equipment location, not more than 3 feet from the window opening, but at least 3 feet from any other surface.	55	50

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Proposed Air Conditioning Units

The project applicant has stated that the proposed outdoor air conditioning condenser units would consist of Carrier Model 38MRA 3-Ton (36K) units and 4-Ton (48K) units. The Carrier Noise Specification sheets for these two models segmented into octave bands are attached to this Memo.

Air Conditioning Units Noise Modeling

The outdoor air conditioning condenser units noise levels were modeled at 3 feet from the property line and then compared to the more restrictive 50 dBA noise standard, in order to provide a conservative analysis. The noise modeling that includes the noise attenuation provided by the proposed 6-foot high concrete masonry unit (cmu) walls on the east and west sides of the project site was performed through use of the algorithms provided in the *Technical Noise Supplement to the Traffic Noise Analysis Protocol* (TeNS), prepared by Caltrans, September 2013. The noise modeling was based on the standard geometric spreading of a point source of noise of a drop-off rate of 6 dB per doubling of distance and the calculated octave noise levels were added together to find the average or Leq noise level that was used to compare to the County's 50 dB noise standard. The spreadsheets that show the noise modeling calculations are attached to this Memo.

Comparison of Air Conditioning Units Noise Levels to County Noise Standards

The outdoor air conditioning condenser units noise levels were modeled at 3 feet from the property line wall and then compared to the County noise standards and the results are shown in Table A. Table A shows that the noise level created from both the proposed 3 Ton and 4 Ton condenser units for both cooling and heating modes would be within the County's 50 dBA noise standard. Therefore, the proposed air conditioner units would create a less than significant noise impact at the adjacent residential properties. It should be noted that due to supply chain issues these exact units may not be available at time of construction, however the project applicant has committed to installing condenser units that would create noise levels that are below the County noise standards.

Table A – Air Conditioning Noise Levels and Comparison to County Noise Standards

Air Conditioner Unit	Heating/ Cooling	Calculated Noise Level at 3 feet from Property Line Wall[1]	County Noise Standard[2]	Exceed County Noise Standard?
Carrier Model 38MURA 3 Ton (36K)	Cooling	40.2	50	No
	Heating	37.0	50	No
Carrier Model 38MURA 4 Ton (48K)	Cooling	39.0	50	No
	Heating	38.2	50	No

Notes:
[1] Includes noise attenuation provided by the proposed 6-foot high cmu walls on east and west sides of project site.
[2] County noise standard from Section 12.08.530 of the Municipal Code.
Source: Caltrans, 2013.

Please let me know if you have any questions or need additional information with regard to the above analysis. I can be reached at (949) 510-5355, or email me at greg@vistalb.com.

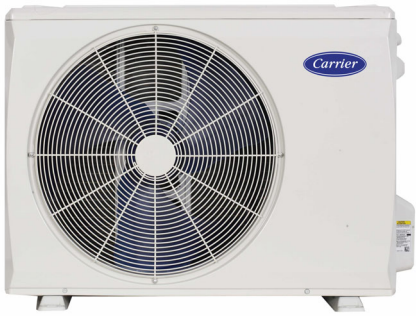
Sincerely,

Greg Tonkovich, INCE
Senior Analyst
Vista Environmental
949 510 5355

Encl.: Carrier Noise Specification sheets
Air Conditioner Noise Modeling Spreadsheets

38MURA
Outdoor Unit Single Zone Heat Pump System
Sizes 1-1/2 to 5 Nominal Tons

Product Data



INDUSTRY LEADING FEATURES / BENEFITS

Energy Efficiency

- 14.7 - 18 SEER2 / 8.2 - 12.4 EER2 / 8.2 - 9.8 HSPF2

Sound

- Levels as low as 54 dBA

Design Features

- Small Footprint
- Integrated 24V and RS-485 communications

Reliability, Quality and Toughness

- Inverter-driven, variable speed, rotary Compressor
- Line lengths up to 213' (65 m)
- Low ambient operation on high heat models down to -22F (-30C) without the use of wind baffles
- Conventional line set sizes

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.

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APPLICATION DATA

Unit Selections

Select equipment that either matches or supports slightly more than the anticipated peak load. This provides better humidity control, fewer unit cycles, and less part-load operation.

For units used in spaces with high sensible loads, base equipment selection on unit sensible load, not on total anticipated load. Adjust for anticipated room wet bulb temperature to avoid undersizing the equipment.

Unit Mounting (Outdoor)

Refer to the unit's installation instructions for further details.

Unit leveling - For reliable operation, units should be level in all planes.

