

AMBIENT AND OPERATIONS NOISE STUDY FOR A PROPOSED H2GO CAR WASH NEAR BROOKHURST ST. AND ADAMS AVE. IN THE CITY OF HUNTINGTON BEACH

Revision 1

September 14, 2019

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1. Introduction

At the request of Mr. Brett Blanchard (TEAM Design), and in compliance with requirements of the city of Huntington Beach (City), a noise study has been conducted by Advanced Engineering Acoustics (AEA). Architect TEAM Design has plans to build an express car wash at 10072 Adams Ave., (SW corner of shopping center at SE corner of Brookhurst Street and Adams Avenue) in Huntington Beach, CA (see Figure 1). In order to document the level of potential noise from the new car wash operations for this commercial business, AEA has obtained noise measurements of proposed operating dryer system and vacuum equipment for the proposed car wash facility and has measured the ambient noise at the residential property lines adjacent to the location of the proposed new car wash. This report provides the measured existing ambient noise and the predicted car wash operations noise at the nearest residential property lines.



Figure 1. Project Vicinity Map

2. Sound Fundamentals

What Humans Hear - Physically, sound pressure magnitude is measured and quantified in terms of the decibel (dB), which is associated with a logarithmic scale based on the ratio of a measured sound pressure to the reference sound pressure of 20 micropascal ($20 \mu\text{Pa} = 20 \times 10^{-6} \text{ N/m}^2$). However, the

decibel system can be very confusing. For example, doubling or halving the number of sources of equal noise output (a 2-fold change in acoustic *energy*) changes the noise level at the receptor by only 3 dB, which is a barely perceptible sound change for humans. However, doubling or halving the sound *loudness* at the receptor results from a 10 dB change and also represents approximately a 10-fold change in the acoustic *energy*.

The human hearing system is not equally sensitive to sound at all frequencies. Because of this variability, a frequency-dependent adjustment called “A-weighting” has been devised so that sound may be measured in a manner similar to the way the human hearing system responds. The A-weighted sound level is abbreviated “dBA”. Figure 2 gives typical A-weighted sound levels for various noise sources and the typical responses of people to these levels.

Hearing, Modeling and Sound Meter Accuracy - Urban ambient noises change continuously with the daily cycle of human and vehicular activities. However, small changes in the level of noise in a typical occupied environment is undetectable to humans. As stated in the Laguna Niguel Gateway Specific Plan EIR, in the portion entitled “Human Exposure to Noise,” a noise level increase “less than 3 dBA” is not discernable to humans. This point has been made in acoustical text books and noise studies for years. However, a noise level increase or decrease greater than 3 dBA in the typical urban setting is just barely noticeable and an increase or decrease of 5 dBA or more is clearly noticeable to humans. In addition, sound meter accuracy also affects noise measurements. The American National Standards Institute (ANSI) specifies sound level meters as three different Types (e.g., 0, 1 and 2). For example, a Type 2 sound meter has an accuracy of ± 2 dBA, while a Type 1 sound meter has a better accuracy of ± 1 dBA. Type 0 sound level meters are used in laboratories for the highest precision sound measurements. What this means is that a group of Type 1 sound level meters making the same measurements at the same location and time would be expected to yield results that could range ± 1 dBA, or readings that are up to 2 dBA different. Therefore, given the imprecision of noise modeling (± 2.5 dBA), the inability of people to discern less than 3 dBA noise level differences in a typical urban setting, and Type 1 precision sound level meters with a measurement accuracy of only ± 1 dBA, this report presents modeling and calculated noise data results as full decibels without decimal points. Noise measurements are reported as given by the sound meters rounded to one decimal place.

Noise Measurement Statistics - The percentile or exceedence levels (L%) provide the statistical distribution of noise over a given measurement period, such as one hour. An L(1.7) exceedence level is the hourly sound level that is exceeded for 1 minute (1.67% of the measurement hour). The L(8.3) exceedence level is the hourly sound level that is exceeded for 5 minutes (8.33% of the measurement hour). L(25) and (L50) are the hourly sound levels that are exceeded for 15 minutes (25% of the measurement hour) and 30 minutes (50% of the measurement hour), respectively.

3. City Noise Standards

The city of Huntington Beach has established stationary source noise limits to ensure that all segments of the community will be protected from excessive noise intrusion. The applicable noise standards are contained within the City of Huntington Beach Noise Ordinance, which follows:

8.40.040 Designated noise zones. *The properties hereinafter described, whether within or without the City, are hereby assigned to the following noise zones:*

Noise Zone 1: All residential properties;

Noise Zone 2: All professional office and public institutional properties;

Noise Zone 3: All commercial properties with the exception of professional office properties; and

Noise Zone 4: All industrial properties.

8.40.050 Exterior noise standards.

(a) The following noise standards, unless otherwise specifically indicated, shall apply to all residential property within a designated noise zone: **Exterior Noise Standards**

Noise Zone	Noise Level	Time Period
1	55 dB(A)	7 a.m. - 10 p.m.
	50 dB(A)	10 p.m. - 7 a.m.
2	55 dB(A)	Anytime
3	60 dB(A)	Anytime
4	70 dB(A)	Anytime

(b) In the event the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the above noise levels shall be reduced by 5 dB.

8.40.060 Exterior noise levels prohibited. It shall be unlawful for any person at any location within the incorporated area of the City to create any noise, or to 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 residential, public institutional, professional, commercial or industrial property, either within or without the City, to exceed the applicable noise standards:

(a) For a cumulative period of more than thirty (30) minutes in any hour;

(AEA added notation: 30 min = 50% of an hour, thus L₅₀ = 55 dBA)

(b) Plus 5 dB(A) for a cumulative period of more than fifteen (15) minutes in any hour;

(15 min = 25% of an hour, thus L₂₅ = 60 dBA)

(c) Plus 10 dB(A) for a cumulative period of more than five (5) minutes in any hour;

(5 min = 8.33% of an hour, thus L_{8.33} = 65 dBA)

(d) Plus 15 dB(A) for a cumulative period of more than one (1) minute in any hour;

(1 min = 1.67% of an hour, thus L_{1.67} = 70 dBA) or,

(e) Plus 20 dB(A) for any period of time. **(Thus L_{max} = 75 dBA)**

In the event the ambient noise level exceeds any of the first four noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said 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. Sound Monitoring Equipment and Locations

In monitoring the proposed car wash location's area ambient noise, AEA used four NtI Model XL2 Type 1 Real-Time Integrating Sound Level Meters (SLM) to monitor the various noise producing activities near the existing residences south and east of the project site and a commercial site north of the project site. Each sound meter system was in current laboratory calibration and was field calibrated according to the manufacturer's instructions just prior to making the sound measurements.

