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Ldn Consulting, Inc.
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www.ldnconsulting.net fax 760-689-4943

October 8, 2018

Alan Smith
Owner / Developer
12549 Overland Drive
Rancho Cucamonga, CA 91739

Subject: The Arbor Carwash Facility Operational Noise Assessment in the City of Rancho Cucamonga CA

Ldn Consulting is pleased to submit the following noise impact analysis for the proposed Arbors Carwash Project (project). The purpose of this assessment is to evaluate operational noise levels from the proposed car wash, and central vacuum equipment. The calculated noise levels have been propagated to the nearest potential habitat using the logarithmic relationship describing the acoustical spreading or drop off rate of 6 dB per doubling of distance from the source. The propagated noise levels are then compared to the applicable City standards.

PROJECT LOCATION/DESCRIPTION

The project consists of a carwash facility and is proposing a drive thru carwash building. The project site is located at 9744 Arrow Route in Rancho Cucamonga, CA. The proposed project site vicinity map is provided in Figure 1.

The project site is surrounded by commercial uses to the west and across Arrow Route, a school use to the north and a residential property to the east. It should be noted: the residential property to the east is looking to rezone that property to commercial. The proposed site configuration can be seen in Figure 2.

CITY OF RANCHO CUCAMONGA NOISE STANDARDS

Section 17.66.050 of the City of Rancho Cucamonga's municipal code regulates exterior noise levels. The noise ordinance provides Noise Standards relative to community noise level exposure, guidelines, and regulations. Pursuant to Municipal Code Section 17.66.050(F), exterior noise levels should not exceed 65 dBA between the hours of 7:00 AM and 10:00 PM at residential uses. The City of Rancho Cucamonga has adopted performance standards for commercial and office uses. All commercial and office uses shall not create any noise that would exceed an exterior noise level of 70 dBA when measured at the adjacent property line between the hours of 7:00 AM and 10:00 PM.

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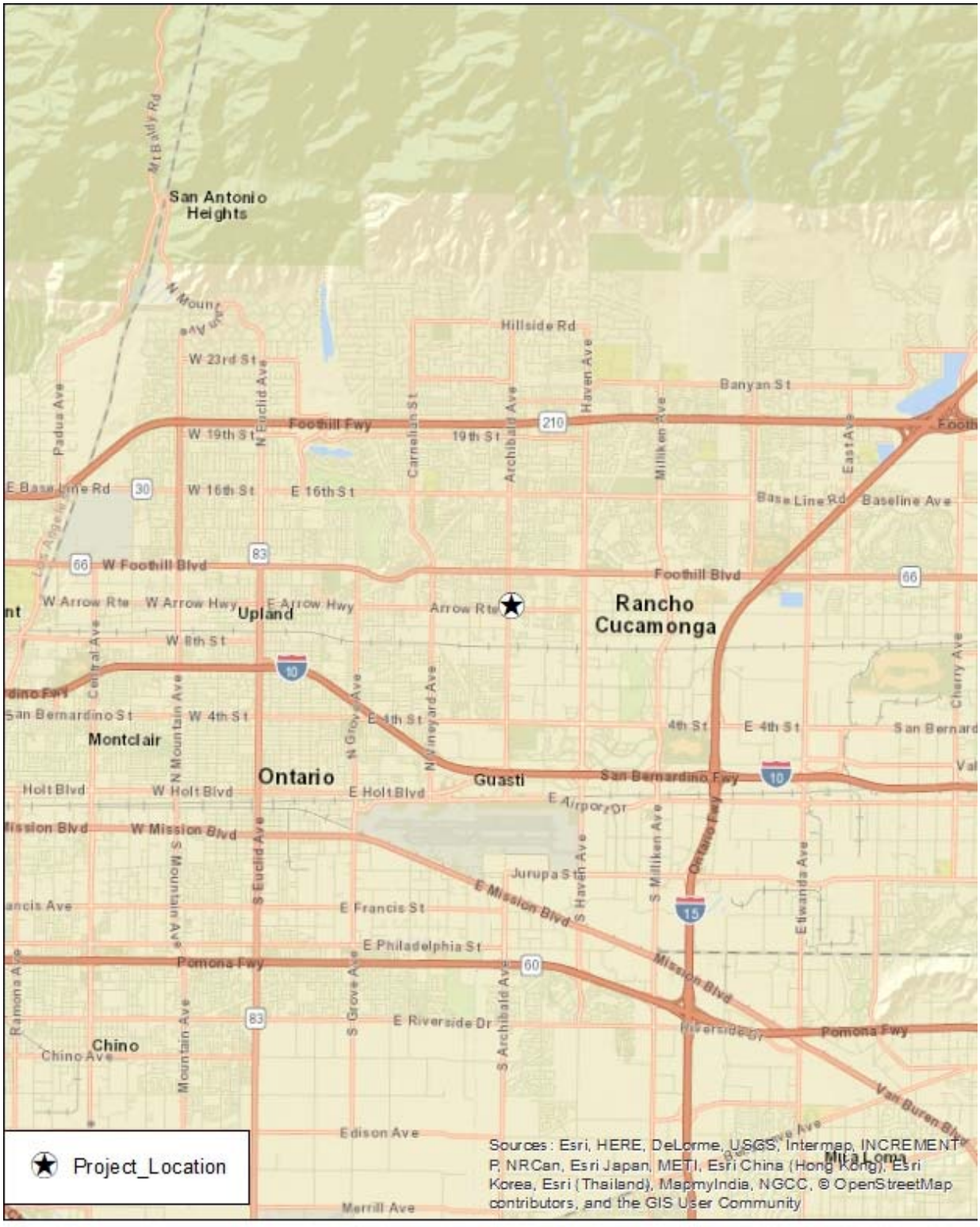

