



AIRTIGHT & NOISECHECK LIMITED

The Old Laundry, Bridge Street, Southwick, Hampshire, PO17 6DZ
Phone: 034 5066 6966 email: info@airtightnoisecheck.co.uk

BS4142 ACOUSTIC TESTING REPORT FOR

**MR TIM FERATI
85 GEOFFREY AVENUE
WATERLOOVILLE
HAMPSHIRE
PO7 5BH**

SITE ADDRESS:

**3 LONDON ROAD
PURBROOK
WATERLOOVILLE
HAMPSHIRE
PO7 5LQ**

Acoustic Engineer:

Michael Vine

Date: 22nd March 2020

AIRTIGHT & NOISECHECK BUILDING ACOUSTIC TESTING

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AIRTIGHT & NOISECHECK LIMITED ACOUSTICS TESTING

Customer Name:

Date: 22nd March 2020

Mr Tim Ferati
85 Geoffrey Avenue
Waterlooville
Hampshire
PO7 5BH

Site Address:

Proposed Car Wash
3 London Road
Purbrook
Waterlooville
Hampshire
PO7 5LQ

Acoustic Engineer:

Mr. Michael Vine

Equipment used:

Norsonic Integrating-averaging Sound Level Meter type 118 – Serial No 31633, Calibration due October 2020.

Analyser complies with the following standards:

IEC 60651 Type 1
IEC 60804 Type 1
IEC 61260 Class 1
IEC 61672 class 1
ANSI S1.4-1997 (type 1)
ANSI S1.43-1997 (type 1)
ANSI S1.11- 1986 type 1D

Measurement Microphone Nor 1225 – Serial Number 59993 – Calibration due October 2020

Acoustic Calibrator – Class 1 (Nor 1251) – Serial No 29212 Calibration due end March 2020.

Measurement Procedure:

The external ambient noise levels were measured for a period of 1hour on Sunday 12th April 2020 in one microphone location (and 5mins in another) at the proposed car wash location at 3 London Road, Purbrook, Waterlooville, PO7 5LQ. This was performed to establish the current background noise levels associated with the proposed site. The background noise levels will be compared to both the noise levels produced from an existing car wash & data taken from the manufacturers data for the proposed equipment to be used.

The testing took place during the period whereby stringent travel restrictions were imposed on the UK, therefore the vehicle movements will probably have been less than usual.

AIRTIGHT & NOISECHECK ACOUSTIC TESTING

Executive Summary:

Airtight & Noisecheck Ltd were instructed by Mr Tim Ferati to undertake a noise assessment at 3 London Road, Purbrook, Waterlooville to establish if the proposed carwash that is yet to be installed will have an adverse impact on the residential dwellings located in close proximity, circa 29m to the West (beyond the timber fence) and 24m to the East (beyond London Road).

A planning application has been made for the car wash to be in operation at the site, which is currently a vacant parcel of land. There are residential dwellings located to the East & West, commercial buildings to the North and a car park to the South.

The findings of this report indicate that the proposed car wash will not cause complaints and the rating levels are equal to the current LA_{90} value measured at the proposed site.

The car park will be enclosed by a timber barrier for dwellings to the West, and also the loud equipment will be housed in a central enclosure (cabin) to reduce the noise break out from the motors. The vacuum will also be completely screened from the dwellings to the West by the cabin. In addition, the dwellings located to the East will be situated next to the busy London Road, which produces very high noise levels.

BS4142: 2014 states that:

- 1- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- 2- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.
- 3- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level this is an indication of the specific sound source having a low impact, depending on the context.

The car wash will only be open during the daytime so will not be in operation during the nighttime period. The car wash will be in operation between 0800-1800 Monday to Saturday and 1000-1600 on Sunday. There will be 3 x car washing bays and 3 x drying/hover bays. It is unlikely that the jet washes and hovers will be on constantly throughout the operating period.