The ambient noise monitoring positions (see Figure 3) were five feet above grade. The first monitoring location (SLM A) was approximately 210 feet east of the centerline of Brookhurst Street at the southeast corner of the proposed carwash site and 10 feet north of the existing residential property line wall. The second monitoring location (SLM B) was about 114 feet to the east of the centerline of Brookhurst Street and 10 feet north of the existing property line wall. The third monitoring location (SLM C) was across the mall entry road on the grass 10 feet south of the realty building and 155 feet to the east of the centerline of Brookhurst Street. The fourth monitoring location (SLM D) was across Brookhurst, 8.5 feet west of the residential property line wall and 55 feet east of the centerline of Brookhurst Street. A fifth site (Site D'), at the sidewalk/project lot line east of Brookhurst Street, was selected for the noise model and would have essentially the same traffic ambient noise as SLM D.

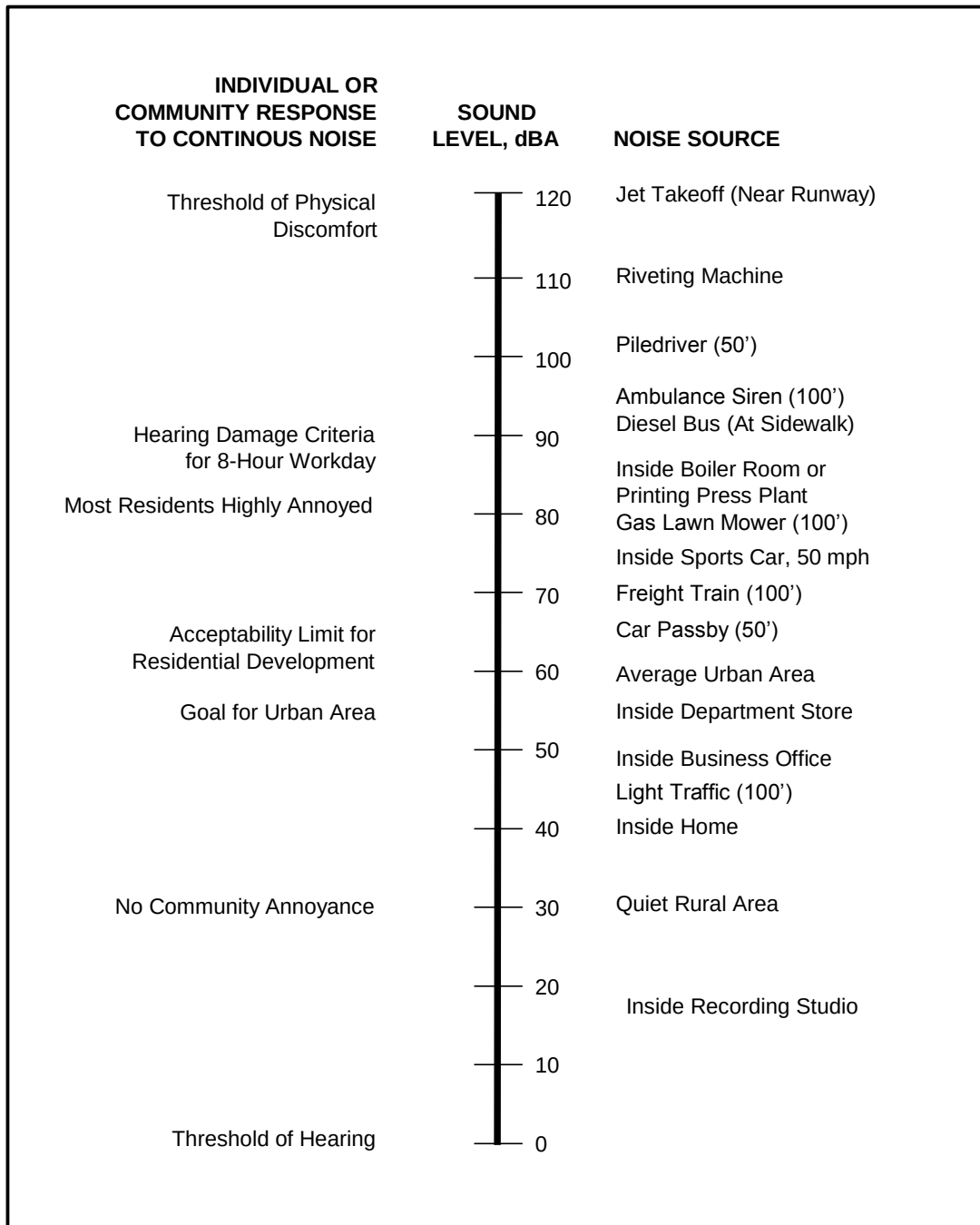


Figure 2 - Typical Sound Levels and their Effect on People

5. Sound Measurements and Results

Ambient noise was monitored for two different time periods on Wednesday, June 26, 2019. The first ambient noise measurements were conducted briefly for 15 minutes during a minimal traffic period beginning at 10:30 a.m. and ending at 10:45 a.m., when a construction crew arrived and began sidewalk demolition near the SLM D monitoring site. The second ambient noise monitoring period that same day was for about 2 ½ hours of evening commuter traffic and began at 5 p.m. and

ended about 7:30 p.m. The ambient noise measurement results for the project vicinity are given in Tables 1 through 4.