Figure 1: Project Vicinity Map

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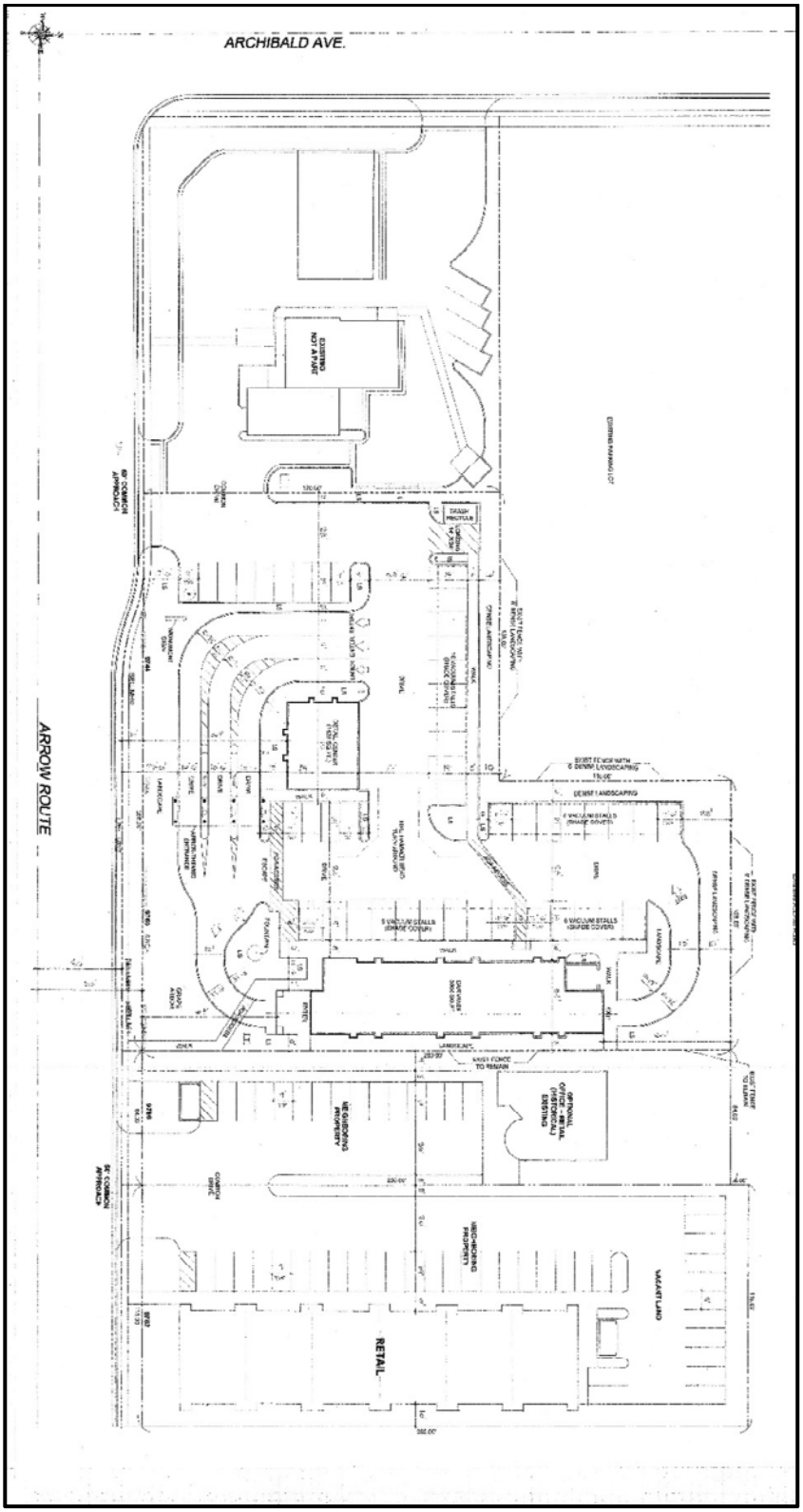

