

01/12 2018

Preliminary Noise Emissions Survey In Line With BS4142:2014

Dear Residents,

The following preliminary report covers the noise emissions from the Extraction System installed at the Restaurant at, Mensija St. San Gilian.

Yours faithfully,

John Fenech

Chairman: NASoM

W: www.nasomalta.org

F: nasomalta

1.0 CLIENTS

1.1 Residents of Dukkara & Belvedere Flats

2.0 SCOPE OF REPORT

To study if the Noise Sensitive Receptors are directly affected by the Extraction System and assess if complaints are justified by the Sensitive Receptors.

The noise emission sources and NSRs illustrated in site plan 1

The assessment is being carried out in full accordance with BSI standards, "*Method for rating noise affecting mixed residential areas*"

Noise Criteria:

BS8233:2014: It suggests that an internal noise level of LA_{eq}, T 30 dB within bedrooms is a 'good' standard, whilst LA_{eq}, T 35 dB is a 'reasonable' standard. For living areas in the daytime, the standard recommends LA_{eq}, T 30 dB as a 'good' standard and LA_{eq}, T 40 dB as being a 'reasonable' standard.

With regards to noise levels in external amenity areas, BS 8233:2014 states: "it is desirable that the steady state noise level does not exceed LA_{eq}, T 50 dB and LA_{eq}, T 55 dB should be regarded as the upper limit."

WHO document on the *Guidelines for Community Noise (London 1999)*

Annoyance: The capacity of a noise to induce annoyance depends upon its physical characteristics, including the sound pressure level, spectral characteristics and variations of these properties with time.

During daytime, few people are highly annoyed at LA_{eq} levels below 55 dB (A), and few are moderately annoyed at LA_{eq} levels below 50 dB (A). Sound levels during the evening and night should be 5–10 dB lower than during the day.

Why is the need for guidelines to assess and mitigate noise pollution?

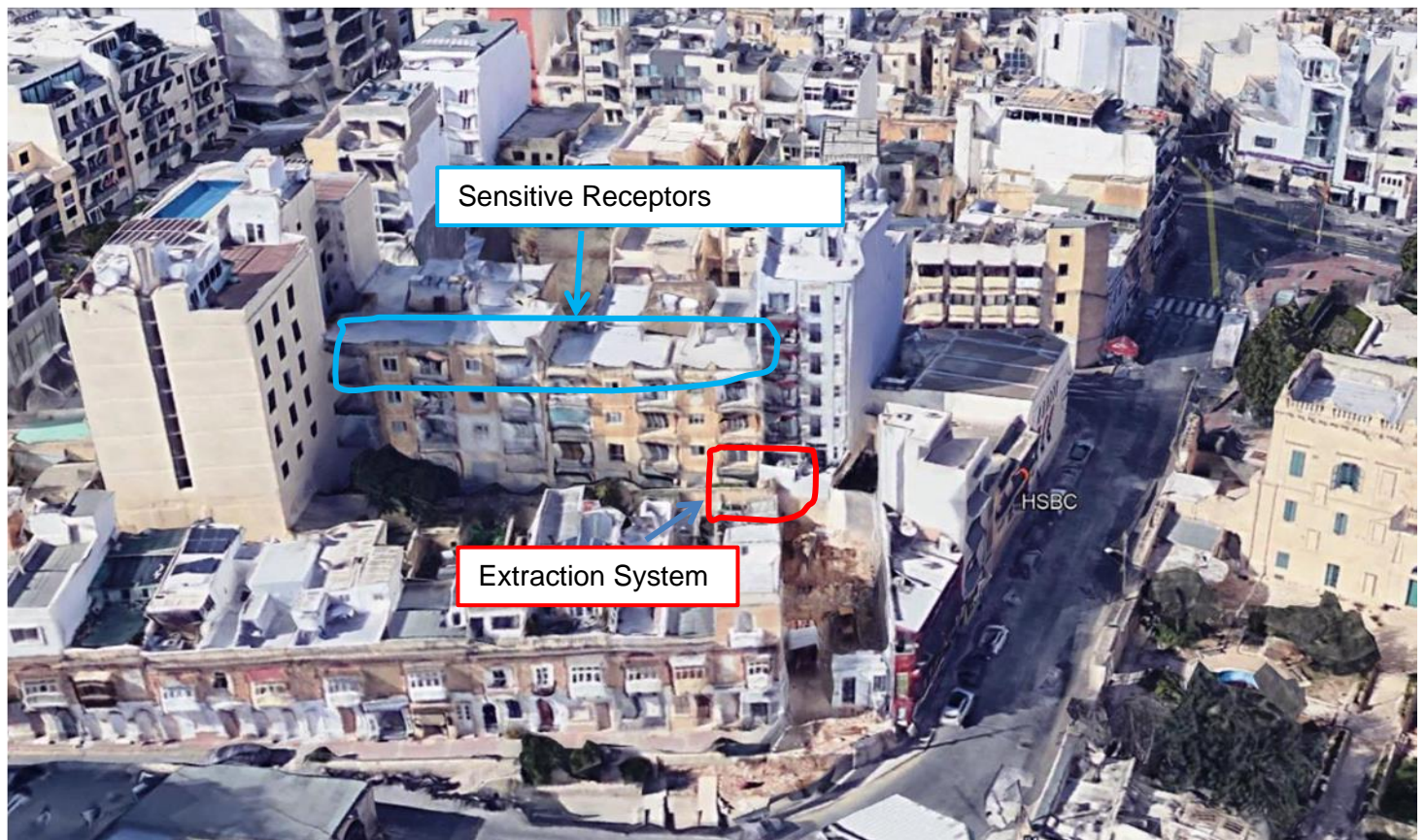
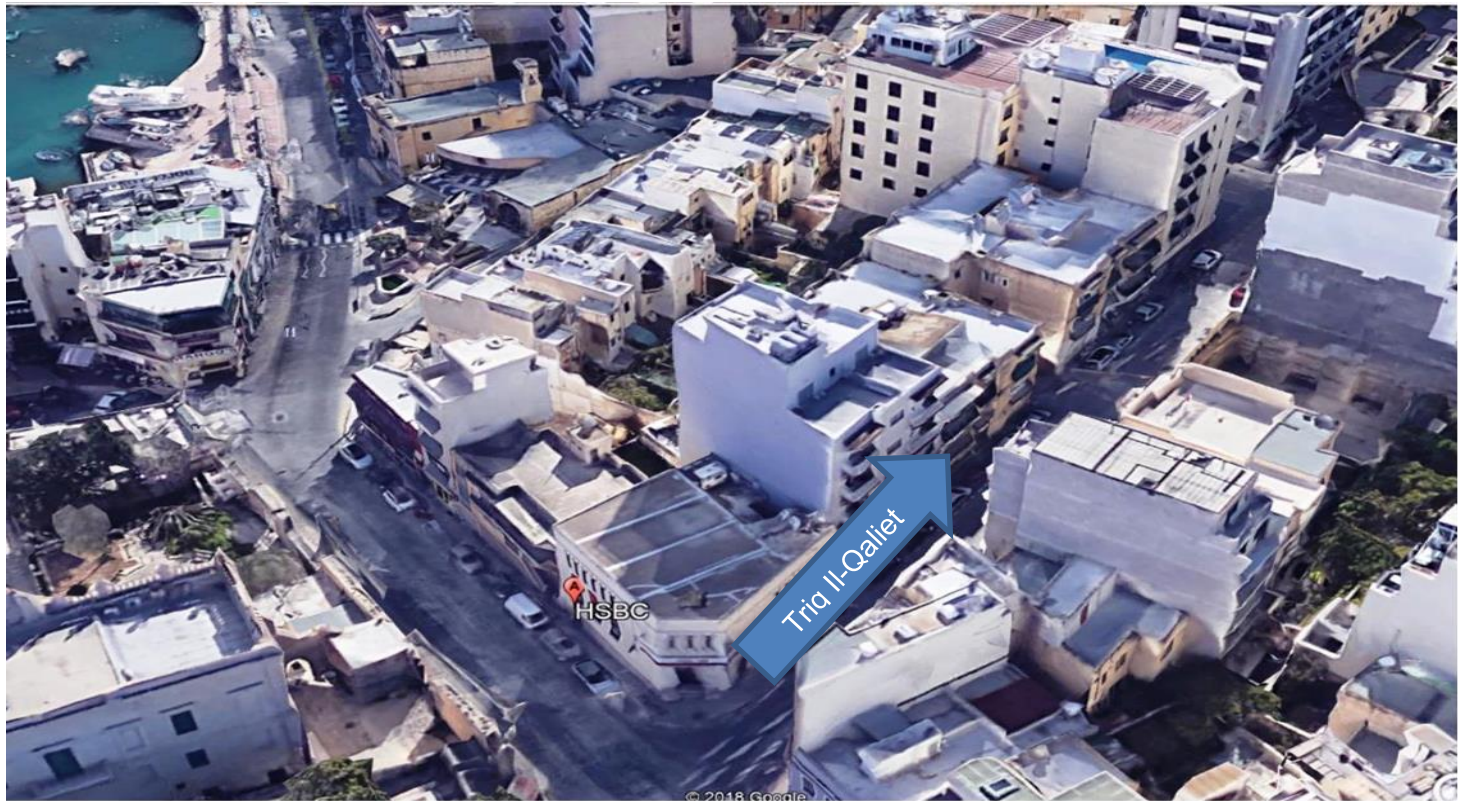
WHO/EU