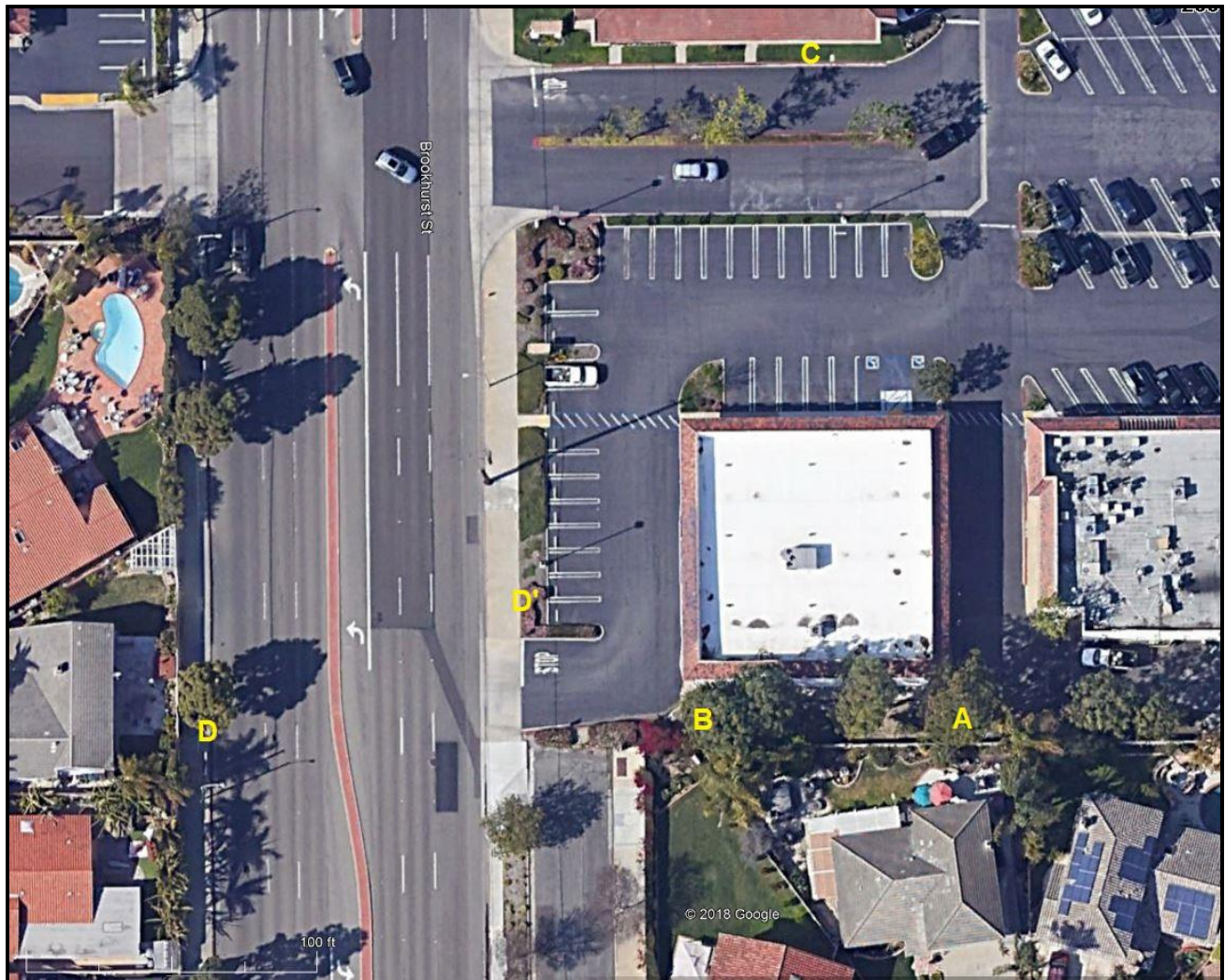


Figure 3. Aerial View of Project Site with Sound Meter Measurement and Model Locations

The ambient noise measurement results include the energy equivalent average sound level (L_{eq}), the minimum sound level (L_{min}) and the maximum sound level (L_{max}). In addition, the noise measurements include the percentile or exceedance levels ($L\%$). An $L_{1.67}$ exceedance level is the sound level that is exceeded for 1.67% of the time (for example, 1 minute per hour). The $L_{8.33}$ exceedance level is the sound level that is exceeded for 8.33% of the time (for example, 5 minutes per hour). L_{25} and L_{50} are the sound levels that are exceeded for their respective time period percentages and would represent exceedance levels of 15 minutes and 30 minutes per hour, respectively. Exceedance descriptors are very useful in assessing the duration and strength of fluctuating noise over the measurement period. All noise level data herein are referenced to 20 micropascal (20 μ Pa) and are A-weighted, slow response, sound levels (dBA).

The measured hourly ambient noise at the four locations along the future easterly residential property line and on the project site was greater than the base city residential property line daytime 30-minute per hour noise limit of 55 dBA. The 30-minute per hour noise level is the equivalent of the L_{50} noise level descriptor. Since the area-ambient noise exceeds the base noise limits in the City noise ordinance base noise limits, the ambient-based exceedance limits would be adjusted to reflect

the actual ambient noise (which notably is dynamic and changes rapidly). The low ambient-based L50 residential noise limit would thus be 55 dBA. The other exceedence level noise limits are to be adjusted in a similar manner. For purposes of this project, the ambient-based 30-minute per hour noise limits have been set at the lowest measured L50 noise level at each respective meter location.