Figure 2: Proposed Site Plan

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Existing Setting

Noise level measurements were conducted between the hours of 12:00 p.m. and 1:30 p.m. on May 9, 2018. Noise measurements were taken with a Larson Davis Model LxT Type 1 sound level meter set on "slow" response and "A-weighting." The meter was positioned 5 feet above the existing ground elevation at all measurement locations. The sound level meter was calibrated before and after each measurement using a Larson-Davis calibrator, Model CAL 200. Table 1 provides a summary of the noise level measurement and detailed measurement data is included in ***Attachment A***. The Measurement location is shown in Figure 3.

Table 1: Summary of Noise Level Measurements

ID	Location Description	Noise Level (dBA)		
		Leq	Lmin	Lmax
1	Central of site at northern property line – set back from roadways	63.4	37.1	90.8

ANALYSIS PROCEDURES

Proposed Carwash and Central Vacuum

The applicant proposes to place a carwash along with blower fans for drying vehicles. The applicant proposes to utilize a Peco Automated Car Wash system, the manufacturer's noise specification is provided in ***Attachment B***. The carwash entrance and exist would be oriented from the south to the north and the blowers would be located on the northern end of the building. The blowers would be located at least 8 feet in the tunnel and would be partially blocked by the building. The blowers would be located approximately 85 feet from the property line to the north. The location of the blowers is shown in Figure 3.

The applicant proposes to utilize a central vacuum unit, a VacuTech (60 HP Turbine Vacuum Producer), or equivalent, placed at the northwestern end of the building. The manufacturer's noise specification is provided in ***Attachment B***. The modeling includes an 8-foot high wall located around the central vacuum. The location of the central vacuum is shown in Figure 3.

Proposed HVAC

Rooftop mechanical ventilation units (HVAC) will be installed on the proposed buildings. In order to evaluate the HVAC noise impacts, the analysis utilized reference noise level measurements provided by Trane. The unshielded noise levels for the HVAC units was found to be 78-80 dBA as can be seen in ***Attachment B***.

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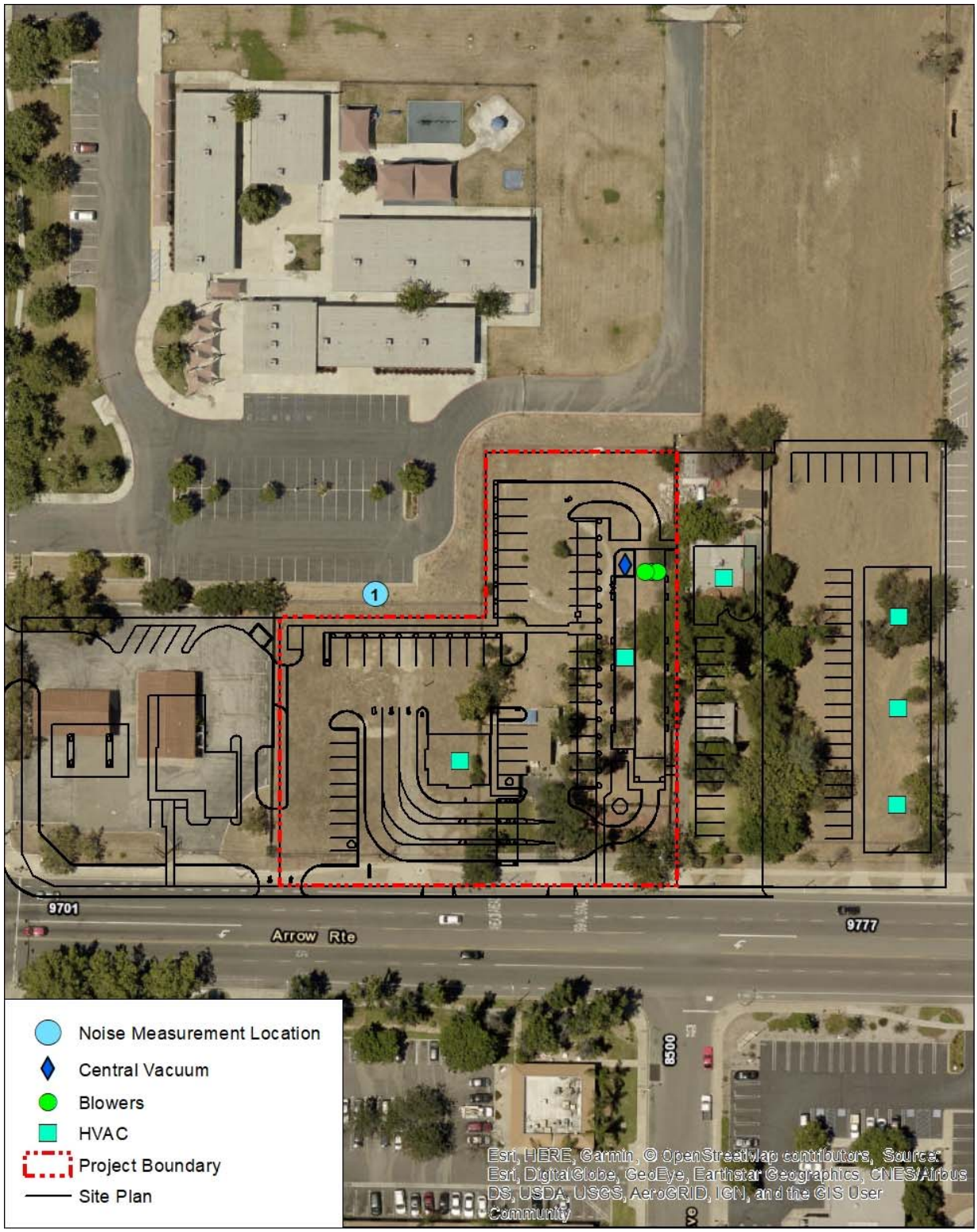

