ACOUSTICS REPORT ON THE TYPICAL NOISE GENERATION OF A WAVES CAR WASH FACILITY

21st June 2012

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1 INTRODUCTION

1.1 RPS (Acoustics) has been commissioned by Waves to carry out an assessment of the noise generated by the typical operation of their car washing facilities.

1.2 In order to accurately report the cumulative noise impact from such a facility, it is necessary to know the noise generation of individual activities associated with the typical operation of a Waves Car wash.

1.3 Measurements for each item of plant or machinery used in the car washing have been measured at existing Waves sites, and combined to give cumulative noise levels for various scenarios.

2 ASSESSMENT PROCESS

Measurements and calculations

2.1 Measurements of sound pressure were taken for each item of plant or machinery at 1, 5 and 10 metre distances. An ambient noise measurement was also taken to ensure that the item of equipment measured was acting as the dominant noise source during the measurement period.

2.2 If the noise level with the item of plant or machinery operating was ≥ 10 dB above the existing ambient noise level, then no correction was made. If the noise level of the item of plant or machinery operating was < 10 dB above the ambient noise level, then the correction process outlined in section 6.3.3 of BS 4142 was applied to the measurement to see that the level used in calculations was truly representative.

2.3 The known sound pressure levels of each item of equipment were then combined logarithmically using the equation below give a single figure sound pressure level at source.

$$L_p = 10Log_{10}(10^{L1/10}+10^{L2/10}.....10^{L_w/10})$$

Equation 1 - Combining Decibels

Plant and Equipment

2.4 The following items of equipment were measured at source at existing Waves sites, and used in the calculation of cumulative noise impact:



Figure 1- Jet Wash and Compressor



Figure 2- Vacuum Cleaner



Figure 3 - Submersible Water Recycling Pump

2.5 All measurements were taken in free-field conditions, i.e. > 1.5 m away from any reflective surfaces.

3 NOISE MEASUREMENTS

a) Measurements

3.1 Attended measurements were carried out over the following time periods:

- Waves at Tesco Dudley - between approximately 10:00 and 11:00 hours on 21st February 2012
- Waves at Tesco Cheltenham - between approximately 10:00 and 10:30 hours on 13th June 2012
- Waves at Tesco Bristol - between approximately 11:30 and 12:00 hours on 13th June 2012

3.2 The engineer attending each site liaised with the operator of the car washing facility to ensure that worst-case noise data was captured for a variety of activities associated with the facility.

3.3 The measurement positions selected for the survey were varied and were intended to capture the noise impact of the car washing operation in various different stages.

3.4 Noise measurements were made using a Class 1 Svan 949, generally in accordance with BS EN 60651:1994 and BS 7445:1993.

3.5 The meter was calibrated before and after each survey and no significant drift was witnessed.

3.6 Copies of the relevant calibration certificates associated with the meter are available upon request.

3.7 Local weather conditions for the Dudley site were generally dry and calm. The temperature measured during the attended survey period was 8 °C. Wind speeds were < 5 m/s.

3.8 Local weather conditions for both the Cheltenham and Bristol sites were generally dry and calm. The temperature measured during the attended survey periods was steady at 14 °C. Wind speeds were < 5 m/s.

3.9 The time period, *T*, varied with the type of activity under measurement, but was generally $L_{Aeq,1min}$.

3.10 Measurements were made for the vacuum cleaner in an undercroft car park and can therefore be considered to include reverberant noise build-up due to the semi-enclosed location. This therefore represents a worst-case scenario situation.

b) Results

3.11 The following Table shows the results of the surveys. All measurements are in dB(A):

Operation	Location	$L_{Aeq,T}$
Dudley (22nd February, 10:00 to 11:00hours)		
Ambient level	1 m from facility	56.3
Vacuum	1 m from operation	59.3
Noise level at source – vacuum:		**56.3**
Cheltenham (13th June, 10:00 to 10:30hours)		
Ambient level	1 m from facility	55.6
Submersible water pump	1 m from operation	53.7
Noise level at source – pump:		**0**
Bristol (13th June, 11:30 to 12:00hours)		
Ambient level	1 m from facility	57.9
Jet wash & compressor	1 m from operation	77.1
Noise level at source – jet wash & compressor:		**77.1**

Table 1 – Measured Specific Noise Levels

c) Discussion

3.12 As can be seen from the Table, the jet wash and compressor are by far the noisiest activities associated with the car wash. The noise generation of the vacuum is shown to be consistently less than 10 dB below the levels generated by the jet wash and compressor. Therefore, running both the jet wash and vacuum simultaneously would result in no noticeable increase in noise level over running the jet wash in isolation.

3.13 The submersible water recycling pump is contained in an underground drain beneath a manhole cover, and therefore generates no measureable degree of noise at ground level.

4 RESULTS

4.1 The following Tables show calculated sound pressure levels (at source) of a typical Waves car washing facility. It should be noted that the following Tables assume all items are running concurrently, and the sound pressure levels given in the Tables therefore represent a worst-case scenario situation. All levels are in dB(A):

a) Scenario 1

- 2 jet washes and 2 compressors
- 2 vacuum cleaners
- 1 submersible pump

Location	Calculated $L_{Aeq,T}$
1 m from facility	**80.1**

Table 2 – Scenario 1 results

b) Scenario 2

- 2 jet washes and 2 compressors
- 1 vacuum cleaner
- 1 submersible pump

Location	Calculated $L_{Aeq,T}$
1 m from facility	**80.1**

Table 3 – Scenario 2 results

c) Scenario 3

- 1 jet wash and 1 compressor
- 2 vacuum cleaners
- 1 submersible pump

Location	Calculated $L_{Aeq,T}$
1 m from facility	**77.2**

Table 4 – Scenario 3 results

d) Scenario 4

- 1 jet wash and 1 compressor
- 1 vacuum cleaner
- 1 submersible pump

Location	Calculated $L_{Aeq,T}$
1 m from facility	**77.1**

Table 5 – Scenario 4 results

5 CONCLUSIONS

5.1 Measurements have been made of the specific noise which is associated with a typical Waves car wash facility.

5.2 Various scenarios have been calculated using different combinations of the various plant and equipment items running simultaneously.

5.3 A typical Waves car wash facility generates a noise level of between 77.1 and 80.1 dB(A) of sound pressure at source, depending on the combination of plant and equipment items in use.

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