The calculations indicate that the proposed car wash should not have an adverse impact on the residential dwellings located nearby. Further to the levels taken from the manufacturer data for the exact equipment to be used, noise emissions were measured at a similar car wash with all bays in operation during the assessment. Over a 1hour period the jet wash and hovers will not all be on together at the same time so this will reduce the rating levels apparent at the residential façade. Nor will they be in constant operation in any 1hour time period, thus a reduction can also be applied for this.

The calculations indicate that rating level will be less the LA_{90} values so this would indicate no adverse impact, also it may be the case that the local road network is busier throughout the week (background noise measured on a Sunday) so the impact would be less during these times.

Acoustic feature corrections have been applied to the rating levels, included +2dB for tonality and +3dB for intermittency.

AIRTIGHT & NOISECHECK LIMITED ACOUSTICS TESTING**1 Objective:**

1.1 The objective of the acoustic procedure is to measure the current background noise levels associated with the proposed car wash site, in order to determine if the proposed car wash will have an adverse impact on the residential units located 24m to the East & 29m to the West. A planning application has been made to create the car wash within the current vacant parcel of land, this will be immediately to the West of London Road, Purbrook. This is a very busy road that is used for long periods during the week, with a high number of vehicles passing the site on a daily basis. The car wash will be screened from the residential dwellings to the West by a close boarded timber fence and the dwellings to the East will be on the opposite side of London Road and thus exposed to considerably higher noise levels.

2 Calibration:

2.1 The measurement microphone was calibrated both before and after the testing procedure and no drift was recorded.

3 Site Layout & Microphone Position:

3.1 3 London Road, Purbrook is located just outside of Waterlooville, Hampshire. It is situated to the North of Portsmouth. The site is a vacant piece of land located immediately to the West of London Road, there are residential dwellings located on the opposite side of London Road to the East, dwellings located beyond a timber barrier to the West, commercial buildings to the North and another parcel of land to the South.

3.2 The nearest residential dwellings are located circa 29m to the West of the proposed car wash and 24m to the East. There are no dwellings located immediately to the North but there are commercial building located here.

3.3 The car wash is also to be enclosed by a close boarded timber fence on the Western façade. The cars will enter the car wash from the Eastern side and exit at the same location. The equipment that will be used is listed below:

Noise Source	Location	Noise Level at pump	Noise levels at Nozzle	Noise Level at source
Inter pump T8.90.2 jet washer	Northern boundary – inside cabin	76dBA – 1m	58dBA @1m	
Inter pump T8.90.2 jet washer	Northern Boundary – Inside cabin	76dBA – 1m	58dBA @1m	
CVS1-4 Vacuum	Northern boundary			58dBA (with acoustic foam) – 3m

3.4 The client has already taken steps to reduce the noise break out, by enclosing the 2 x jet washers within the portable cabin, screening the vacuum from the dwellings to the West by the cabin and also installing acoustic foam to the vacuum casing.

4 Microphone Locations:

4.1 For the background noise levels, the microphone was positioned at the Western boundary of the proposed car wash location, it was at least 1.2m from the ground & in excess of 3.5m from any other reflective surface. For reference further readings (5mins) were also taken at the Eastern façade (facing London Road) and for 1minute on Marrels Wood Gardens.

AIRTIGHT & NOISECHECK LIMITED ACOUSTICS TESTING**5 Hours of Operation:**

5.1 The car wash will be in operation between 0800-1800hrs Monday to Saturday and 0900-1700hrs on a Sunday. It will not be in operation during the night time period.

6 Description of Testing:

6.1 The ambient noise levels were measured at the proposed car wash location for a period of 1hour on a Sunday morning to establish the lowest noise levels associated with this location. The lowest L_{Aeq} and L_{A90} values for this time period were then used in order to compare these values and assess them in accordance with BS4142: 2014. Data received from the manufacturers for the exact equipment to be used has been received and listed below.