Current estimates suggest that many millions of people around the world are seriously affected by (environmental) noise in their communities. This noise is increasingly perceived as being related to the sustainability of growth because it has negative effects on the quality of life and well-being of people around the world and because of its potential for causing harmful physiological health effects. With increasingly urbanized societies it is inevitable that unless control of noise impact is adequately dealt with, this situation will only get worse.

3.0 GENERAL INFORMATION ABOUT THE SOURCE AND THE NEIGHBOURHOOD

The distance between the Catering Establishments & the Noise Sensitive Receptors varies between 5 and 35 meters

3.1 Site Plan 1: Location: Catering Establishments & NSR



4.0 GENERAL INFORMATION ABOUT THE BASIS OF THE REPORT

BS 4142 : 2014, “describes a method of determining the level of a noise of an industrial nature, together with procedures for assessing whether the noise in question is likely to give rise to complaints from persons living in the vicinity”

The principles upon which the standard assesses the likelihood that an industrial facility will cause nuisance to the adjacent residential zones is best described in the following paragraph: *“Response to noise is subjective and affected by many factors (acoustic and non-acoustic). In general, the likelihood of complaint in response to a noise depends on factors including the margin by which it exceeds the background noise level, its absolute level, time of day, change in the noise environment etc., as well as local attitudes to the premises and the nature of the neighbourhood”*. BS 4142:2014 *“is only concerned with the rating of a noise of an industrial nature, based on the margin by which it exceeds the background noise level with an appropriate allowance for the acoustic features present in the noise. As this margin increases, so does the likelihood of complaint.”*

BS 4142:2014 acknowledges that the *“likelihood that an individual will complain depends on individual attitudes and perceptions in addition to the noise levels and acoustic features present”*, yet the standard itself *“makes no recommendations in respect of the extent to which individual attitudes and perceptions should be taken into account in any particular case.”*

5.0 IDENTIFICATION OF NEAREST SENSITIVE RECEPTORS

In accordance to BS 4142:2014, the nearest residential receptors were easily identified on the following site plan.