Clearance - Minimum clearance (see Fig. 5 — on page 8) must be provided for airflow. The condensing units are designed for free-flow application. Air inlets and outlets should not be restricted.

Unit location - A location which is convenient to installation and not exposed to strong winds. A location that can bear the weight of the outdoor unit and where the outdoor unit can be mounted in a level position.

Do not install the indoor or outdoor units in a location with special environmental conditions. For those applications, contact your sales representative.

System Operating Conditions

OPERATING RANGE MIN/MAX °F / °C

All High Heat Units:

- **Cooling: -22/130 (-30/55)**
- **Heating: -22/86 (-30/30)**

Regular Heat Units:

- **Cooling: 5/130 (-15/55)**
- **Heating: -5/86 (-20/30)**

NOTE: Without intervention, the unit may continue to run at temperatures outside of the specified operating temperatures. However, operation outside of the specified temperature range may result in decreased performance and may cause damage to the unit.

METERING DEVICES

The outdoor unit has an electronic expansion valve to manage the refrigerant flow of the connected fan coil.

DRAIN CONNECTIONS

Install drains to meet the local sanitation codes.

REFRIGERANT LINES

General refrigerant line sizing:

1. The outdoor units are shipped with a full charge of R410A refrigerant. All charges, line sizing, and capacities are based on runs of 25 ft. (7.6 m). For runs over 25 ft. (7.6 m), add 0.69 oz/ft (65 g/m) of refrigerant charge.
2. Refrigerant lines should not be buried in the ground. If it is necessary to bury the lines, do not bury more than 36-in (914 mm). Provide a minimum 6-in (152 mm) vertical rise to the service valves to prevent refrigerant migration.
3. Insulate the suction line with a minimum 3/8-in (10 mm) wall thermal pipe insulation. Follow local codes.
4. Special consideration should be given to isolating the interconnecting tubing from the building structure. Isolate the tubing so vibration or noise is not transmitted into the structure.

⚠ CAUTION

It is **REQUIRED** to flow Nitrogen while brazing the line set or line set adapter(s) for these condensing units.

WIRING

All wires must be sized per NEC (National Electrical Code) or CEC (Canadian Electrical Code) and local codes. Use Electrical Data table MCA (minimum circuit amps) and MOCP (maximum over current protection) to correctly size the wires and the disconnect fuse or breakers respectively.

Power wiring

1. Remove the electric cover of the outdoor unit.
2. Connect the fork terminal to the terminals.
3. Match the wire labels with the labels on the terminal block.
4. Firmly screw the fork terminal of each wire to its corresponding terminal.
5. Insulate unused wires with electrical tape. Keep them away from any electrical or metal parts.
6. Reinstall the cover of the electric control box