Table 1a. Ambient Noise Monitoring Results 210 Feet West of Brookhurst C/L (Site A)

Date	Time	Leq	Lmax	Lmin	L(1.67)	L(8.33)	L(25)	L(50)
26 Jun 2019	10:30 – 10:45	56.6	70.5	45.6	62.0	59.5	57.3	55.1
26 Jun 2019	17:00 – 18:00	57.7	70.8	46.4	64.1	60.2	58.5	56.4
26 Jun 2019	18:00 – 19:00	57.5	73.4	47.4	62.1	60.1	58.6	56.7
26 Jun 2019	19:00 – 19:30	57.7	76.8	47.6	62.8	59.7	58.0	55.9

Table 1b. Ambient Noise Monitoring Results 210 Feet West of Brookhurst C/L (Site 4)*

Date	Time	Leq	Lmax	Lmin	L(1.67)	L(8.33)	L(25)	L(50)
26 Jun 2019	10:30 – 10:45	50.3	64.3	42.8	55.8	53.3	51.1	49.8
26 Jun 2019	17:00 – 18:00	51.5	64.6	43.6	57.9	54.0	52.3	50.2
26 Jun 2019	18:00 – 19:00	51.3	67.2	44.6	55.9	53.9	52.4	50.5
26 Jun 2019	19:00 – 19:30	51.5	70.6	44.8	56.6	53.5	51.8	49.7

*Residence side of yard wall

Table 2a. Ambient Noise Monitoring Results 114 Feet West of Brookhurst C/L (Site B)

Date	Time	Leq	Lmax	Lmin	L(1.67)	L(8.33)	L(25)	L(50)
26 Jun 2019	10:30 – 10:45	61.7	72.8	45.1	66.1	64.7	62.9	60.8
26 Jun 2019	17:00 – 18:00	63.0	74.9	47.6	69.0	66.1	63.9	61.6
26 Jun 2019	18:00 – 19:00	63.5	84.3	46.9	68.3	66.1	64.2	61.7
26 Jun 2019	19:00 – 19:30	62.7	75.6	47.2	68.8	65.8	63.7	61.1

Table 2b. Ambient Noise Monitoring Results 114 Feet West of Brookhurst C/L (Site 1)*

Date	Time	Leq	Lmax	Lmin	L(1.67)	L(8.33)	L(25)	L(50)
26 Jun 2019	10:30 – 10:45	53.2	64.3	40.0	57.6	56.2	54.4	52.3
26 Jun 2019	17:00 – 18:00	54.5	66.4	42.5	60.5	57.6	55.4	53.1
26 Jun 2019	18:00 – 19:00	55.0	67.4	41.8	59.8	57.7	55.7	53.2
26 Jun 2019	19:00 – 19:30	54.2	67.1	42.1	60.3	57.3	55.2	52.6

*Residence side of yard wall

Table 3. Ambient Noise Monitoring Results 155 Feet West of Brookhurst C/L (Site C)

Date	Time	Leq	Lmax	Lmin	L(1.67)	L(8.33)	L(25)	L(50)
26 Jun 2019	10:30 – 10:45	64.5	78.5	50.9	69.3	67.7	66.0	63.6
26 Jun 2019	17:00 – 18:00	66.3	79.7	49.4	71.5	69.3	67.6	65.2
26 Jun 2019	18:00 – 19:00	66.4	78.8	48.1	71.1	69.5	67.9	65.5
26 Jun 2019	19:00 – 19:30	65.9	78.8	48.4	71.2	69.1	67.0	64.7

Table 4a. Ambient Noise Monitoring Results 55 Feet East of Brookhurst C/L (Site D)

Date	Time	Leq	Lmax	Lmin	L(1.67)	L(8.33)	L(25)	L(50)
26 Jun 2019	10:30 – 10:45	76.0	95.7	52.1	82.8	78.2	75.9	72.7
26 Jun 2019	17:00 – 18:00	76.2	89.4	52.6	82.1	80.2	77.8	73.7
26 Jun 2019	18:00 – 19:00	76.0	91.8	48.1	81.8	80.0	77.7	73.6
26 Jun 2019	19:00 – 19:30	75.3	93.9	48.6	81.8	79.5	76.4	72.2

Table 4b. Ambient Noise Monitoring Results 55 Feet East of Brookhurst C/L (Site 8)*

Date	Time	Leq	Lmax	Lmin	L(1.67)	L(8.33)	L(25)	L(50)
26 Jun 2019	10:30 – 10:45	64.3	84.0	44.7	71.1	66.5	64.2	61.0
26 Jun 2019	17:00 – 18:00	64.5	77.7	45.2	70.4	68.5	66.1	61.9
26 Jun 2019	18:00 – 19:00	64.4	80.1	40.7	70.1	68.3	66.0	61.9
26 Jun 2019	19:00 – 19:30	63.6	82.2	41.2	70.3	67.8	64.7	60.5

*Residence side of yard wall

6. Proposed Car Wash Operations

The preferred hours of operation of the proposed car wash are 7 a.m. to 8 p.m., seven (7) days a week. The project layout in Figure 4 shows that the maximum number of patron vehicles queued up for a car wash at a time could be seventeen (17). In addition, there are sixteen (16) vacuum stations. Assuming a worst-case scenario of 17 queued idling vehicles and low speed vehicle movements on-site would be about 60 dBA at 50 feet. Also assuming 16 vehicles being vacuumed at once, the self-serve vacuum cleaner noise would be 50 dBA at 150 feet and 56 dBA at 75 feet. Each individual vacuum typically operates 50% of the time, as drivers arrive, prepare, vacuum, and leave. An enclosed equipment room contains small quiet pumps. Figure 5 shows planned tunnel noise abatement installed in the tunnel. Computer modeling of these noise sources and car wash equipment noise, transmitted through the car wash tunnel exit opening, entrance opening, Thermoclick™ Multiwall Lexon™ tunnel walls and 25 gauge sheet metal roof, was conducted using the SoundPLAN™ Version 8.1 community noise modeling software. The Appendix shows the modeled receiver locations on a project aerial view, the predicted car wash noise at those locations and the corresponding noise contours map. Table 5 shows the predicted worst-case project noise on the existing residential and commercial property due to car wash dryers, 17 idling vehicles waiting for a car wash and all 16 vacuums operating. Table 6 shows the predicted worst-case project noise and the estimated future ambient noise at the modeled receiver sites. After combining sound levels at yard locations, the log sum of the ambient noise and the modeled car wash noise is less than the residential exterior noise code limits. Combining sound levels with differences greater than 10 dB causes no increase.