This report therefore assesses the likelihood of complaints from the residential areas when subjected to the noise emissions from the catering establishment equipment

6.0 DATES OF INSPECTION VISITS

The inspections were conducted at the NSR residence by Mr. J. Fenech
The monitoring was conducted on the following days:

Noise source	$L_{Aeq,T}$	L_{90}	L_{10}	L_{Max}	Date	Recording Location
Background noise	56.9	53.1	59.2	77.6	12/11/18:19:30:37	Resident Unit
Ambient with Extractor System on	59.3	58.4	59.9	75.5	15/11/18: 07:58:00	Resident unit
Ambient with Extractor System on	59.1	58.1	59.9	66.2	16/11/18: 07:41:51	Resident unit
Ambient with Extractor System on	58.2	57.3	58.9	66.2	16/11/18: 21:37:10	Resident unit
Ambient with Extractor System on	62.6	60.2	64.4	79.5	17/11/18: 08:57:55	Resident unit
Ambient with Extractor System on	58.9	57.2	59.9	73.1	18/11/18: 20:26:21	Resident unit
Ambient with Extractor System on						Resident unit

The distance between the Sensitive receptors and the Extraction System varies between 5 & 40 meters
During the noise monitoring the measuring instrument was 40 meters away from the extraction system
During the monitoring the predominant background noise was road traffic

7.0 PROCEDURE IN ACCORDANCE TO BS 4142:1997, SECTION 10

a	<i>Noise source under investigation</i>
1	<u>Description of source and of specific noise</u> Noise transmitted to the residences include the following source: - Air Extraction System - 2 <u>Hours of operation</u> During the evening 6 days per week . 3 <u>Mode of operation</u> Continuous during open hours. 4 <u>Description of premises in which source is situated</u> Catering Establishment
b	<i>Subjective impressions of the surveyor</i>
1	<u>Dominance or audibility of specific noise</u> The noise source is audible from the residential units in Triq Il-Qaliet 2 <u>Main sources contributing to the residual noise</u> - Predominantly traffic noise -
c	<i>General description of the site</i>
1	<u>Location of measurement position</u> The noise level was measured at the locations shown in the siteplan 1. For Residential Unit 1, the noise level was measure outside the resident's dwelling 2 <u>Ground topography</u> The Residential Units are located approximately 1.5 below and between 35 & 5 meters distant from the noise source. This neighbouring buildings configuration might defract the noise 3 <u>Site plan</u>

d	Noise measuring instruments
1	<u>Type</u> : Cirrus Class 1 Sound Level Meter
2	<u>Manufacturer</u> : Model 171 A , Type approval: IEC 61672-1-2013,
3	Microphone: Class 1 instrumentsMK:224 pre-polarized free-field ½" condenser
4	<u>Serial Number</u> : G080702

e	Operational Test
1	Reference level of calibrator: CR 515 1 KHz : Meets IEC 60942 Class1 Serial Number: 8435284352
2	Meter reading before measurement with calibrator: 93.7 dB
3	Meter reading after measurement with calibrator: 93.7 dB

f	Weather conditions (applicable to both test dates)
1	<u>Wind speed and direction</u> Speed less than Force 2 (Beaufort scale), Wind direction: variable
2	<u>Weather condition</u> Calm, clear
3	<u>Precipitation</u> None
4	<u>Fog</u> None

G	<i>Date and time of measurements</i>		
1	<u>Specific noise level</u>		
	<i>Receptor</i>	<i>Daytime</i>	<i>Evening</i>
	Residential Unit	between 07:00 and 08:15	19:30 & 23:15
2	<u>Background and residual noise levels</u>		
	<i>Receptor</i>	<i>Daytime</i>	<i>Evening/Nighttime</i>
	Residential Unit	Between 16:00 and 17:15	

H	Specific noise level (from the Restaurant air extraction system)																		
1	<p><u>Measured noise level(s)</u></p> <p>Refer to Appendices 1 and 2 for the noise character as measured on site.</p> <p>Appendix 1 contains four tests carried out to determine the specific noise levels as measured at Residence Unit</p> <p>Appendix 2 describes the sound character observed from the measurement location with the extractor switched off. This trend was used to assess the residual noise level and the background noise level.</p>																		
2	<p><u>Residual noise levels and method of determination</u></p> <p>The residual noise level is the continuous A-weighted sound pressure level at a given position in a given situation when the specific noise source is suppressed to a degree that it does not contribute to the background noise. This was obtained by measuring the noise level at the residential units after the restaurant Extraction system was switched off. The characteristic trends can be viewed in Appendix 2.</p> <p>The residual noise levels were thence determined to be:</p> <table><tr><th>Condition</th><th>Location</th><th>Residual Noise level</th></tr><tr><td>Day</td><td>Residential Unit</td><td>L_{Aeq}, 53.1 dB(A) 1 Hr: 56 min</td></tr></table>	Condition	Location	Residual Noise level	Day	Residential Unit	L _{Aeq} , 53.1 dB(A) 1 Hr: 56 min												
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3	<p><u>Specific noise level and method of determination</u></p> <p>The specific noise level is the continuous A-weighted sound pressure level at the assessment position over a given reference time interval that is produced by the noise source that is being investigated for assessing the likelihood of complaints.</p> <p>The specific noise levels is summarised below :</p> <table><tr><th>Condition</th><th>Location</th><th>Specific Noise level</th></tr><tr><td>Day</td><td>Residential Unit</td><td>L_{Aeq},48 min 6 sec = 59.3dB</td></tr><tr><td>Evening</td><td>Residential Unit</td><td>L_{Aeq},43min 16se = 58.1 dB</td></tr><tr><td>Evening</td><td>Residential Unit</td><td>L_{Aeq}, 45min 54 sec =58.2 dB</td></tr><tr><td>Evening</td><td>Residential Unit</td><td>L_{Aeq}, 22min 54 sec =62.6 dB</td></tr><tr><td>Evening/ Night</td><td>Residential Unit</td><td>L_{Aeq},2hr, 37min = 58.9 dB</td></tr></table>	Condition	Location	Specific Noise level	Day	Residential Unit	L _{Aeq} ,48 min 6 sec = 59.3dB	Evening	Residential Unit	L _{Aeq} ,43min 16se = 58.1 dB	Evening	Residential Unit	L _{Aeq} , 45min 54 sec =58.2 dB	Evening	Residential Unit	L _{Aeq} , 22min 54 sec =62.6 dB	Evening/ Night	Residential Unit	L _{Aeq} ,2hr, 37min = 58.9 dB
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4	<p><u>Justification of methods</u></p> <p>The specific noise levels were investigated for the minimum period required even though the noise levels measured were in most cases due to sources not generated by the noise source, such as (traffic etc.)</p> <p>The residual noise level was measured when the the source noise was off.</p>																		
5	<p><u>Details of any corrections applied:</u></p> <p>Where both the ambient noise and the source noise are reasonably steady, the L_{A90} descriptor can be used to calculate the component level</p>																		