Noise Source	L_{Aeq} at 1m	L_{Aeq} at 3m	Combined Level - L_{Aeq}
2 x Jet washers	76dBA	66dBA	69dBA
1 x Vacuum		58dBA	58dBA
			69dBA at 3m

Please Note that due to the above equipment being located in different locations and the pumps being located inside a cabin, various calculations will be included.

6.2 BS4142: 2014 states that:

1- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.

2- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.

3- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level this is an indication of the specific sound source having a low impact, depending on the context.

6.3 The rating level applies to the specific noise level (noise of car wash) - the residual noise (the noise level apparent once the specific noise is switched off). The following table indicates the value to subtract dependent on the above values recorded.

7 Background Noise Levels:

7.1 The background noise levels have been measured and the lowest L_{A90} value is listed in the table below.

Day Time L_{A90} – 1hour West boundary	L_{A90} 5min – Eastern boundary	L_{A90} 1minute – Marrels Wood Gardens
45dBA	48dBA	48dBA

Day Time L_{Aeq} – 1hour West boundary	L_{Aeq} 5min – Eastern boundary	L_{Aeq} 1minute – Marrels Wood Gardens
57dBA	70dBA	58dBA

AIRTIGHT & NOISECHECK LIMITED ACOUSTICS TESTING**8 BS4142 Noise Table - Rating Level for jet washers – dwellings to West:**

Results		Commentary
Ambient Sound Level	Sound Pressure Level = 79dBA	Measured at 1m with jet washes in operation together
Residual Sound Level	57dBA	Measured with no operating car wash
Specific Sound Level	79dB	
Acoustic Feature Corrections	+2dB for tonality +3dB for intermittent noise	BS4142: 2014 section 9.2
Reductions due to distance & barrier	-10dB to levels for barrier -25dB for cabin -29 for distance (29m/1m)	-29dB for point source reduction (1m to 29m) and -10dB for the timber enclosure (completely screened).
Rating Level	20dBA	Calculation based on above
Background Sound level	45dBA	Measured at proposed location
Excess of rating over background	-25dB	
Assessment indicates no impact at receptor		The calculations have used existing car wash figures along with the measured BGN at the proposed site.

BS4142 Noise Table - Rating Level for Vacuum – dwellings to West:

Results		Commentary
Ambient Sound Level	Sound Pressure Level = 61dBA	Calculation for vacuum (58dBA) and Residual (57dBA) as vacuum not yet installed
Residual Sound Level	57dBA	Measured with no operating car wash
Specific Sound Level	59dB	$L_s = 10\log(10^{L_a/10} - 10^{L_r/10})$
Acoustic Feature Corrections	+2dB for tonality +3dB for intermittent noise	BS4142: 2014 section 9.2
Reductions due to distance & barrier	-10dB to levels for barrier -10dB for screening -20 for distance (29m/3m)	-20dB for point source reduction (3m to 29m) and -10dB for the timber enclosure (completely screened by the cabin).
Rating Level	24dBA	Calculation based on above
Background Sound level	45dBA	Measured at proposed location
Excess of rating over background	-21dB	
Assessment indicates no impact at receptor		The calculations have used existing car wash figures along with the measured BGN at the proposed site.

AIRTIGHT & NOISECHECK LIMITED ACOUSTICS TESTING**BS4142 Noise Table - Rating Level for Nozzles – dwellings to West:**

<i>Results</i>		<i>Commentary</i>
Ambient Sound Level	Sound Pressure Level = 62dBA	Calculation for 2 x nozzles (61dBA) and Residual (57dBA) as pump not yet installed
Residual Sound Level	57dBA	Measured with no operating car wash
Specific Sound Level	60dB	$L_s = 10\log(10^{L_a/10} - 10^{L_r/10})$
Acoustic Feature Corrections	+2dB for tonality +3dB for intermittent noise	BS4142: 2014 section 9.2
Reductions due to distance & barrier	-10dB to levels for barrier -26 for distance (21m/1m)	-26dB for point source reduction (1m to 21m) and -10dB for the timber enclosure (completely screened).
Rating Level	29dBA	Calculation based on above
Background Sound level	45dBA	Measured at proposed location
Excess of rating over background	-16dB	
Assessment indicates no impact at receptor		The calculations have used existing car wash figures along with the measured BGN at the proposed site.