Table 5. Proposed Car Wash Noise at Receiver Sites

Sound Meter Locations	Low Ambient Noise, L50(h), dBA	High Ambient Noise, L50(h), dBA	Base Day Noise Code Limit, L50(h), dBA	Proposed Car Wash Side, L50(h), dBA	Receiver Yard Side, L50(h), dBA
SLM A	55	57	60 *	63	52
SLM B	61	62	60 *	68	51
SLM C *	64 *	66 *	60 *	67	67
SLM D	72	74	n/a (ROW)	60	47
Site D'	72	74	n/a (ROW)	68 / 63 **	68 / 63 **

* Northerly commercial land-use.

** Sidewalk with and without west air nozzles operating.

Table 6. Worst Case Combined Car Wash & Street Traffic Noise at Receiver Sites

Receiver Locations	High Ambient Noise Level L50(h), dBA	Ambient-Based or Code Limit, L50(h), dBA	Modeled Project Noise, L50(h), dBA	Combined Future Noise, L50(h), dBA	Project Compliance at Residence
SLM A	57	57	63	64	n/a
Site 4 *	49	55	53	54	YES
SLM B	62	62	68	69	n/a
Site 1 *	50	55	51	54	YES
SLM C **	66	66	67 **	70	n/a
SLM D	74	74	60	74	n/a
Site D'	74	74	68 / 63 ***	75 / 74 ***	n/a
Site 8 *	64	64	47	64	YES

* Residential property side shielded by existing property line walls.

** Northerly commercial land-use.

*** West half of compressed air nozzles not operating.

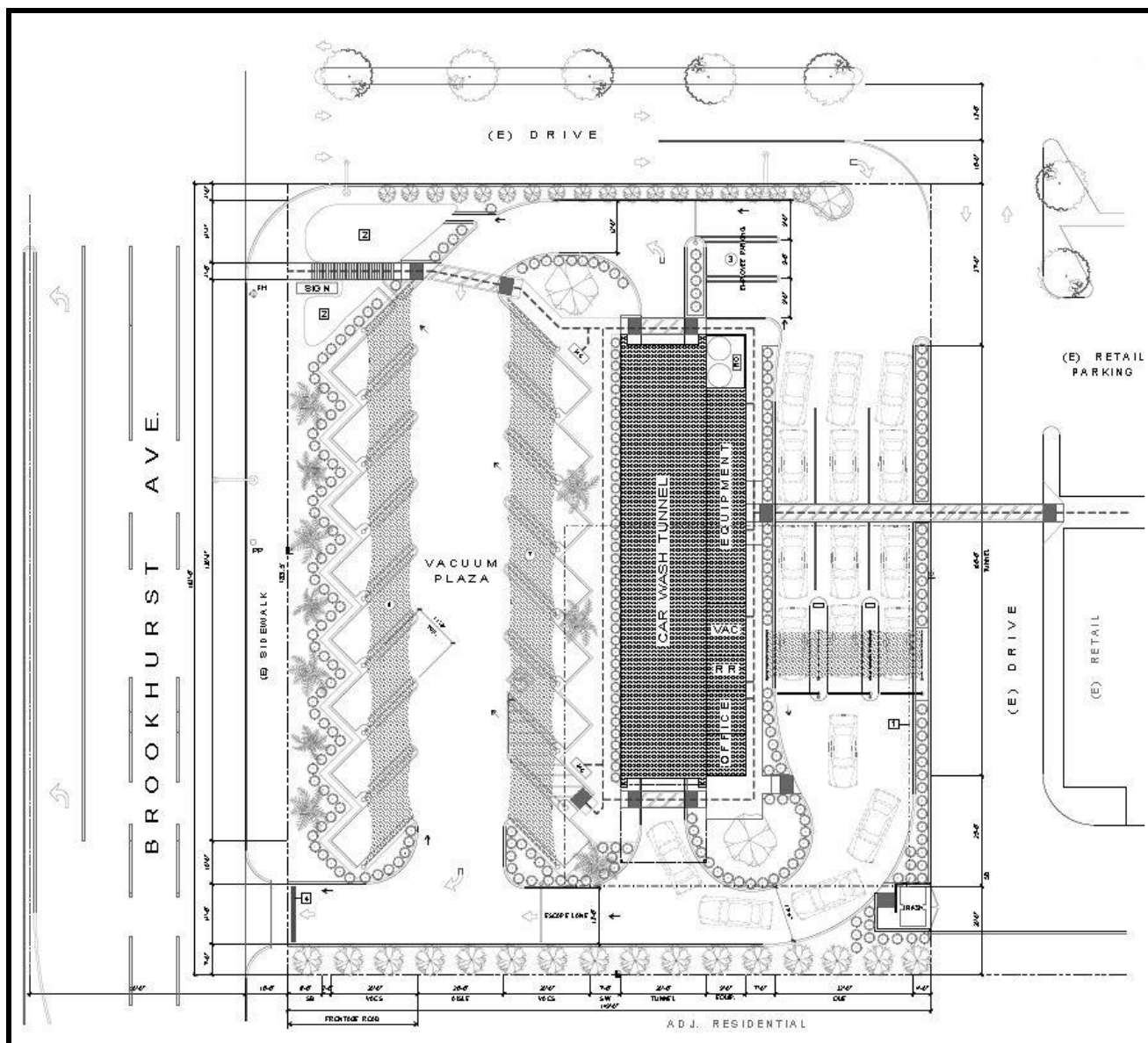


Figure 4. Proposed Car Wash Project Layout

In addition, as a “Good Neighbor” policy, it is recommended that project operations require audible patron radios and entertainment systems be turned off while in the car wash entrance queue line and at the vacuum stations. Signage should request patron cooperation to minimize noise of car door slams, loud talking, audible entertainment systems and in general requesting basic quiet consideration for residential neighbors.