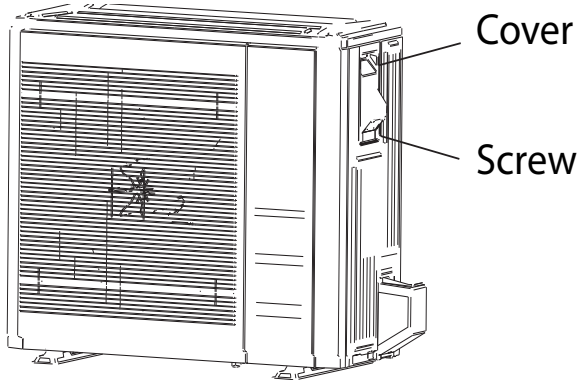

Fig. 1 —Remove Electrical Cover

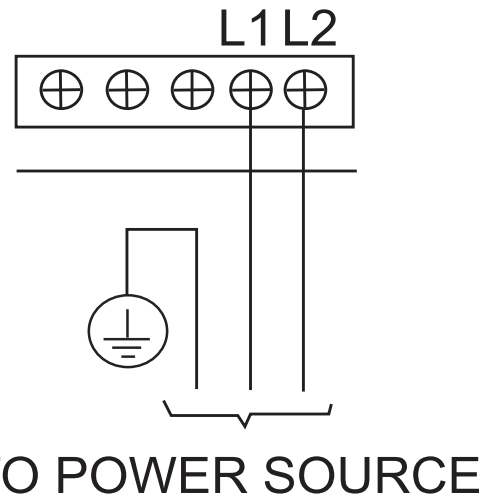

Fig. 2 —Match Fork Terminal to Terminal Labels

Sound Pressure in Octave Bands

	Frequency (Hz)	63	125	250	500	1000	2000	4000	8000
18K (208V)	Cooling dB(A)	43.1	43.5	46.2	48.6	47.0	42.8	37.8	32.9
	Heating dB(A)	37.8	42.8	43.7	46.9	48.3	45.5	41.4	34.6
18K (208V) High Heat	Cooling dB(A)	56.9	63.4	57.0	53.4	48.7	43.7	37.4	32.0
	Heating dB(A)	59.7	63.3	57.7	54.3	50.3	44.8	39.7	34.7
24K (208V)	Cooling dB(A)	47.2	50.1	50.0	51.1	51.7	47.5	41.6	34.4
	Heating dB(A)	44.0	48.6	49.7	51.4	53.2	49.1	44.4	37.6
24K (208V) High Heat	Cooling dB(A)	63.3	62.4	59.2	53.6	51.0	46.1	42.6	36.8
	Heating dB(A)	65.6	66.8	62.6	55.4	53.7	49.3	45.3	40.8
30K (208V)	Cooling dB(A)	42.9	47.3	54.1	54.2	56.2	54.4	49.6	41.8
	Heating dB(A)	44.0	50.5	51.9	52.9	53.5	50.9	47.7	40.4
30K (208V) High Heat	Cooling dB(A)	64.0	69.4	61.6	55.7	54.5	50.4	47.1	41.3
	Heating dB(A)	64.2	68.2	62.7	57.1	56.5	52.6	49.1	43.5
36K (208V)	Cooling dB(A)	45.5	56.1	55.8	56.4	56.8	53.3	50.6	42.9
	Heating dB(A)	43.6	51.0	52.4	52.9	55.7	52.9	49.5	41.7
36K (208V) High Heat	Cooling dB(A)	65.9	63.3	57.4	57.6	53.2	48.4	44.1	48.0
	Heating dB(A)	68.5	64.8	58.9	58.0	54.6	49.0	44.2	42.5
48K (208V)	Cooling dB(A)	51.6	51.6	50.4	54.8	55.9	54.6	46.8	41.0
	Heating dB(A)	48.4	50.0	49.9	55.3	56.0	52.3	47.3	43.9
48K (208V) High Heat	Cooling dB(A)	65.4	66.5	58.7	57.7	54.6	50.1	46.5	45.6
	Heating dB(A)	64.0	65.5	60.9	59.7	56.1	50.6	45.6	42.7
60K (208V)	Cooling dB(A)	49.1	52.1	53.7	57.0	58.2	55.1	47.8	41.1
	Heating dB(A)	45.5	50.9	53.3	56.7	56.7	52.3	46.5	42.2
60K (208V) High Heat	Cooling dB(A)	49.4	52.2	52.3	56.4	56.4	50.9	48.2	51.0
	Heating dB(A)	49.8	51.1	51.2	54.9	56.8	51.6	46.2	43.2

Outdoor Unit Sound Pressure Test Conditions

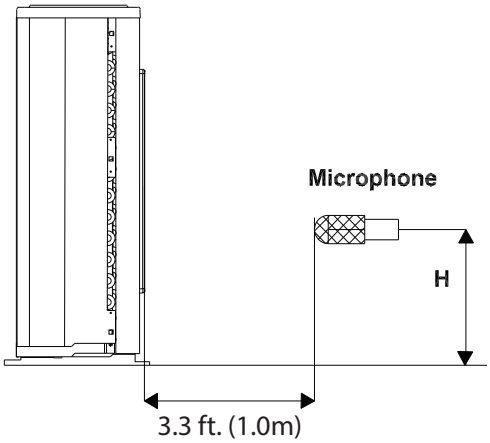

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Fig. 5 —Outdoor Unit Sound Pressure Test

NOTE: H=0.5 x Height of outdoor unit

	INDOOR CONDITION		OUTDOOR CONDITION	
	DB	WB	DB	WB
Cooling	80.6°F (27°C)	66.2°F (19°C)	95°F (35°C)	75.2°F (24°C)
Heating	68°F (20°C)	59°F (15°C)	44.6°F (7°C)	42.8°F (6°C)

Air Conditioner Noise Calculations at Nearest Homes East and West of Project Site

Carrier 36K Cooling	AC Noise Spec Sheets		At 3' from Property Line	
Octave Spectrum	**Distance**	**Leq**	**Distance**	**Leq**
63	3.28	45.5	16.5	31.5
125	3.28	56.1	16.5	42.1
250	3.28	55.8	16.5	41.8
500	3.28	56.4	16.5	42.4
1000	3.28	56.8	16.5	42.8
2000	3.28	53.3	16.5	39.3
4000	3.28	50.6	16.5	36.6
8000	3.28	42.9	16.5	28.9

