SOURCE – AMBIENT NOISE – WOOLMONGER STREET – BRIDGE STREET

Receiver – The Pinnacle, Woolmonger Street

Officer – P Mallard

Recording equipment used – Symphonie

Analysis equipment used - DB Trait

Survey date – 15 to 19 August 2013

Measurement Location

The measurements were carried out on the 3rd floor of the Pinnacle in a flat on the facade marked red on the plan below.

The microphone was located in the Living room of the flat near the windows. One of the windows was open during the survey. A bedroom in the flat is on the same façade and would be subject to the same noise exposure as the living room.

Object of the survey

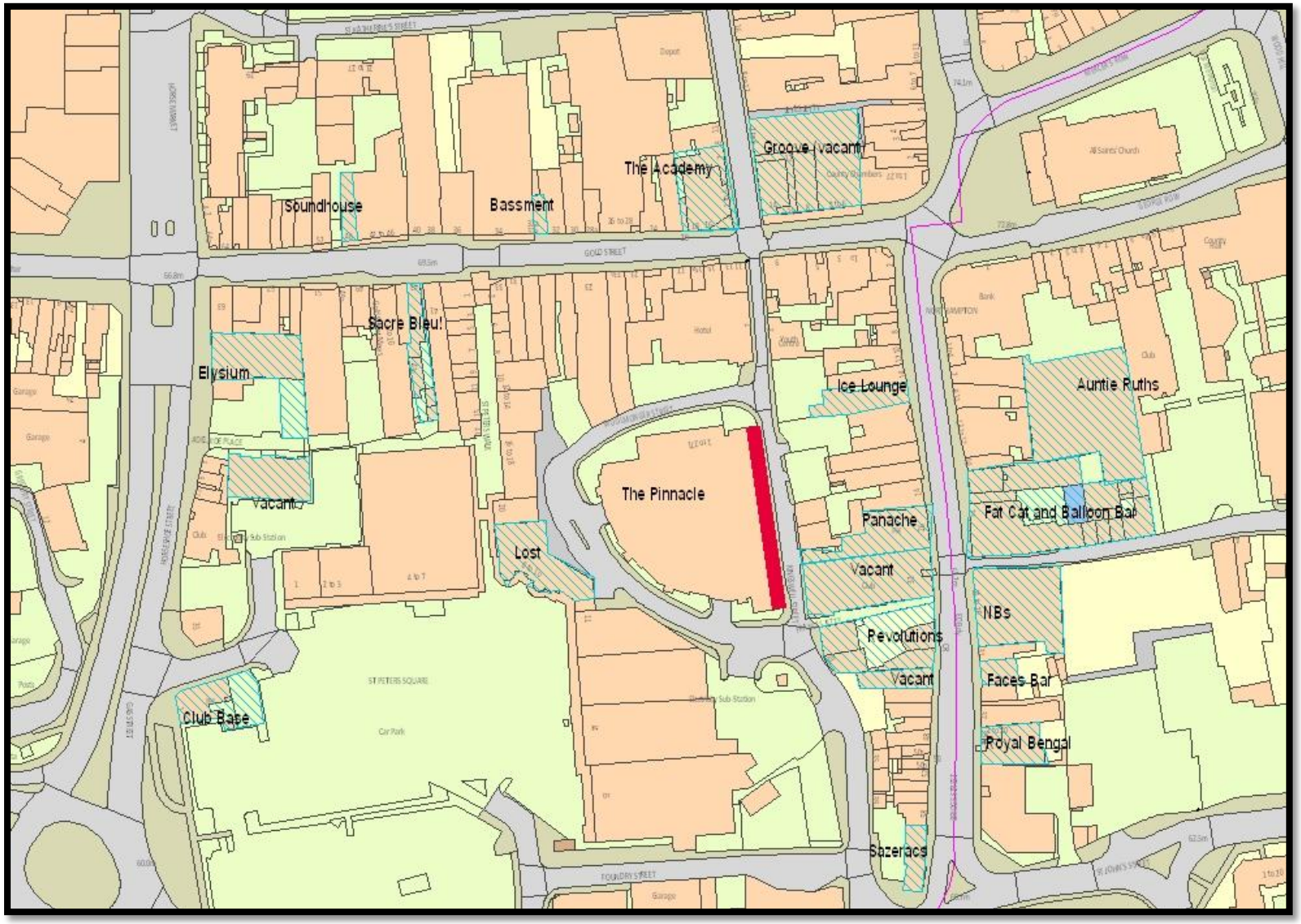
The survey was carried out in connection with an application from Panache, a bar in Bridge Street, to extend their opening hours until 06.00 hours.

We have concerns about the noise exposure currently experienced by residents in the town centre, particularly in Bridge Street and the Pinnacle. Adverse comments have been made by several residents of the Pinnacle relating to the noise from people in the street migrating between the various clubs. There have also been problems with loud music from several establishments that have resulted in the service of noise abatement notices on the premises concerned, where a nuisance has been established.

The survey was set to establish the noise climate on the Eastern façade of The Pinnacle, between midnight and 06.00 hours, over the week-end, when the greatest activity in connection with the operation of Licenced premises in the vicinity takes place, in order to estimate what the effect of extending the Licensing Hours might be.

Our concern is that an extension of hours for Panache will lead to other bars in the area also wishing to increase their hours leading to noise from activity in the Town Centre being extended to all night. We have had a tentative enquiry from another bar in the area regarding an extension of hours to 6.00 am.