7. Conclusion

Since the proposed project is not planning to operate after 8 p.m., the AEA project noise study finds that the proposed project’s daytime operational car wash noise would not exceed the daytime ambient-based noise limits of the City Noise Ordinance at the nearest residential yards when the planned noise abatement measures are properly implemented. In addition, the car wash operations would not exceed the City baseline noise limits with the tunnel noise abatement in place. Thus, no significant noise impacts are predicted and no violations of the City residential noise standards are expected due to the proposed Brookhurst H2Go express car wash operations.

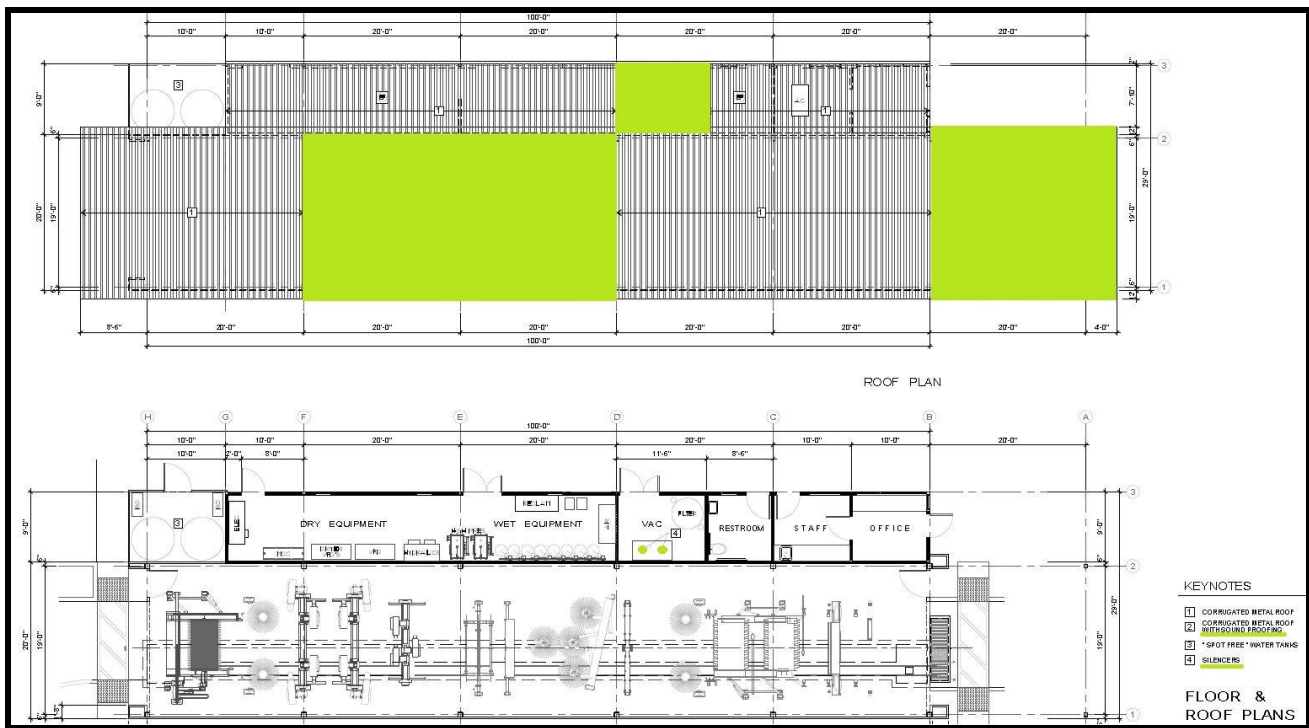


Figure 5. Proposed Car Wash Noise Abatement Features

APPENDIX

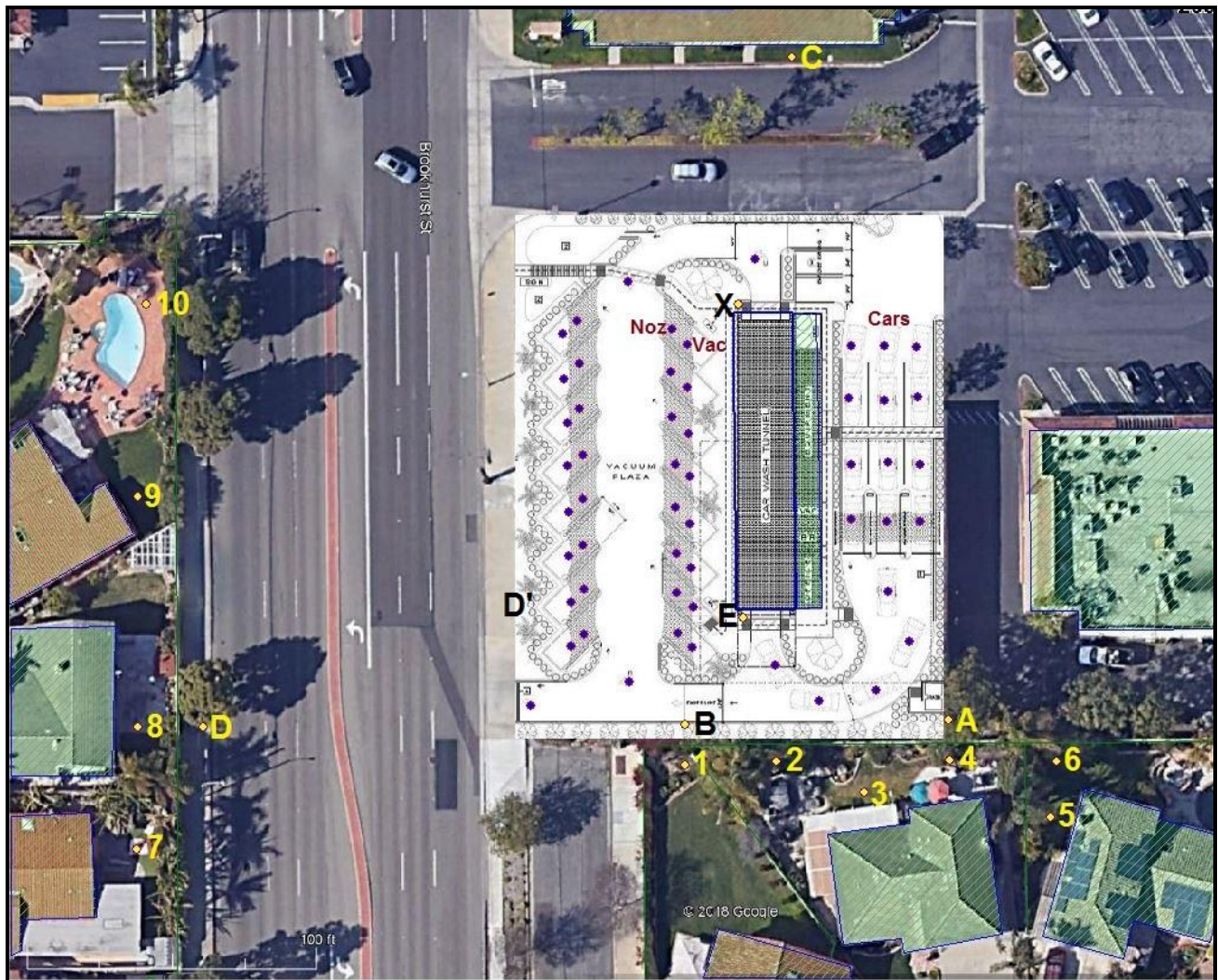


Figure A-1. Modeled Receiver Locations

H2Go - Huntington Beach Car Wash - RSPS0001.res: H2Go HB Car Wash - Design Abatement			
Run info Single receiver Details + graphics Sources			
Receiver	Usage	Ld	
		dB(A)	