I		Measurement time intervals																		
	1	Measurement time interval for the specific noise levels: <table> <tr> <th>Condition</th><th>Location</th><th>Time Interval</th></tr> <tr> <td>Day</td><td>Residential Unit</td><td>00:48:00</td></tr> <tr> <td>Day</td><td>Residential Unit</td><td>00:43:00</td></tr> <tr> <td>Evening</td><td>Residential Unit</td><td>00:23:00</td></tr> <tr> <td>Day</td><td>Residential Unit</td><td>00:43:00</td></tr> <tr> <td>Evening/night</td><td>Residential Unit</td><td>02:37:00</td></tr> </table>	Condition	Location	Time Interval	Day	Residential Unit	00:48:00	Day	Residential Unit	00:43:00	Evening	Residential Unit	00:23:00	Day	Residential Unit	00:43:00	Evening/night	Residential Unit	02:37:00
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J	Reference Time Intervals
	The standard prescribes a reference time interval of 5 minutes for investigation of noises during the night (the definition of night being intended to refer to the times when the general adult population are preparing to sleep or are actually sleeping), and 1 hour for measurement of the specific noise level during the day.

k	Rating Levels																		
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2	<u>Acoustic features of the specific noise</u> <p>The noise generated from the extraction system is continuous with no distinguishable, discrete, continuous noises such as whines, hisses, screeches, hums etc, as such there is no need to apply an adjustment to the specific noise level in line with the directions of Clause 8 of the standard.</p>																		
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I	Background noise level						
	<p>The background noise level is the A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of the given time interval.</p> <p>For this study it was found to be as follows:</p> <table><tr><td>Condition</td><td>Location</td><td>Background Noise level</td></tr><tr><td>Day</td><td>Residential Unit 1</td><td>$L_{A90,1hr:40min:32sec} = 53.1 \text{ dB}$</td></tr></table>	Condition	Location	Background Noise level	Day	Residential Unit 1	$L_{A90,1hr:40min:32sec} = 53.1 \text{ dB}$
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M	Assessment																		
1	<p><u>Excess of the rating level over the measured background noise level</u></p> <p>The difference between the rating level and the background noise level at each location is as follows:</p> <table><tr><th>Condition</th><th>Location</th><th>Difference between rating level and background level</th></tr><tr><td>Day</td><td>Residential Unit</td><td>+ 6.2 dB</td></tr><tr><td>Day</td><td>Residential Unit</td><td>+ 6.0 dB</td></tr><tr><td>Evening</td><td>Residential Unit</td><td>+ 5.1 dB</td></tr><tr><td>Day</td><td>Residential Unit</td><td>+ 9.5 dB</td></tr><tr><td>Evening/night</td><td>Residential Unit</td><td>+ 5.8 dB</td></tr></table>	Condition	Location	Difference between rating level and background level	Day	Residential Unit	+ 6.2 dB	Day	Residential Unit	+ 6.0 dB	Evening	Residential Unit	+ 5.1 dB	Day	Residential Unit	+ 9.5 dB	Evening/night	Residential Unit	+ 5.8 dB
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2	<p><u>Assessment</u></p> <p>The standard defines the likelihood of complaints by the excess of the rating level above the background noise level as follows:</p> <ul style="list-style-type: none">- A difference of + 5dB is of marginal significance- A difference of +10 dB or more indicates that complaints are likely. <p>In this case the difference varies between 5.8 and 9.5.</p>																		

8.0 CONCLUSIONS

The methodology adopted in this report is based on BS 4142:2014 which assesses the likelihood for complaints solely on the difference between the rating level of the noise source and the background noise level, while ignoring other relevant factors such as its absolute value, the time of the day etc. as described in section 5 of this report.

Based on the standard, therefore the following are the likelihoods for complaints:

<i>Condition</i>	<i>Location</i>	<i>Assessment</i>
Day	Residential Unit	+ 9.5 dB difference, indicates that complaints are likely
Evening	Residential Unit	+ 5.8 dB complaints are unlikely

Based on the WHO Community guidelines the Day & Evening noise level exceed the limits by:
Day 4.3 dB and Evening by 8.9 dB

END OF REPORT

PREPARED IN 1st December 2018

Annexes to report:

Appendix 1 – Specific Noise levels

- Residential Unit 1 (daytime),
- Residential Unit 1 (evening),
-

Appendix 2 – Background noise levels

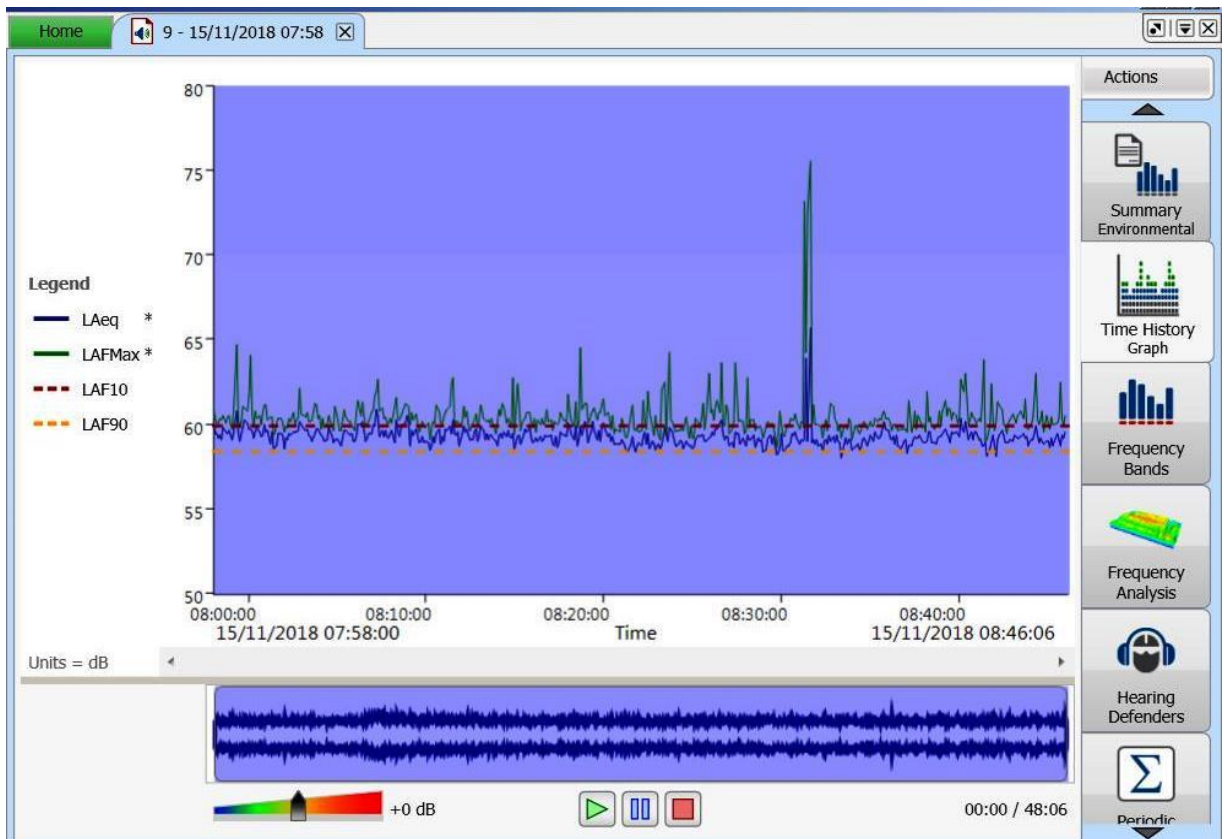
- Residential Unit 1 (daytime),
-

Appendix 1

15 November 2018 - Morning

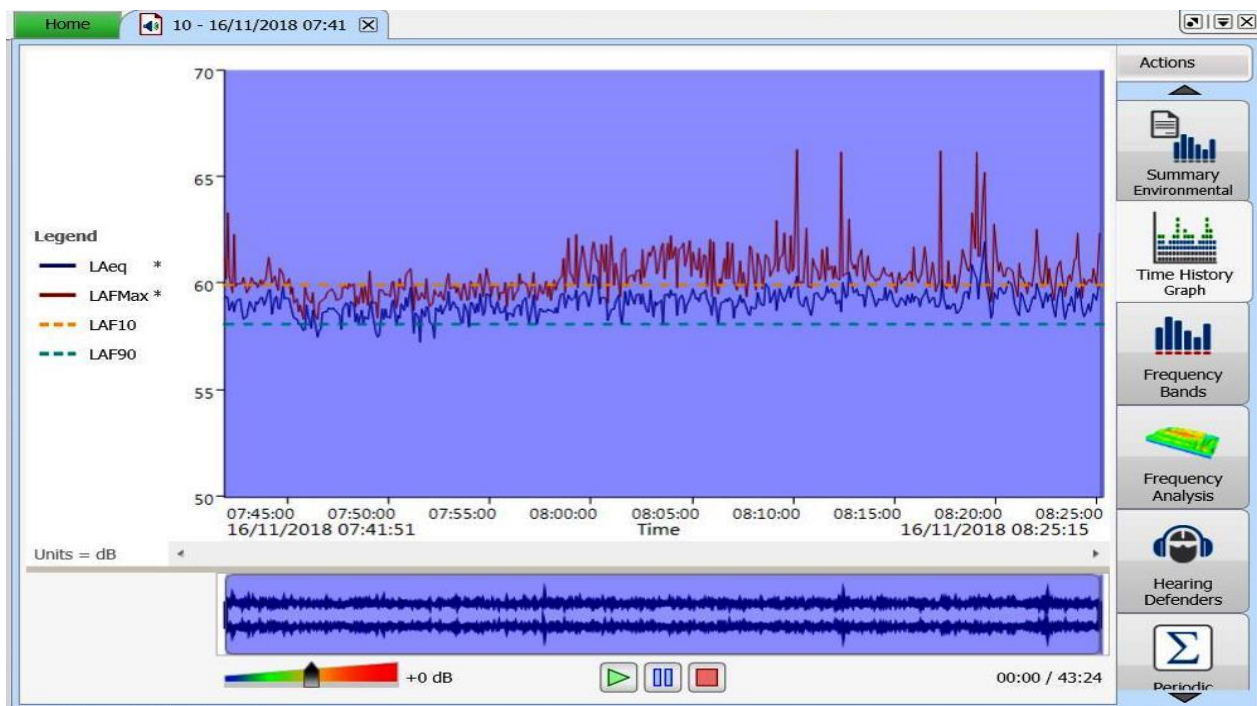
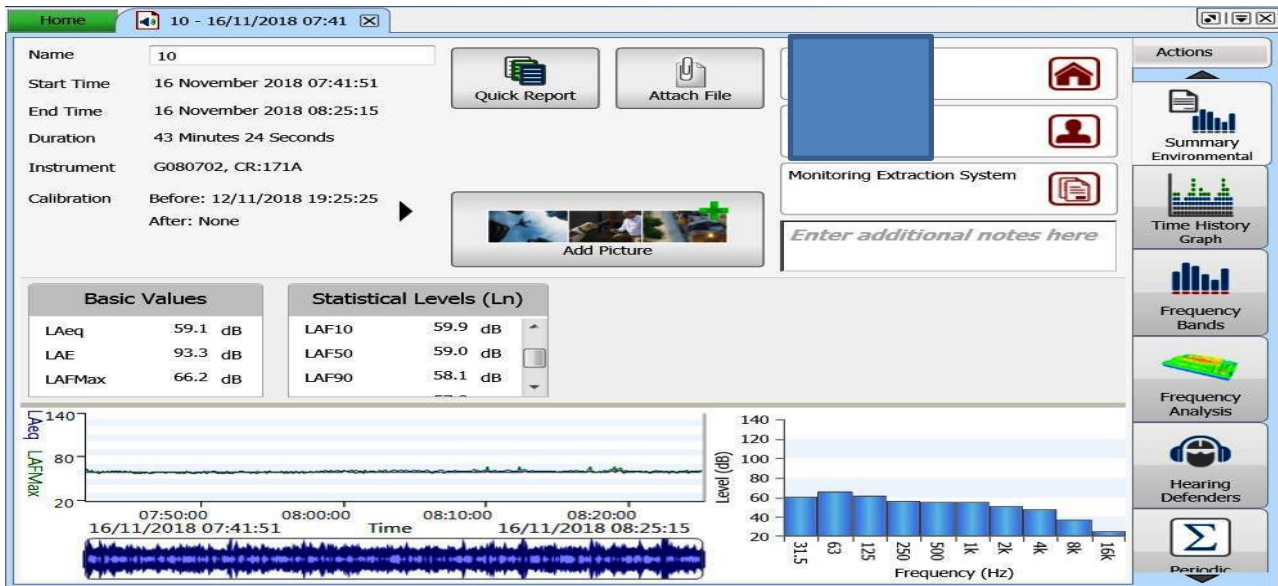
Monitoring the Extraction System noise level





