



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

REPORT DATE: 15TH OCTOBER 2020

Acoustic Engineer:

Michael Vine

Date: 15th October 2020

AIRTIGHT & NOISECHECK BUILDING ACOUSTIC TESTING

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Customer Name:

Date: 15th October 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 31st 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 31st October 2020

Acoustic Calibrator – Class 1 (Nor 1251) – Serial No 29212 Calibration due July 2021.

Measurement Procedure:

The external specific & residual noise levels were measured for sample periods on Wednesday 14th October 2020 at the operating car wash location at 3 London Road, Purbrook, Waterlooville, PO7 5LQ. This was performed to establish if the relocated pressure washer motors & vacuum will have an adverse impact on the residential dwellings nearby to the existing car wash. The background noise levels measured in March 2020 and formed part of the original report will be compared to both the noise levels produced from the jet washers and the vacuum. The jet washer nozzles will remain in the same place as listed in the original noise assessment.

The car wash was in operation and 2 no vehicles were in operation during the attended assessment of 1hour. The jet washers were on for no more than 10minutes during the 1hour period and the vacuum was not used, so this was switched on for the purpose of the assessment only.

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Executive Summary:

Airtight & Noisecheck Ltd were instructed by Mr Tim Ferati to undertake a revised noise assessment at 3 London Road, Purbrook, Waterlooville to establish if the existing carwash will have an adverse impact on the residential dwellings located in close proximity, circa 26m to the West (beyond the timber fence) and 33m to the East (beyond London Road) from the jet washers and 35m from the vacuum (West) and 19m from the vacuum (East).

A planning application has been granted for the car wash to be in operation at the site, but the jet washers and vacuum are not in the agreed location, therefore a further assessment is required to ensure the noise emissions will not have an adverse impact on the residential dwellings.

The findings of this report indicate that the existing car wash will not cause complaints and the rating levels are equal to or less than the current LA90 value measured at the site.

The car wash is enclosed by a timber barrier for dwellings to the West, and also the equipment is housed in a central enclosure 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 is open during the daytime so will not be in operation during the night time period. The car wash is in operation between 0800-1800 Monday to Saturday and 1000-1600 on Sunday. There were 2 x jet washers, and 2 x hoovers. It is unlikely that the jet washes and hoovers will be on constantly throughout the operating period. It is likely that the jet washers will be in operation for circa 30mins in every hour and the hoovers for no more than 20minutes in every hour.

The calculations indicate that the car wash should not have an adverse impact on the residential dwellings located nearby. Over a 1hour period the jet wash and hoovers 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 LA90 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. This is substantiated by the fact that the measured LA90 on a Wednesday was +7dB higher to the West & +17dB higher at the roadside, further illustrating that the car wash should not have an adverse impact.

Acoustic feature corrections have been applied to the rating levels, which was +3dB for intermittency. The noise sources were not tonal at the receptor locations.

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1 Objective:

1.1 The objective of the acoustic procedure is to measure the noise sources in their new location and ascertain if the operating car wash will have an adverse impact on the residential units located 33m to the East (Washers) and 20m to the East (Vacuum) & 26m to the West (washers) and 35m to the West (Vacuum). A planning application has been granted for the car wash, but the equipment is not located in the original locations, therefore further measurements are required to ensure the noise emissions are still below the background noise levels. The car wash is located 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 operating as a car wash, and is 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 26m to the West of the car wash jet washers and 33m to the East. The Western dwellings are 35m from the vacuum and the dwellings to the East are 20m from the vacuum. There are no dwellings located immediately to the North but there are commercial buildings 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
2 x Inter pump T8.90.2 jet washer	Western boundary – inside encasement	72dBA – 1m
CVS1-4 Vacuum	Northern boundary	74dBA – 1m

3.4 The client has already taken steps to reduce the noise break out, by enclosing the 2 x jet washers within the metal encasement which has been lined with acoustic foam, screening the vacuum from the dwellings to the West by the cabin and also installing acoustic foam to the vacuum casing. In addition, a 1.8m timber fence has been erected in front (East) of the jet washers.

4 Microphone Locations:

4.1 For the background noise levels, the microphone was positioned at the Western boundary of the existing 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. For the noise source locations, each source was monitored directly at source for a sample period whilst in operation.

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

5.1 The car wash is 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 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. Actual noise levels were then taken for each noise source. These were done separately due to the sources being in different locations and unlikely to be in operation at the same time.

Noise Source	L_{Aeq} at 1m
2 x Jet washers	72dBA
1 x Vacuum	73dBA

Please Note that due to the above equipment being located in different locations and the sources being located inside encasements, 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
52dBA – October 2020	65dBA – October 2020	52dBA

Day Time L_{Aeq} – 1hour West boundary	L_{Aeq} 5min – Eastern boundary	L_{Aeq} 1minute – Marrels Wood Gardens
57dBA	70dBA	58dBA
56dBA – October 2020	75dBA – October 2020	56dBA

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 = 72dBA	Measured at 1m with jet washes in operation together
Residual Sound Level	57dBA	Measured with no operating car wash
Specific Sound Level	72dB	
Acoustic Feature Corrections	+3dB for intermittent noise	BS4142: 2014 section 9.2
Reductions due to distance & barrier	-10dB to levels for barrier -28 for distance (26m/1m) -3 for only in operation for 30minutes	-28dB for point source reduction (1m to 26m) and -10dB for the timber enclosure (completely screened).
Rating Level	34dBA	Calculation based on above
Background Sound level	45dBA	Measured at proposed location
Excess of rating over background	-11dB	
Assessment indicates no impact at receptor		The calculations have used the measured levels at the car wash whilst in operation