► Rec 1 - Yard 1	ROA	51.5	
Rec 2 - Yard 2E	ROA	51.2	
Rec 3 - Yard 2S	ROA	52.9	
Rec 4 - Yard 2W	ROA	52.4	
Rec 5 - Yard 3S	ROA	49.7	
Rec 6 - Yard 3N	ROA	47.2	
Rec 7 - Yard 4	ROA	46.3	
Rec 8 - Yard 5	ROA	46.5	
Rec 9 - Yard 6S	ROA	42.9	
Rec 10 - Yard 6N	ROA	46.3	
Rec E - Entrance	BD	80.6	
Rec X - Exit	BD	87.4	
Site D'	BD	68.0	
SLM A	BD	62.7	
SLM B	BD	68.3	
SLM C	BD	66.7	
SLM D	BD	59.5	

Figure A-2. H2Go Car Wash Model Predicted Unabated L50 Noise at Receiver Locations

H2Go - Huntington Beach Car Wash - RSPS0003.res: H2Go HB Car Wash - Noise Abatement - West 1/2 of Air Nozzles OFF - Points			
Run info Single receiver Details + graphics Sources			
Receiver	Usage	L50 d dB(A)	
► Rec 1 - Yard 1	ROA	51.0	
Rec 2 - Yard 2E	ROA	50.7	
Rec 3 - Yard 2S	ROA	52.5	
Rec 4 - Yard 2W	ROA	52.1	
Rec 5 - Yard 3S	ROA	49.3	
Rec 6 - Yard 3N	ROA	46.8	
Rec 7 - Yard 4	ROA	45.4	
Rec 8 - Yard 5	ROA	45.4	
Rec 9 - Yard 6S	ROA	40.9	
Rec 10 - Yard 6N	ROA	45.4	
Rec E - Entrance	BD	80.6	
Rec X - Exit	BD	87.4	
Site D'	BD	63.4	
SLM A	BD	62.3	
SLM B	BD	67.4	
SLM C	BD	66.5	
SLM D	BD	57.9	