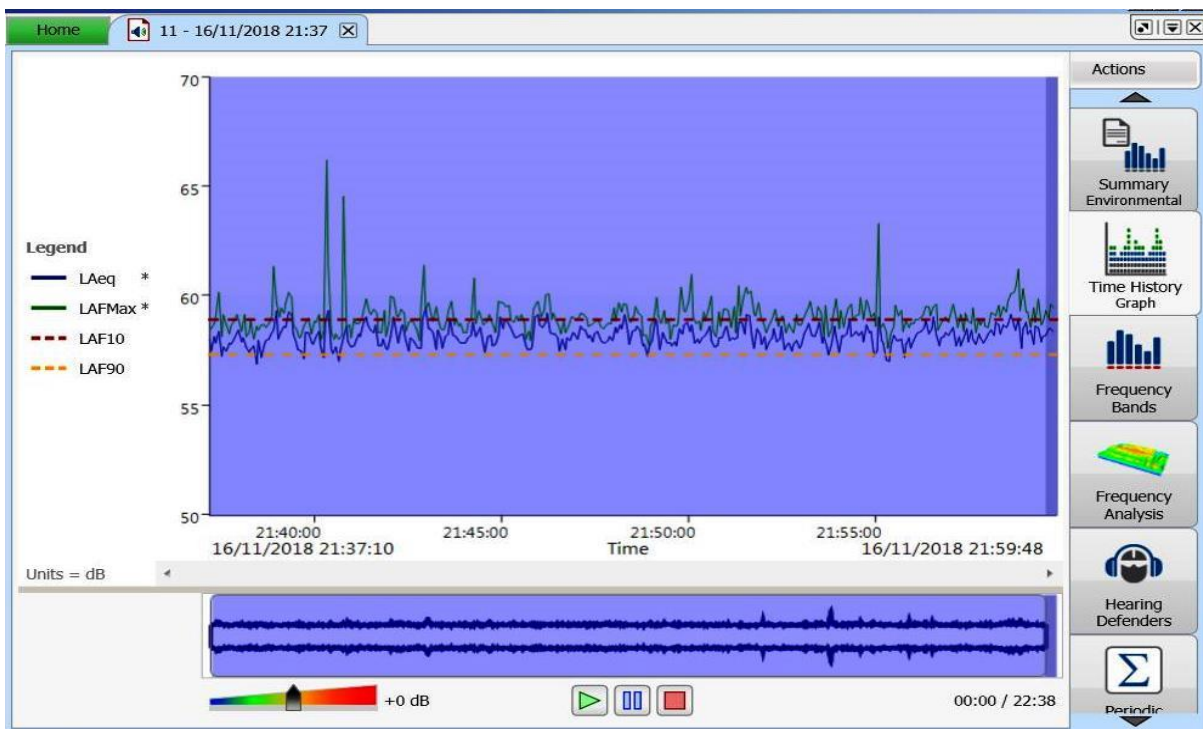
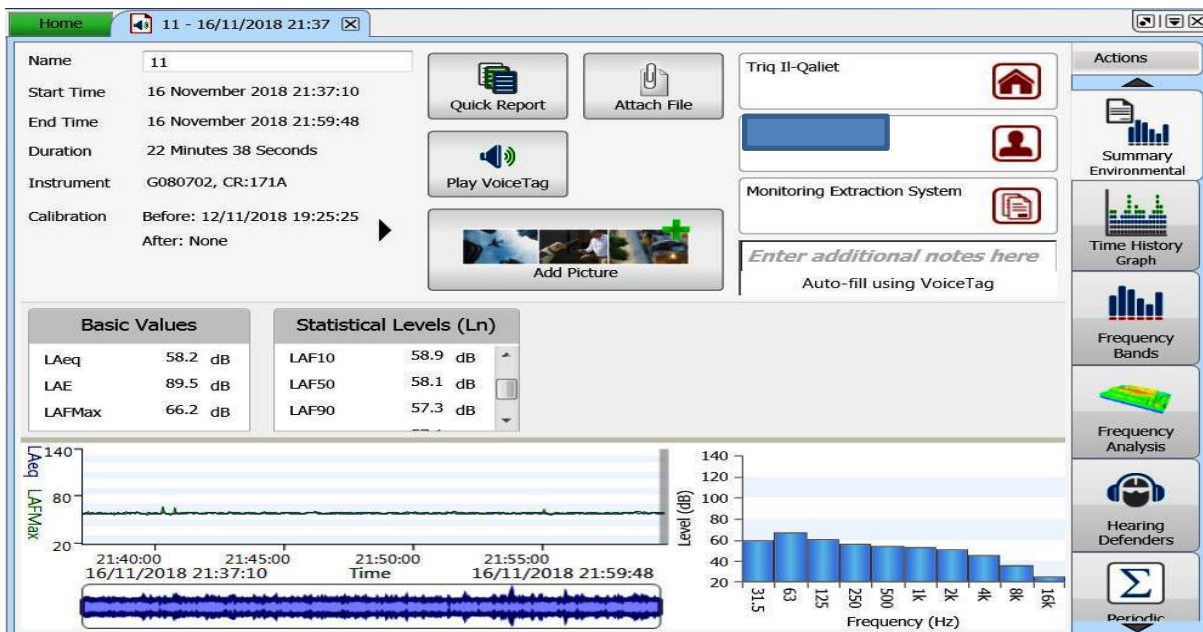
16 November 2018 - Day