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

Results		Commentary
Ambient Sound Level	Sound Pressure Level = 73dBA	Measured at 1m from Hoover
Residual Sound Level	57dBA	Measured with no operating car wash
Specific Sound Level	73dB	$L_s = 10\log(10^{L_a/10} - 10^{L_r/10})$
Acoustic Feature Corrections	+3dB for intermittent noise	BS4142: 2014 section 9.2
Reductions due to distance & barrier	-10dB to levels for barrier -10dB for screening -31 for distance (35m/1m) -5dB for only in operation for 20mins	-31dB for point source reduction (1m to 35m) and -10dB for the timber enclosure (completely screened by the cabin).
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 measured levels at source

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

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	+3dB for intermittent noise	BS4142: 2014 section 9.2
Reductions due to distance & barrier	-10dB to levels for barrier -28 for distance (26m/1m) -3 for only in operation for 30minutes	-28dB for point source reduction (1m to 26m) and -10dB for the timber enclosure (completely screened).
Rating Level	22dBA	Calculation based on above
Background Sound level	45dBA	Measured at proposed location
Excess of rating over background	-23dB	
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**

Noise Source	1	2	3	Total
Dwellings to West	34	20	22	34

1 – 2 x Jet Washers

2 – 1 x Vacuum

3- 2 x Nozzles

Location	Combined Level	LA90 Noise Level	Difference	Assessment Indicates
West	34dBA	45dBA	-11dB	No impact

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

Results		Commentary
Ambient Sound Level	Sound Pressure Level = 72dBA	Measured at 1m with jet washes in operation together
Residual Sound Level	70dBA	Measured with no operating car wash
Specific Sound Level	68dB	
Acoustic Feature Corrections	+3dB for intermittent noise	BS4142: 2014 section 9.2
Reductions due to distance & barrier	-0dB for barrier - None -30 for distance (33m/1m) -3 for 30mins duration	-30dB for point source reduction (1m to 33m) and -0dB for the timber fence as none apparent 30mins operation time
Rating Level	38dBA	Calculation based on above
Background Sound level	48dBA	Measured at proposed location
Excess of rating over background	-10dB	
Assessment indicates no impact at receptor		The calculations have used measured levels

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

Results		Commentary
Ambient Sound Level	Sound Pressure Level = 73dBA	Calculation for vacuum – measured at 1m
Residual Sound Level	70dBA	Measured with no operating car wash
Specific Sound Level	70dB	$L_s = 10\log(10^{L_a/10} - 10^{L_r/10})$
Acoustic Feature Corrections	+3dB for intermittent noise	BS4142: 2014 section 9.2
Reductions due to distance & barrier	-0dB to levels for barrier -0dB for screening -26 for distance (20m/1m) -5 for 20mins operation	-26dB for point source reduction (1m to 26m) and -0dB for the timber fence – None installed to Eastern boundary 20mins in operation in any 1hour
Rating Level	42dBA	Calculation based on above
Background Sound level	48dBA	Measured at proposed location
Excess of rating over background	-6dB	
Assessment indicates no impact at receptor		The calculations have used measured levels on 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	+3dB for intermittent noise	BS4142: 2014 section 9.2
Reductions due to distance & barrier	-0dB to levels for barrier -0dB for screening -30 for distance (30m/1m) -3 for 30mins operating time	-30dB for point source reduction (1m to 30m) and -0dB for the timber fence – none installed to Eastern boundary 30mins operating time in 1hour
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.

Combined levels for dwellings to the East

Combined Jet Washers, Vacuum & Nozzles

Noise Source	1	2	3	Total
Dwellings to East	38	42	30	44

1 – 2 x Jet Washers

2 – 1 x Vacuum

3- 2 x Nozzles

Location	Combined Level	LA90 Noise Level	Difference	Assessment Indicates
East	44dBA	48dBA	-4dB	No impact

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9 Results Conclusion:

9.1 The measured and calculated results indicate that the existing car wash should not have an adverse impact on the dwellings located to the West or to the East. The dwellings to the West are screened from the washers and vacuum by a timber fence & the encasement surrounding both machines. 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 L_{A90} level to the West by -11dBA and to the East they should be -4dBA less than the background noise levels. It is fair to say that during the week the L_{A90} value is significantly 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. Neither the jet washer motors or the vacuum are audible at either residential façade when in operation.

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

- $10\log (\text{duration of event/duration of reference period})$ 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. Both of these reductions have been applied to the measured levels and used in the calculations.

9.4 Based on the measured levels it indicates that the car wash does not have an adverse impact on the residential dwellings located nearby, thus satisfying the requirements of the local authority. It must also be noted that during the second assessment the measured levels to the rear of the site are higher when the car wash was not in operation due to the road traffic fluctuations. The increase in L_{Aeq} is circa 3dB indicating that the road traffic is the dominant noise source in the area.

9.5 If the background noise levels measured as part of the revised noise assessment are to be used then the impact will be even less as the noise levels during the week are considerably higher than those on a Sunday. In addition, the traffic levels are closer to 'normal levels' after a nationwide lockdown being apparent during the initial assessment.

9.8 The immediate area is a very busy road and produces high noise levels in a regular basis. The vehicle movements entering and leaving the car wash were not audible at any time during the assessment over the road traffic noise.

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

1. Locate the washers inside a enclosure with acoustic foam 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
4. Erect a 1.8m high timber fence in front of the jet washers (East)

All of which have helped reduce the impact of the car wash even more.

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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.

LAmx - 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

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