Figure 3 Proposed Site Configuration

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Operational Noise Modeling

Noise levels from the proposed operation activities were modeled with SoundPLAN Essential, version 4.1, a three-dimensional acoustical modeling software package (NAVCON 2017). Propagation of modeled stationary noise sources was based on ISO Standard 9613-2, "Attenuation of Sound during Propagation Outdoors, Part 2: General Method of Calculation." The model includes digital terrain modeling, which allows the calculation to take topography into account. The terrain model was developed from project specific topographical data. The ISO Standard 9613-2 assumes that all receptors would be downwind of stationary sources. This is a worst-case assumption for total noise impacts, since, in reality, only some receptors will be downwind at any one time.

Typical increases or decreases of sound levels depend on the ground absorption factor between the source and receiver. Acoustically hard sites include surfaces, such as pavement, bare hard ground, water, and ice, with high reflectivity (i.e., 0.0 absorption). A higher ground factor defines more absorptive ground, such as vegetation or tilled and loose soil (typically 0.5 to 1.0). Based on field observations, portions of the site and off site uses are considered acoustically soft, or absorptive, therefore, an acoustic ground factor of 0.5 was used for modeling. The modeled source noise levels are presented in Table 2. Elevations were taken from the project plans.

Table 2: Operational Reference Noise Levels (dBA)

Noise Source	Number of Sources	Reference Sound Power Level[1]
Carwash Blowers	3	90.5
Central Vacuum	1	89.7
3-Ton HVAC	2	78.0
5-Ton HVAC	3	80.0

[1] Reference Noise Level provided in Attachments.

The results of the noise modeling at specific points are shown in Table 3. The results of the noise modeling along with the receiver locations are shown are shown in Figure 4 for the unmitigated scenario. As shown in Table 3 and Figure 4, noise levels would not exceed the City's standards for adjacent properties. Therefore, no noise abatement measure is required to comply with City standards.

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Table 3: Operational Noise Levels (dBA)

Receiver	Without Mitigation
R-1	60
R-2	59
R-3	42
R-4	33
R-5	37
R-6	34
R-7	43
R-8	40

FINDINGS

Operational noise levels would not exceed City standards at adjacent properties with the following design features:

1. *The carwash dryer system shall not to exceed 82.5 dBA unmitigated noise level at 5 feet and shall be set back within the carwash tunnel approximately eight feet from the exit allowing the tunnel structure to function as a sound attenuation barrier.*
2. *All carwash supporting equipment including pumps, compressors, and vacuum motor and canister system shall be installed within a dedicated equipment room equipped with passive rooftop ventilation.*
3. *In order to meet daytime noise limits as defined in the Escondido Noise Ordinance, the carwash must cease operating no later than 10:00 p.m.*

No noise abatement measures are required or recommended. If you have any questions, please contact me directly at (760) 473-1253.

Sincerely,
Ldn Consulting, Inc.