Combined Levels for Western dwellings

Combined Jet washers, vacuum & Nozzles

<i>Noise Source</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>Total</i>
Dwellings to West	20	24	29	31

1 – 2 x Jet Washers

2 – 1 x Vacuum

3- 2 x Nozzles

<i>Location</i>	<i>Combined Level</i>	<i>LA90 Noise Level</i>	<i>Difference</i>	<i>Assessment Indicates</i>
West	31dBA	45dBA	-14dB	No impact

BS4142 Noise Table - Rating Level for jet washers – dwellings to East:

<i>Results</i>		<i>Commentary</i>
Ambient Sound Level	Sound Pressure Level = 79dBA	Measured at 1m with jet washes in operation together
Residual Sound Level	70dBA	Measured with no operating car wash
Specific Sound Level	78dB	
Acoustic Feature Corrections	+2dB for tonality +3dB for intermittent noise	BS4142: 2014 section 9.2
Reductions due to distance & barrier	-0dB for barrier - None -25dB for cabin -28 for distance (24m/1m)	-28dB for point source reduction (1m to 24m) and -0dB for the timber fence as none apparent
Rating Level	30dBA	Calculation based on above
Background Sound level	48dBA	Measured at proposed location
Excess of rating over background	-18dB	
Assessment indicates no impact at receptor		The calculations have used existing car wash figures along with the measured BGN at the proposed site.

AIRTIGHT & NOISECHECK LIMITED ACOUSTICS TESTING**BS4142 Noise Table - Rating Level for Vacuums – dwellings to East:**

Results		Commentary
Ambient Sound Level	Sound Pressure Level = 61dBA	Calculation for vacuum (58dBA) and Residual (57dBA) used as vacuum not yet installed
Residual Sound Level	57dBA	Measured with no operating car wash
Specific Sound Level	59dB	$L_s = 10\log(10^{L_a/10} - 10^{L_r/10})$
Acoustic Feature Corrections	+2dB for tonality +3dB for intermittent noise	BS4142: 2014 section 9.2
Reductions due to distance & barrier	-0dB to levels for barrier -0dB for screening -18 for distance (24m/3m)	-18dB for point source reduction (3m to 24m) and -0dB for the timber fence – None installed to Eastern boundary
Rating Level	46dBA	Calculation based on above
Background Sound level	48dBA	Measured at proposed location
Excess of rating over background	-2dB	
Assessment indicates no impact at receptor		The calculations have used existing car wash figures along with the measured BGN at the proposed site.

BS4142 Noise Table - Rating Level for Nozzles – dwellings to East:

Results		Commentary
Ambient Sound Level	Sound Pressure Level = 62dBA	Calculation for 2 x nozzles (61dBA) and Residual (57dBA) as pump not yet installed
Residual Sound Level	57dBA	Measured with no operating car wash
Specific Sound Level	60dB	$L_s = 10\log(10^{L_a/10} - 10^{L_r/10})$
Acoustic Feature Corrections	+2dB for tonality +3dB for intermittent noise	BS4142: 2014 section 9.2
Reductions due to distance & barrier	-0dB to levels for barrier -0dB for screening -28 for distance (24m/1m)	-28dB for point source reduction (1m to 24m) and -0dB for the timber fence – none installed to Eastern boundary
Rating Level	37dBA	Calculation based on above
Background Sound level	48dBA	Measured at proposed location
Excess of rating over background	-11dB	
Assessment indicates no impact at receptor		The calculations have used existing car wash figures along with the measured BGN at the proposed site.