1 (Line Source: hard=0, soft=.5; Point Source: hard=1, soft=1.5)
(eq. N-2141.2 of TeNS)

Octave Spectrum	**Distance from Receptor to Wall**	**Distance from source to Wall (feet)**	**Height of Wall* (feet)**	**Without Wall Noise Level at 3' from Prop Line**	**With Wall Noise Level at 3' from Prop Line**	**Source Height (feet)**	**Exterior Observer Height (feet)**	**Source Frequency (hz)**	barrier to receiver - b (all)	source to barrier - a	source to receiver - c	path difference y =a+b-c (auto)	line of sight (slope)	fresnel	Barrier Atten
63	3	13.5	6	31	**25.7**	2.8	5	63	3.162	13.874	16.646	0.390	1	0.087	-5.8
125	3	13.5	6	42	**35.5**	2.8	5	125	3.162	13.874	16.646	0.390	1	0.173	-6.56
250	3	13.5	6	42	**34.1**	2.8	5	250	3.162	13.874	16.646	0.390	1	0.347	-7.7
500	3	13.5	6	42	**33.1**	2.8	5	500	3.162	13.874	16.646	0.390	1	0.694	-9.27
1000	3	13.5	6	43	**31.7**	2.8	5	1000	3.162	13.874	16.646	0.390	1	1.388	-11.06
2000	3	13.5	6	39	**26.0**	2.8	5	2000	3.162	13.874	16.646	0.390	1	2.776	-13.301
4000	3	13.5	6	37	**20.9**	2.8	5	4000	3.162	13.874	16.646	0.390	1	5.551	-15.63
8000	3	13.5	6	29	**11.6**	2.8	5	8000	3.162	13.874	16.646	0.390	1	11.103	-17.232
		Combined Noise Levels		**49.1**	**40.2**										

Air Conditioner Noise Calculations at Nearest Homes East and West of Project Site

Carrier 36K Heating	AC Noise Spec Sheets		At 3' from Property Line	
Octave Spectrum	**Distance**	**Leq**	**Distance**	**Leq**
63	3.28	43.6	16.5	29.6
125	3.28	51.0	16.5	37.0
250	3.28	52.4	16.5	38.4
500	3.28	52.9	16.5	38.9
1000	3.28	55.7	16.5	41.7
2000	3.28	52.9	16.5	38.9
4000	3.28	49.5	16.5	35.5
8000	3.28	41.7	16.5	27.7

1 (Line Source: hard=0, soft=.5; Point Source: hard=1, soft=1.5)
(eq. N-2141.2 of TeNS)

Octave Spectrum	**Distance from Receptor to Wall**	**Distance from source to Wall (feet)**	**Height of Wall* (feet)**	**Without Wall Noise Level at 3' from Prop Line**	**With Wall Noise Level at 3' from Prop Line**	**Source Height (feet)**	**Exterior Observer Height (feet)**	**Source Frequency (hz)**	barrier to receiver - b (all)	source to barrier - a	source to receiver - c	path difference y =a+b-c (auto)	line of sight (slope)	fresnel	Barrier Atten
63	3	13.5	6	30	**23.8**	2.8	5	63	3.162	13.874	16.646	0.390	1	0.087	-5.8
125	3	13.5	6	37	**30.4**	2.8	5	125	3.162	13.874	16.646	0.390	1	0.173	-6.56
250	3	13.5	6	38	**30.7**	2.8	5	250	3.162	13.874	16.646	0.390	1	0.347	-7.7
500	3	13.5	6	39	**29.6**	2.8	5	500	3.162	13.874	16.646	0.390	1	0.694	-9.27
1000	3	13.5	6	42	**30.6**	2.8	5	1000	3.162	13.874	16.646	0.390	1	1.388	-11.06
2000	3	13.5	6	39	**25.6**	2.8	5	2000	3.162	13.874	16.646	0.390	1	2.776	-13.301
4000	3	13.5	6	35	**19.8**	2.8	5	4000	3.162	13.874	16.646	0.390	1	5.551	-15.63
8000	3	13.5	6	28	**10.4**	2.8	5	8000	3.162	13.874	16.646	0.390	1	11.103	-17.232
		Combined Noise Levels		**46.7**	**37.0**										

Air Conditioner Noise Calculations at Nearest Homes East and West of Project Site