Jeremy Louden, Principal

ATTACHMENTS A – Measurement Data
B – Sound Reference Data

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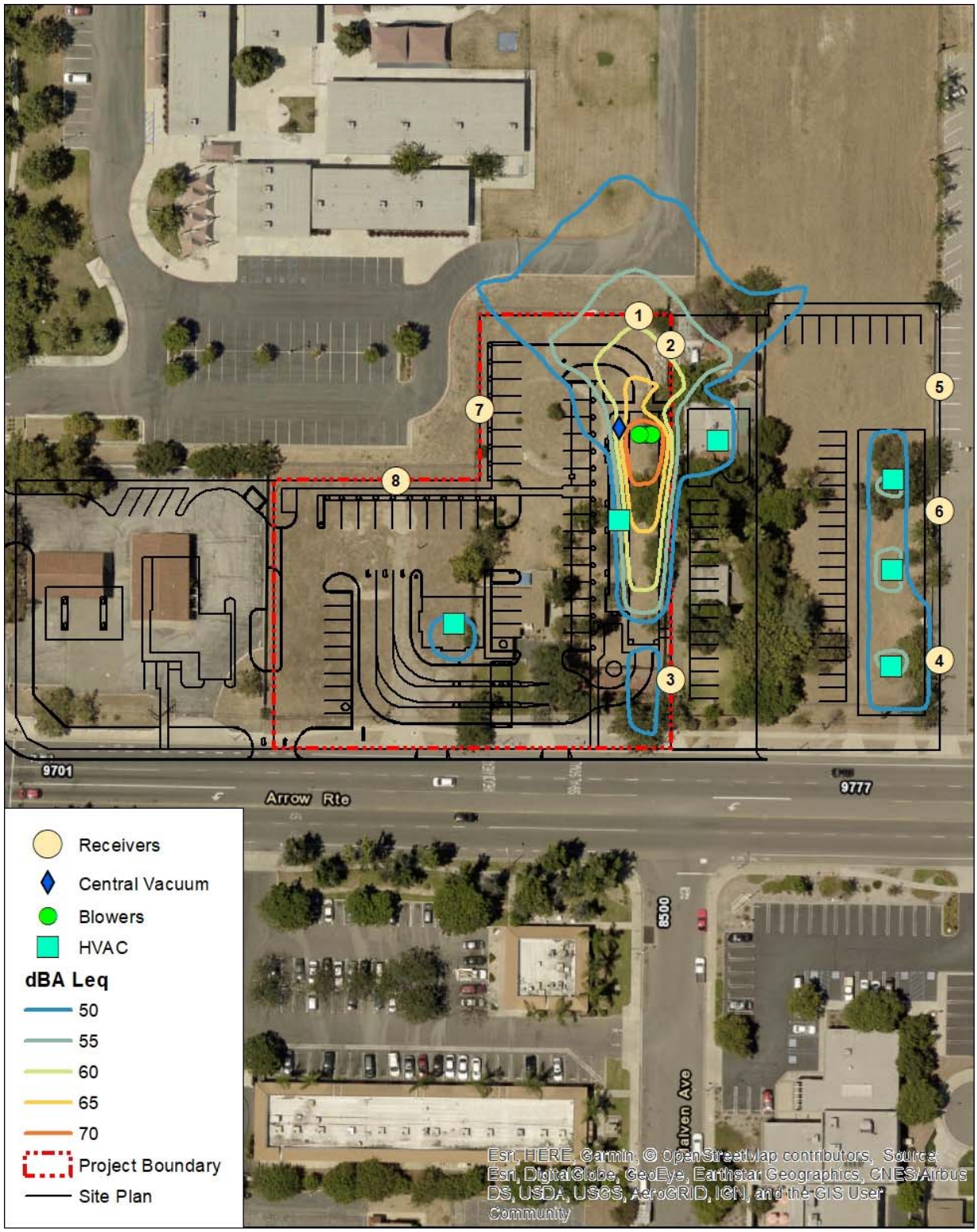

Figure 4 Unmitigated Noise Level Contours

Attachment A: Ambient Noise Levels

General Information	
Serial Number	21733
Model	703+
User	
Job Description	
Location	
Start Time	Wednesday, 9 May 2018 12:00:14
Stop Time	Wednesday, 9 May 2018 13:30:14
Run Time	01:30:00
Pre Calibration	12:00:01
Post Calibration	13:30:26
Calibration Deviation	60 Sec.
Sample Interval	

Note

Results	Dose 4	
Dose	1.3	%
Projected Dose	6.9	%
Leq	63.4	dBA
TWA	63.4	dBA
TWA (8)	56.1	dBA
Lmax	90.8	dBA
Lpeak (max)	122.8	dB
SEA	125.8	dB
Lmin	37.1	dBA
Lep (8)	56.1	dBA
SE	0.0	Pa²hr
Overload?		Yes

Statistics		
L10	60.0	dBA
L30	56.5	dBA
L50	54.5	dBA
L70	53.0	dBA
L90	51.0	dBA

Settings		
Exchange Rate	3	
Threshold	0	dBA
Criterion Level	75	dBA
Criterion Duration	8	hours
RMS Weight	A Weighting	
Peak Weight	Unweighted	
Detector	Slow	
Gain	30	dB

Measurement Results

The results of all measurements, in the form of print-outs directly from the sound level meter, can be found following this report. All measurements were taken as 15-second averages. For clarity, the results of the ⅓-octave band measurements are listed below. For comparison, I have included the test results from our measurements taken on your original blower (1 motor configuration) in 1998.