Combined levels for dwellings to the East

Combined Jet Washers, Vacuum & Nozzles

Noise Source	1	2	3	Total
Dwellings to East	30	46	37	47

1 – 2 x Jet Washers

2 – 1 x Vacuum

3- 2 x Nozzles

Location	Combined Level	LA90 Noise Level	Difference	Assessment Indicates
East	47dBA	48dBA	-1dB	No impact

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9 Results Conclusion:

9.1 The measured and calculated results indicate that the proposed car wash should not have an adverse impact on the dwellings located circa 29m to the West or 24m to the East. The dwellings to the West are screened from the washers and vacuum by a timber fence & the portable building whereby the washers will be stored (assumed reduction of 25dB for this building specification). The dwellings to the East will not be screened but the increase in background noise levels here should ensure no adverse impact.

9.2 The calculations take the acoustic feature corrections into account and they show that the rating level should be less than the LA_{90} level to the West by -14dBA and to the East they should be -1dBA less than the background noise levels. It is fair to say that during the week the LA_{90} value may be higher due to London Road being busier and thus the impact will be less, but even on a Sunday the calculations indicate that the rating levels should be less than the current background noise levels measured on site.

9.3 In addition to the above, it must also be stated that the jet washers and vacuum will not be in operation for the entire time, in any 1hour period the jet washers may be on for 30minutes and the hoovers for 20minutes as not all cars get valeted. If this is the case, then the noise levels will reduce further due to not being in operation all the time. They can be calculated by the following equation

- $10\log$ (duration of event/duration of reference period) in seconds

Therefore, if we assume the jet washers are in operation for 30mins in any 1hour, this would reduce the rating level by -3dB, shown below.

- $10\log (1800/3600) = -3$

The vacuums will be on for circa 20minutes per hour, so this equates to a -5dB reduction thus indicating less impact. This has just been included to show that the rating levels could be reduced over time.

9.4 Based on the information received, calculations performed it indicates that the proposed car wash should not have an adverse impact on the residential dwellings located nearby, thus satisfying the requirements of the local authority.

9.5 If the further reductions listed above are taken into account the final rating levels at the Western façade façade is -18dB below the LA_{90} value and the levels to the East would be -6dBA below the LA_{90} value. This further illustrates that the proposed car wash should not have an adverse impact on the immediate area, the general noise levels will be higher when the traffic restrictions are relaxed and the levels during the week will be higher than those on a Sunday, thus reducing the impact even further.

9.8 The immediate area is a very busy road and produces high noise levels in a regular basis. The vehicle movements have not been assessed as part of this assessment due to the site being next to a very busy road and thus the vehicle movements entering and leaving the car wash would not be audible at any time.

9.9 The measures taken by the client indicate that they are prepared to take measures to reduce the impact of the car wash. These steps include:

1. Locate the washers inside a portable cabin and thus reducing noise break out
2. Locating the vacuum behind the cabin so screening it from the dwellings to the West
3. Installing acoustic foam to the vacuum system to reduce the noise even further