Monitoring the Extraction System noise level



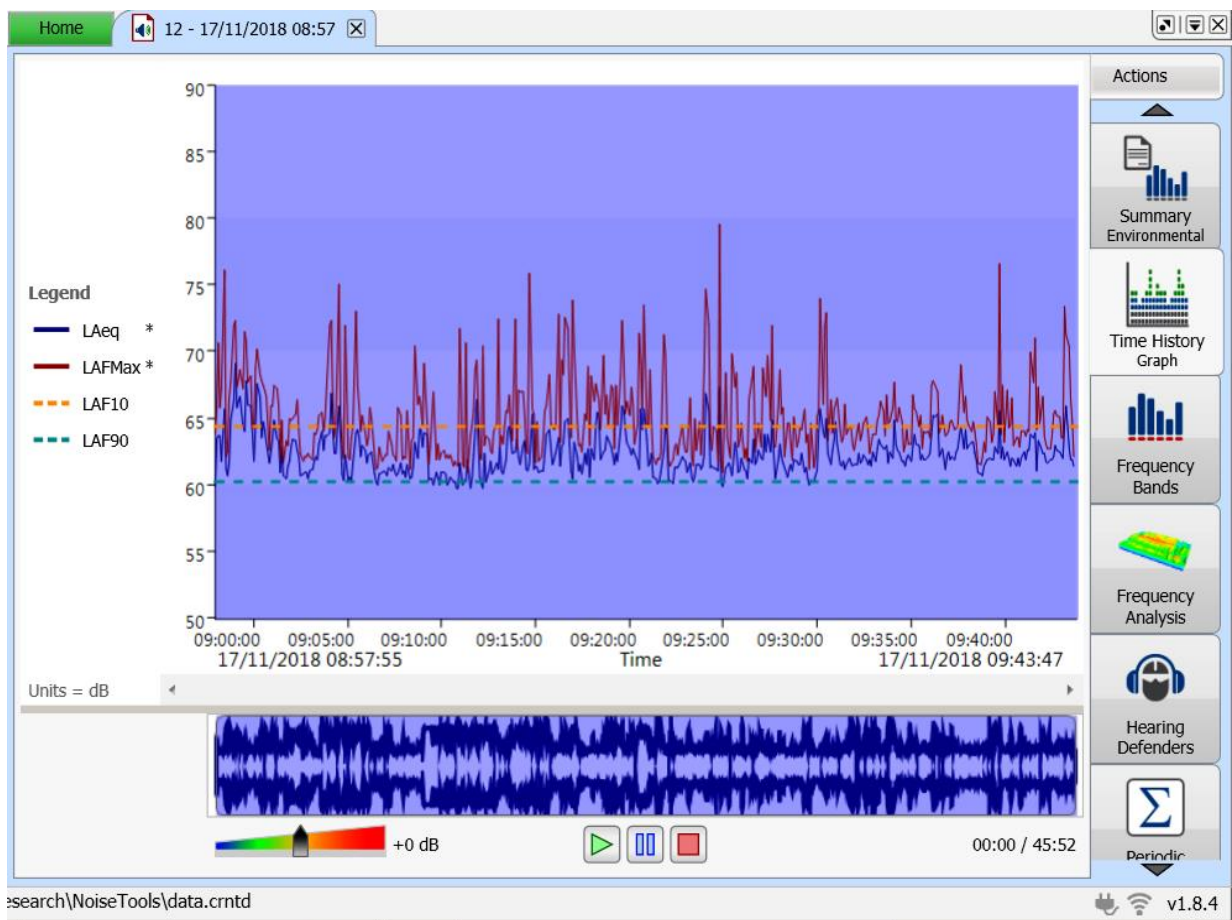
16 November 2018 - Evening

Monitoring the Extraction System noise level



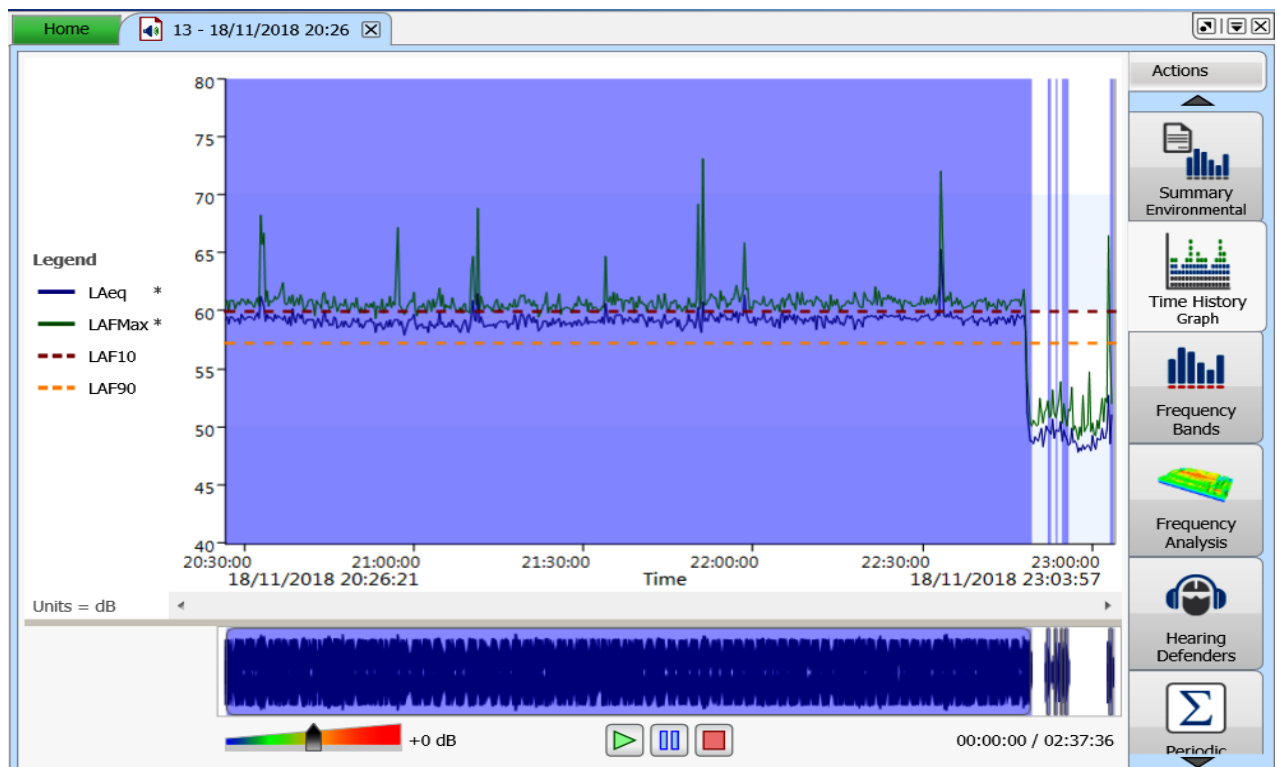
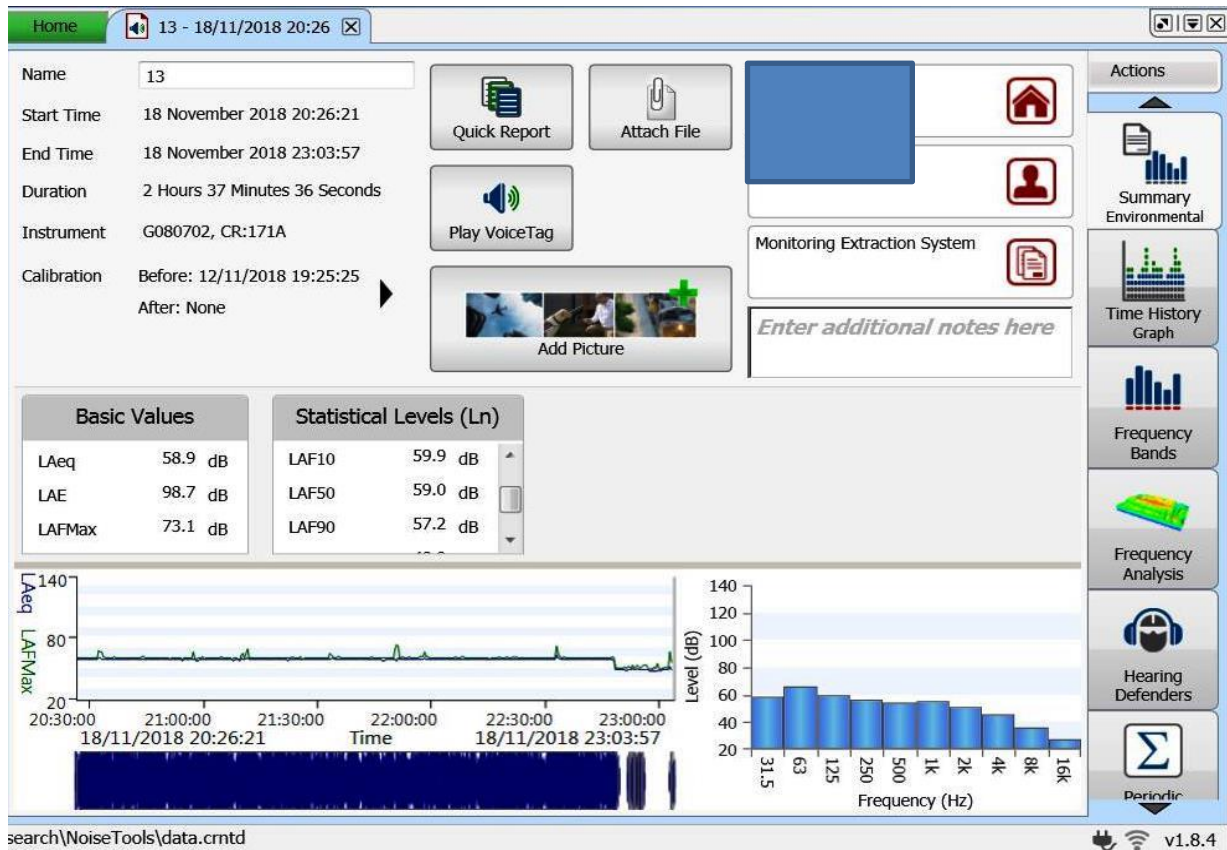
17 November 2018 - evening

Monitoring the Extraction System noise level



18th November 2018 - evening

Monitoring the Extraction System noise level



Appendix 2

12 November 2018 - evening

Monitoring the background noise level