⅓-Octave Band Sound Pressure Levels, in decibels (dB)

Center Frequency (Hz)	5 Feet from Blowers (4 motor system)	20 Feet from Blowers (4 motor system)	*5 Feet from Blower (1 motor - 1998 test)*
25	76.1	70.2	*67.3*
31.5	76.6	71.9	*71.4*
40	76.8	72.0	*75.5*
50	78.4	74.2	*79.3*
63	77.8	72.8	*85.3*
80	77.3	74.8	*81.9*
100	78.1	74.0	*83.7*
125	80.0	73.7	*83.3*
160	75.9	73.8	*86.4*
200	77.0	73.9	*85.9*
250	81.7	73.7	*88.5*
315	79.3	75.0	*90.5*
400	83.6	80.5	*97.0*
500	76.9	73.7	*96.2*
630	67.0	70.8	*96.5*
800	67.1	63.7	*89.7*
1,000	66.4	64.9	*88.5*
1,250	64.5	64.5	*84.7*
1,600	65.8	63.7	*82.4*
2,000	64.5	61.5	*83.0*
2,500	61.4	59.4	*80.3*
3,150	61.5	58.3	*78.5*
4,000	59.5	56.8	*76.4*
5,000	57.9	54.1	*74.0*
6,300	54.5	49.9	*72.5*
8,000	51.3	48.8	*70.6*
10,000	49.6	44.5	*68.9*
12,500	47.2	42.2	*67.1*
16,000	44.9	38.4	*64.3*
20,000	38.9	32.8	*59.9*
Overall (sum):	90.5 dB	86.4 dB	*103.0 dB*
A-Weighted:	**82.5 dBA**	**79.4 dBA**	***99.8 dBA***

Please note that even though the data are listed to the nearest 0.1 decibel, accuracy beyond the nearest whole decibel should not be expected.

SOUND LEVEL METER READINGS

MODEL: FT-DD-T460HP3 (60HP TURBINE VACUUM PRODUCER)

READING ONE: 72 DB-A, 10 FEET FROM TURBINE @ 45° ANGLE
AND NO BACKGROUND NOISE OR OUTSIDE INTERFERENCE.

READING TWO: 65 DB-A, 20 FEET FROM TURBINE @ 45° ANGLE
AND NO BACKGROUND NOISE OR OUTSIDE INTERFERENCE.

READING THREE: 59 DB-A, 30 FEET FROM TURBINE @ 45° ANGLE
AND NO BACKGROUND NOISE OR OUTSIDE INTERFERENCE.

SOUND LEVEL METER USED:

SIMPSON MODEL #40003 – MSHA APPROVED.
MEETS OSHA & WALSH-HEALY REQUIREMENTS FOR NOISE CONTROL.
CONFORMS TO ANSI S1.4-1983, IEC 651 SPECS FOR METER TYPE.

NOTE: THESE READINGS WERE TAKEN OUTSIDE ON CONCRETE SLAB NO ENCLOSURE.

Vacutech
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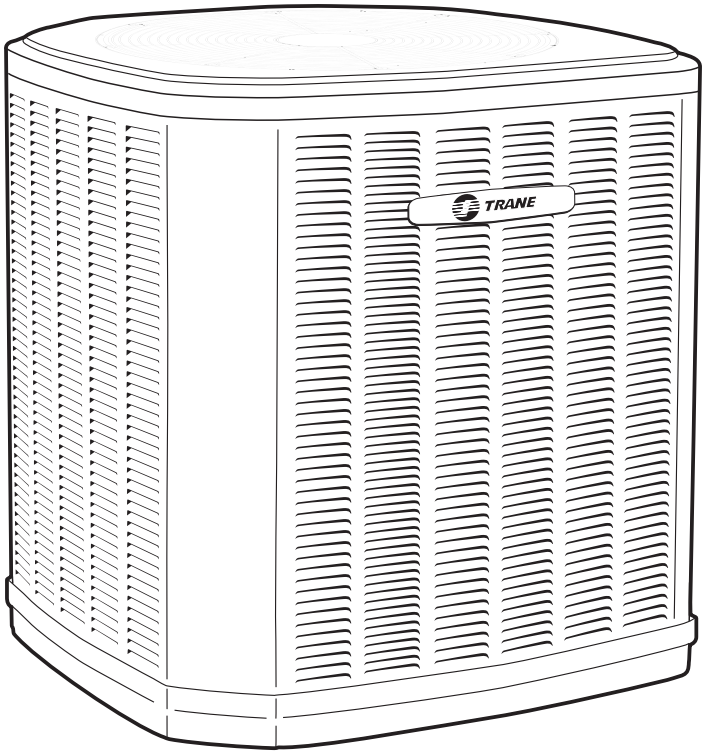
PHONE: (800) 917-9444 FAX: (303) 675-1988
EMAIL: info@vacutechllc
WEB SITE: vacutechllc.com