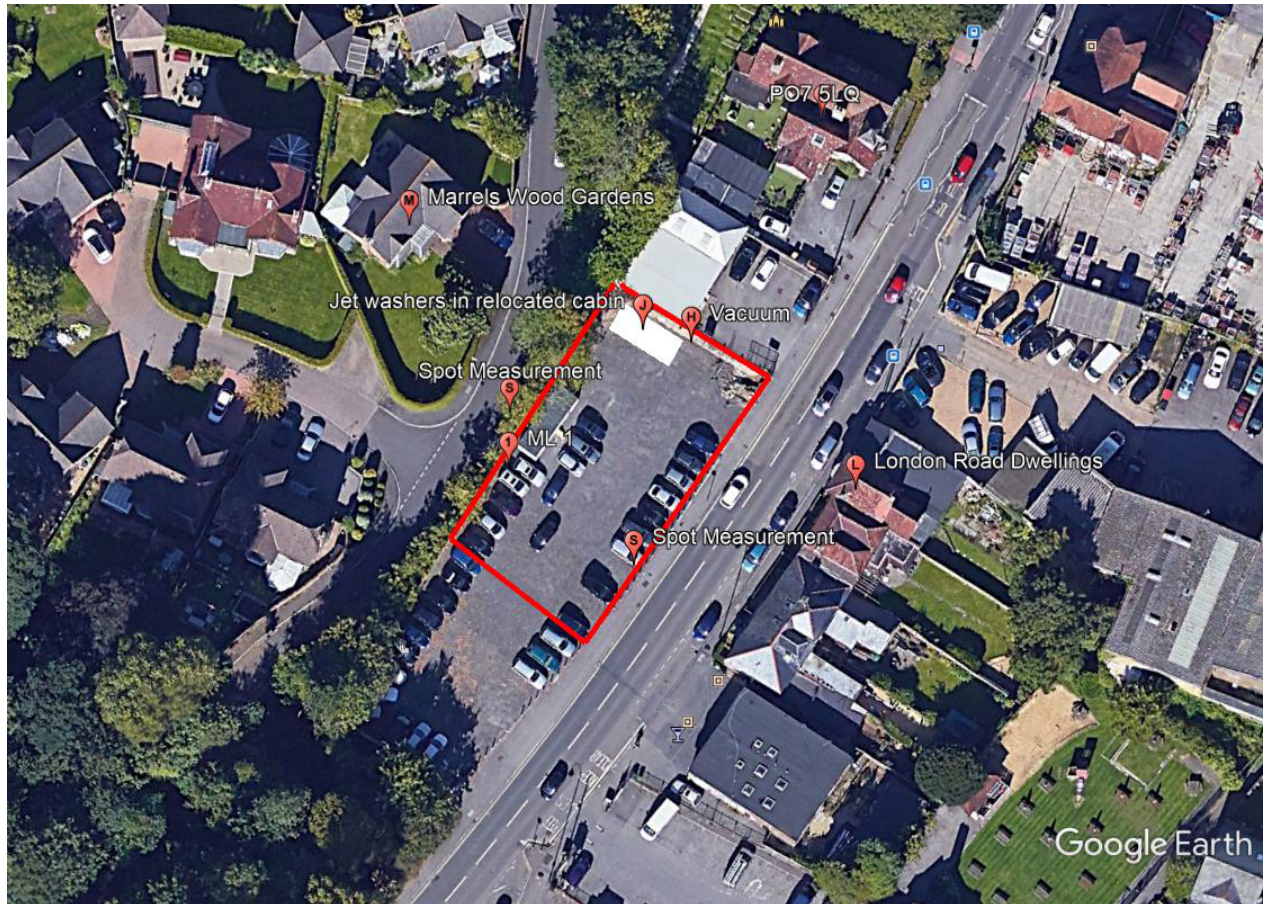
All of which will help to reduce the impact of the car wash even more.

10 **Site Plan PDF:**



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11 Google Earth Image:



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APPENDIX

Continuous equivalent noise level, LAeq — The steady noise level (usually in dBA) which, over the period of time under consideration, contains the same amount of sound energy as the time varying noise.

L_{Amax} - The maximum value that the A-weighted sound pressure level reaches during a measurement period.

dB (A) — The A-weighted sound pressure level.

Decibel (dB) — A unit used for many acoustic qualities to indicate the level of sound with respect to a reference level.

A-weighting — A frequency weighting that relates to the response of the human ear.

Background noise level — Prevailing noise level in a specified environment measured in the absence of the noise being studied.

Habitable Room — A room used for sleeping or recreation/relaxation

LA₉₀ - The A-weighted noise level exceeded for 90% of the measurement duration.

British Standards & associated documents:

Code of Practice: BS8233: 2014 - Sound Insulation and noise reduction for buildings.

BS4142: Methods for rating and assessing industrial and commercial sound

$L_2 = L_1 - 20\log(r_2/r_1)$ — Point source equation

$10\log(\text{duration of event}/\text{duration of reference period})$