Figure A-3. H2Go Car Wash Model Predicted Abated L50 Noise at Receiver Locations

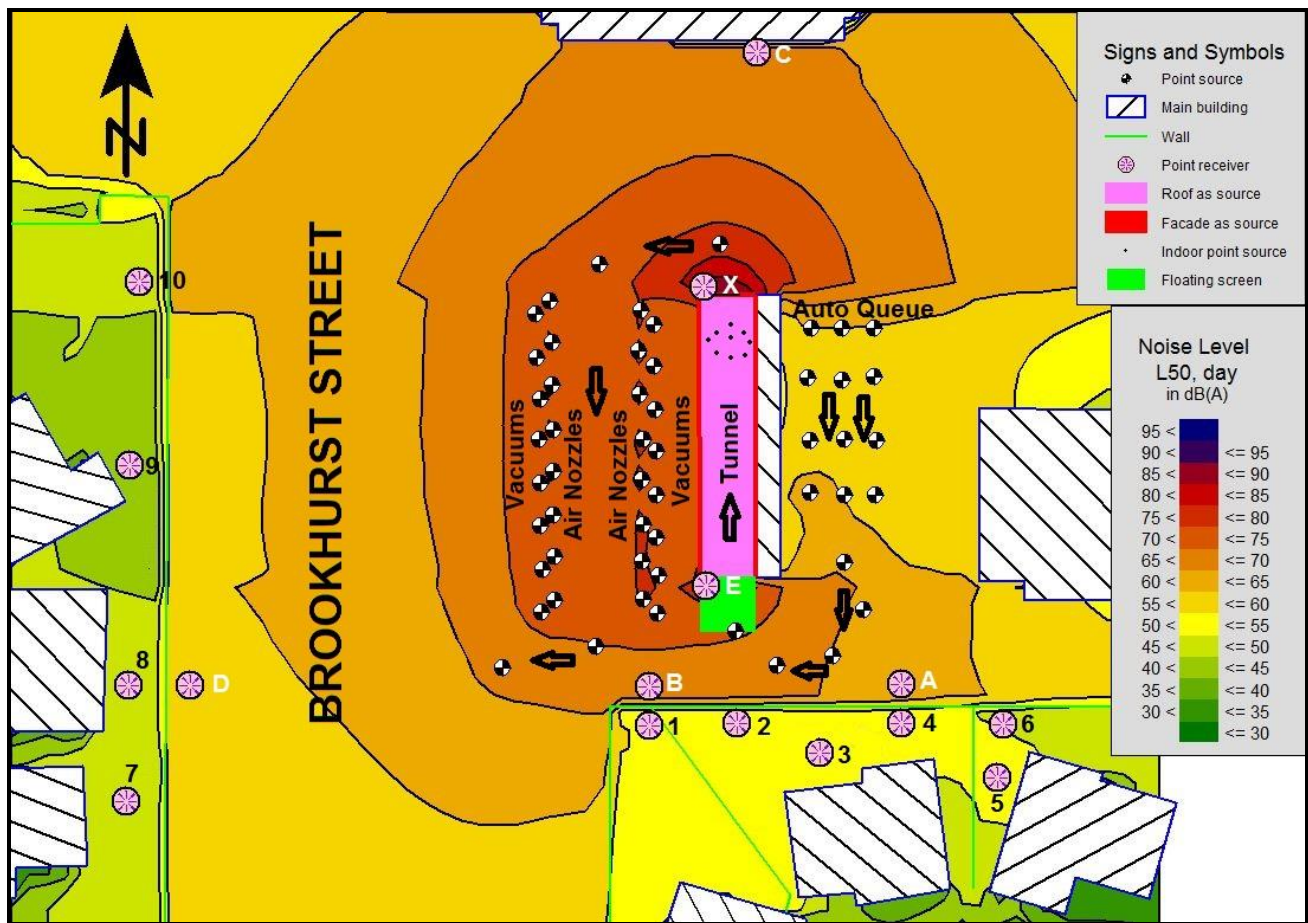


Figure A-4. H2Go Car Wash Model Predicted Unabated L50 Noise Contours

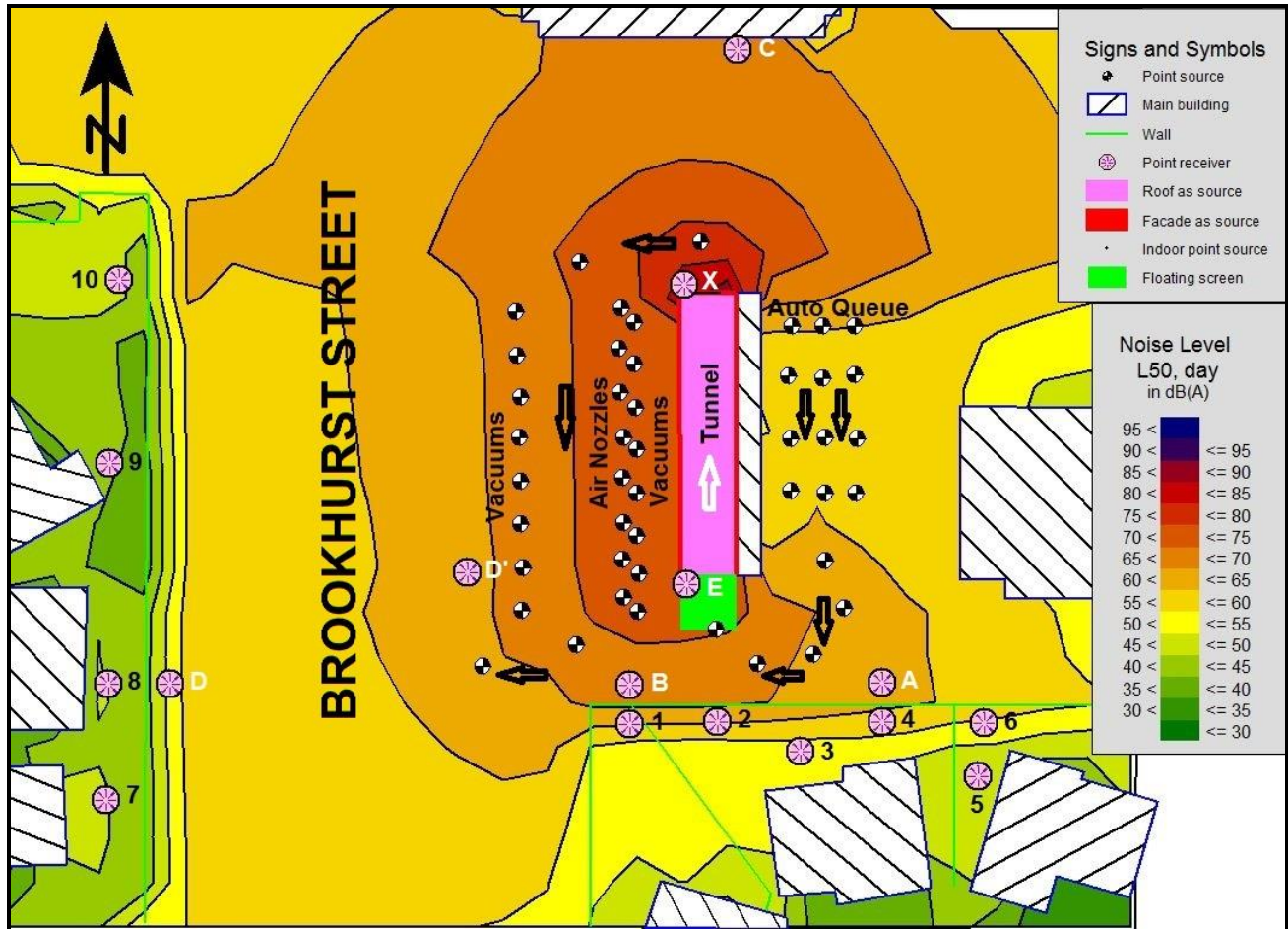


Figure A-5. H2Go Car Wash Model Predicted Abated L50 Noise Contours