TRANE®

Split System Cooling Product Data

Three Phase
4TTA3

2½ – 5 Tons



PUB. NO. 22-1791-14-EN

Features and Benefits

- All aluminum **Spine Fin**™ coil
- **WeatherGuard**™ fasteners
- **Quick-Sess**™ cabinet, service access and refrigerant connections with full coil protection
- **DuraTuff**™ base, fast complete drain, weatherproof
- **Comfort "R"**™ mode approved
- Glossy corrosion resistant finish
- Internal compressor high/low pressure and temperature protection
- Liquid line filter-drier
- Polyslate gray cabinet with anthracite gray badge and cap
- R-410A refrigerant
- Low Pressure Switch
- High Pressure Switch
- Compressor Sump Heat
- S.E.E.T. design testing
- 100% line run test
- Low ambient cooling to 55°F as shipped
- Low ambient cooling to 30°F with AY28X079
- Low ambient cooling to 0°F with BAYLOAM103

- **Extended warranties available**

Contents

TRANE®

General Data

Product Specifications

Model No. ①	4TTA3030A3	4TTA3030A4	4TTA3036B3	4TTA3036B4
Electrical Data V/Ph/Hz ②	200/230/3/60	460/3/60	208/230/3/60	460/3/60
Min Cir Ampacity	10	5	14	8
Max Fuse Size (Amps)	15	15	20	15
Compressor	RECIP	RECIP	SCROLL	SCROLL
RL Amps - LR Amps	7.4 - 54.9	3.7 - 28	10.4 - 73	5.8 - 38
Outdoor Fan FL Amps	0.7	0.4	0.56	0.4
Fan HP	1/8	1/8	1/8	1/8
Fan Dia (inches)	23.0	23.0	23.0	23.0
Coil	Spine Fin™	Spine Fin™	Spine Fin™	Spine Fin™
Refrigerant R-410A	5/11-LB/OZ	5/11-LB/OZ	5/12-LB/OZ	5/12-LB/OZ
Line Size - (in.) O.D. Gas ③	3/4	3/4	3/4	3/4
Line Size - (in.) O.D. Liquid ③	3/8	3/8	3/8	3/8
Charge Spec. Subcooling	10°	10°	10°	10°
Dimensions H x W x D (Crated)	38 x 30.1 x 33	38 x 30.1 x 33	34 x 30.1 x 33	34 x 30.1 x 33
Weight - Shipping	224	222	176	176
Weight - Net	197	195	149	149
Start Components	NO	NO	NO	NO
Sound Enclosure	NO	NO	NO	NO
Compressor Sump Heat	YES	YES	YES	YES
Optional Accessories: ④				
Anti-short Cycle Timer	TAYASCT501A	TAYASCT501A	TAYASCT501A	TAYASCT501A
Evaporator Defrost Control	AY28X079	AY28X079	AY28X079	AY28X079
Rubber Isolator Kit	BAYISLT101	BAYISLT101	BAYISLT101	BAYISLT101
Snow/Sand Legs - Base & Cap 4" High	BAYLEGS002	BAYLEGS002	BAYLEGS002	BAYLEGS002
Snow/Sand Legs - 4" Extension	BAYLEGS003	BAYLEGS003	BAYLEGS003	BAYLEGS003
Indoor Fan Delay Kit	BAY24X045	BAY24X045	BAY24X045	BAY24X045
Sound Enclosure	BAYSDEN001	BAYSDEN001	BAYSDEN003	BAYSDEN003
Extreme Condition Mounting Kit	BAYECMT001	BAYECMT001	BAYECMT001	BAYECMT001
Seacoast Kit	BAYSEAC001	BAYSEAC001	BAYSEAC001	BAYSEAC001
Low Ambient Kit	BAYLOAM103	BAYLOAM103	BAYLOAM103	BAYLOAM103
Refrigerant Lineset ⑤	TAYREFLN2*	TAYREFLN2*	TAYREFLN7*	TAYREFLN7*

① Certified in accordance with the Unitary Air-Conditioner equipment certification program which is based on AHRI Standard 210/240.
② Calculated in accordance with N.E.C. Only use HACR circuit breakers or fuses.
③ Standard line lengths - 60'. Standard lift - 60' Suction and Liquid line.
For greater lengths and lifts refer to refrigerant piping software Pub# 32-3312-0†. (†denotes latest revision)
④ For accessory description and usage, see page 5.
⑤ * = 15, 20, 25, 30, 40 and 50 foot lineset available.