Carrier 48K Cooling	AC Noise Spec Sheets		At 3' from Property Line	
Octave Spectrum	**Distance**	**Leq**	**Distance**	**Leq**
63	3.28	51.6	16.5	37.6
125	3.28	51.6	16.5	37.6
250	3.28	50.4	16.5	36.4
500	3.28	54.8	16.5	40.8
1000	3.28	55.9	16.5	41.9
2000	3.28	54.6	16.5	40.6
4000	3.28	46.8	16.5	32.8
8000	3.28	41.0	16.5	27.0

1 (Line Source: hard=0, soft=.5; Point Source: hard=1, soft=1.5)
(eq. N-2141.2 of TeNS)

Octave Spectrum	Distance from Receptor to Wall	Distance from source to Wall (feet)	Height of Wall (feet)	Without Wall Noise Level at 3' from Prop Line	With Wall Noise Level at 3' from Prop Line	Source Height (feet)	Exterior Observer Height (feet)	Source Frequency (hz)	barrier to receiver - b (all)	source to barrier - a	source to receiver - c	path difference y =a+b-c (auto)	line of sight (slope)	fresnel	Barrier Atten
63	3	13.5	6	38	**32.1**	4.2	5	63	3.162	13.619	16.519	0.262	1	0.059	-5.5
125	3	13.5	6	38	**31.5**	4.2	5	125	3.162	13.619	16.519	0.262	1	0.117	-6.08
250	3	13.5	6	36	**29.4**	4.2	5	250	3.162	13.619	16.519	0.262	1	0.233	-7.01
500	3	13.5	6	41	**32.5**	4.2	5	500	3.162	13.619	16.519	0.262	1	0.466	-8.3
1000	3	13.5	6	42	**31.8**	4.2	5	1000	3.162	13.619	16.519	0.262	1	0.933	-10.09
2000	3	13.5	6	41	**28.5**	4.2	5	2000	3.162	13.619	16.519	0.262	1	1.866	-12.02
4000	3	13.5	6	33	**18.4**	4.2	5	4000	3.162	13.619	16.519	0.262	1	3.731	-14.33
8000	3	13.5	6	27	**10.5**	4.2	5	8000	3.162	13.619	16.519	0.262	1	7.463	-16.438
		Combined Noise Levels		**47.5**	**39.0**										

Air Conditioner Noise Calculations at Nearest Homes East and West of Project Site

Carrier 48K Heating	AC Noise Spec Sheets		At 3' from Property Line	
Octave Spectrum	**Distance**	**Leq**	**Distance**	**Leq**
63	3.28	48.4	16.5	34.4
125	3.28	50.0	16.5	36.0
250	3.28	49.9	16.5	35.9
500	3.28	55.3	16.5	41.3
1000	3.28	56.0	16.5	42.0
2000	3.28	52.3	16.5	38.3
4000	3.28	47.3	16.5	33.3
8000	3.28	43.9	16.5	29.9

1 (Line Source: hard=0, soft=.5; Point Source: hard=1, soft=1.5)
(eq. N-2141.2 of TeNS)

Octave Spectrum	Distance from Receptor to Wall	Distance from source to Wall (feet)	Height of Wall (feet)	Without Wall Noise Level at 3' from Prop Line	With Wall Noise Level at 3' from Prop Line	Source Height (feet)	Exterior Observer Height (feet)	Source Frequency (hz)	barrier to receiver - b (all)	source to barrier - a	source to receiver - c	path difference y =a+b-c (auto)	line of sight (slope)	fresnel	Barrier Atten
63	3	13.5	6	34	**28.9**	4.2	5	63	3.162	13.619	16.519	0.262	1	0.059	-5.5
125	3	13.5	6	36	**29.9**	4.2	5	125	3.162	13.619	16.519	0.262	1	0.117	-6.08
250	3	13.5	6	36	**28.9**	4.2	5	250	3.162	13.619	16.519	0.262	1	0.233	-7.01
500	3	13.5	6	41	**33.0**	4.2	5	500	3.162	13.619	16.519	0.262	1	0.466	-8.3
1000	3	13.5	6	42	**31.9**	4.2	5	1000	3.162	13.619	16.519	0.262	1	0.933	-10.09
2000	3	13.5	6	38	**26.2**	4.2	5	2000	3.162	13.619	16.519	0.262	1	1.866	-12.02
4000	3	13.5	6	33	**18.9**	4.2	5	4000	3.162	13.619	16.519	0.262	1	3.731	-14.33
8000	3	13.5	6	30	**13.4**	4.2	5	8000	3.162	13.619	16.519	0.262	1	7.463	-16.438
		Combined Noise Levels		**46.9**	**38.2**										