A-Weighted Sound Power Level [dB(A)]

MODEL	SOUND POWER LEVEL [dB(A)]	A_WEIGHTED FULL OVTAVE SOUND POWER LEVEL dB - [dB(A)]							
		63	125	250	500	1000	2000	4000	8000
4TTA3030A3/4	78	49	60.2	66	70.3	71.4	69.8	60.4	53
4TTA3036B3/4	78	45.5	58.7	63.1	69.7	70	68.1	59	49.8
4TTA3042D3/4	79	47.5	64.5	67	75.3	74	70.7	62.2	52.8
4TTA3048D3/4	79	47.4	60	66.9	75.3	73.5	70.3	62	51.4
4TTA3060D3/4	80	47.3	55.7	69	72.7	75.8	69.4	62.2	53.3

Note: Rated in accordance with AHRI Stnadard 270-2008

General Data

Product Specifications

Model No. ①	4TTA3042D3	4TTA3042D4	4TTA3048D3	4TTA3048D4
Electrical Data V/Ph/Hz ②	208/230/3/60	460/3/60	208/230/3/60	460/3/60
Min Cir Ampacity	18	8	18	8
Max Fuse Size (Amps)	30	15	30	15
Compressor	SCROLL	SCROLL	SCROLL	SCROLL
RL Amps - LR Amps	13.6 - 83	6.4 - 41	13.7 - 83	6.4 - 41
Outdoor Fan FL Amps	1.2	0.6	1.2	0.6
Fan HP	1/5	1/5	1/5	1/5
Fan Dia (inches)	27.6	27.6	27.6	27.6
Coil	Spine Fin™	Spine Fin™	Spine Fin™	Spine Fin™
Refrigerant R-410A	6/2-LB/OZ	6/2-LB/OZ	6/13-LB/OZ	6/13-LB/OZ
Line Size - (in.) O.D. Gas ③	3/4	3/4	7/8	7/8
Line Size - (in.) O.D. Liquid ③	3/8	3/8	3/8	3/8
Charge Spec. Subcooling	10°	10°	10°	10°
Dimensions H x W x D (Crated)	34.4 x 35.1 x 38.7	38.4 x 35.1 x 38.7	34.4 x 35.1 x 38.7	38.4 x 35.1 x 38.7
Weight - Shipping	228	228	235	235
Weight - Net	196	196	203	203
Start Components	NO	NO	NO	NO
Sound Enclosure	NO	NO	NO	NO
Compressor Sump Heat	YES	YES	YES	YES
Optional Accessories: ④				
Anti-short Cycle Timer	TAYASCT501A	TAYASCT501A	TAYASCT501A	TAYASCT501A
Evaporator Defrost Control	AY28X079	AY28X079	AY28X079	AY28X079
Rubber Isolator Kit	BAYISLT101	BAYISLT101	BAYISLT101	BAYISLT101
Snow/Sand Legs - Base & Cap 4" High	BAYLEGS002	BAYLEGS002	BAYLEGS002	BAYLEGS002
Snow/Sand Legs - 4" Extension	BAYLEGS003	BAYLEGS003	BAYLEGS003	BAYLEGS003
Indoor Fan Delay Kit	BAY24X045	BAY24X045	BAY24X045	BAY24X045
Sound Enclosure	BAYSDEN003	BAYSDEN003	BAYSDEN003	BAYSDEN003
Extreme Condition Mounting Kit	BAYECMT001	BAYECMT001	BAYECMT001	BAYECMT001
Seacoast Kit	BAYSEAC001	BAYSEAC001	BAYSEAC001	BAYSEAC001
Low Ambient Kit	BAYLOAM103	BAYLOAM103	BAYLOAM103	BAYLOAM103
Refrigerant Lineset ⑤	TAYREFLN7*	TAYREFLN7*	TAYREFLN3*	TAYREFLN3

Accessory Description and Usage

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

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

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

Hard Start kit — Start capacitor and relay to assist compressor motor startup. Use in areas with marginal power supply, on long linesets, low ambient conditions, etc.

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

AHRI Standard Capacity Rating Conditions

AHRI STANDARD 210/240 RATING CONDITIONS —

(A) Cooling 80°F DB, 67°F WB air entering indoor coil, 95°F DB air entering outdoor coil.

(B) High Temperature Heating 47°F DB, 43°F WB air entering outdoor coil, 70°F DB air entering indoor coil.

(C) Low Temperature Heating 17°F DB, 15°F WB air entering outdoor coil, 70°F DB air entering indoor coil.

(D) Rated indoor airflow for heating is the same as for cooling.

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

AHRI CERTIFIED™ www.ahridirectory.org
Unitary Small AC
AHRI Standard 210/240
Certification applies only when the complete system is listed with AHRI.

ETL LISTED c US
Intertek