Site Plan


Soundhouse
Bassment
The Academy
Groove (vacant)
Sacre Bleu!
Elysium
Vacant
The Pinnacle
Lost
Ice Lounge
Auntie Ruths
Fat Cat and Balloon Bar
Panache
Vacant
Revolutions
Vacant
NBs
Faces Bar
Royal Bengal
Sazeracs
Club Base
GOLD STREET
FOUNDRY STREET
ST PETERS SQUARE

Background

The World Health Organisation (WHO), in its document Guidelines on Community Noise, published in 1999 (text attached), section 3.4, states that the primary sleep disturbance effects are

- difficulty in falling asleep
- awakenings
- alterations of sleep stages or depth, especially a reduction in the proportion of REM sleep

Other physiological effects are

- increased blood pressure
- increased heart rate
- increased finger pulse amplitude
- vasoconstriction
- changes in respiration
- cardiac arrhythmia
- increased body movements

The threshold and response for each of these effects may be different. Different noises have different information content and this could also affect the physiological threshold and noise-response relationships.

Exposure to nighttime noise also introduces secondary effects, or so called after effects. These can be measured the next day, while the individual is awake. These secondary effects include

- reduced perceived sleep quality
- increased fatigue
- depressed mood or wellbeing
- decreased performance

The guidance advises that if the negative effects of sleep disturbance are to be avoided then, for continuous noise, the equivalent sound pressure level (L_{Aeq}) should not exceed L_{Aeq} 30 dB indoors. If the noise is not continuous, sleep disturbance correlates best with the L_{Amax} and effects have been observed at L_{Amax} 45 dB or less. This is particularly true if the background level is low. The WHO consider that it should be possible to sleep with the bedroom window slightly open (giving a reduction of 15 dB from outside to inside). To prevent sleep disturbance one should consider the equivalent sound pressure level and the number and level of sound events. Mitigation targeted toward the first part of the night is believed to be effective for the ability to fall asleep.

The measurements obtained below are internal levels and are applicable to the room in which there were measured. In other rooms the amount that the window is opened, the position in the room and the amount of soft furnishings will affect the immission levels.

The methodology for analysing the survey was to examine the first two night's surveys to ascertain the general character of the noise recorded. The main sources of noise were established as

- vehicle noise, which gave rise to obvious peaks,
- people noise arising from loud voices close to the receiver,
- music noise intermingled with distant voices
- noise from bottle and refuse tipping
- residual noise when the above sources were absent
- noise originating within the flat where the survey was located

The vehicle noise and people noise were found to have characteristic noise levels at particular frequencies that enabled them to be coded automatically. This gave an indication when these events occurred. The recordings were then screened to refine the coding. The people noise coding gave rise to numerous incidents and these were consolidated into events. For example over a one minute period there might be 20 separate peaks due to loud voices and shouting, these, and similar events would be consolidated into one event. This was considered to provide a more sensible assessment of the number of incidents.

Noises within the flat on the last night's survey were particularly noticeable and were excluded from the survey results. On other nights they have been included in the Residual measurement as it was considered that they would not affect the background noise level.

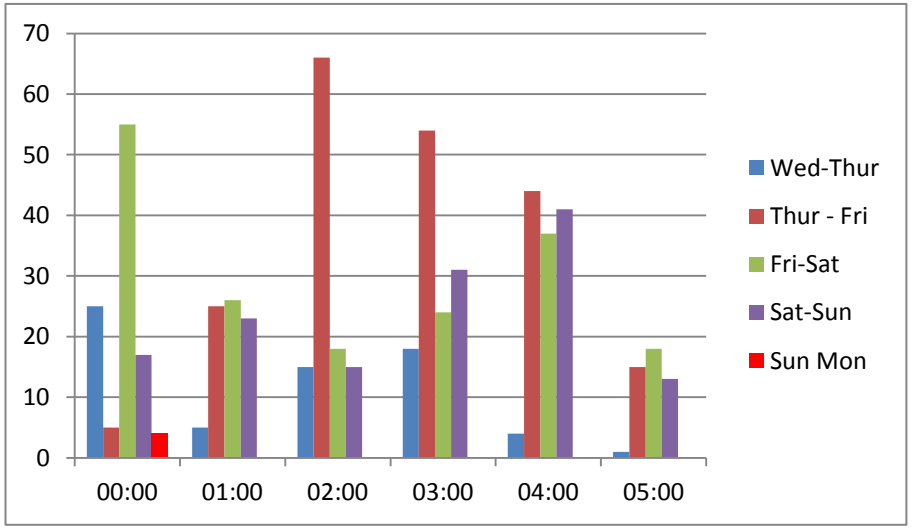
The survey shows that noise levels for all sources are considerably above the WHO guideline levels of L_{Aeq} 30 dB for steady levels and above L_{Amax} 45 dB for peak levels and such events take place on numerous times.

The results of the people noise measurements, i.e. the discrete louder incidents, excluding the people noise intermingled with the music noise are as follows.

People noise	Count	L_{A90}	L_{Aeq}	L_{A10}	L_{A1}	L_{Amax}	Duration
Wed-Thur	68	47	56	58	67	73	00:23:07:700
Thur-Fri	209	50	56	58	65	86	01:06:37:100
Fri-Sat	178	48	59	60	68	84	01:13:28:300
Sat-Sun	140	48	58	60	67	82	00:56:26:700
Sun-Mon	4	47	52	54	63	67	00:01:25:000

It can be seen that the "peak" levels, described by the L_{A10}, L_{A1} and L_{Amax} levels are well in excess of the WHO guideline of 45 dBA and there are a considerable number of incidents over the weekend when the bars and clubs are most active.

When the number of people noise incidents are examined on an hour-by-hour basis it can be seen that they peak around 2.00 to 3.00 am on Wednesday night, 2.00 am on Thursday night and 4.00 am on Friday and Saturday night. There were no events detected after 1.00 am on Sunday night. They appear to generally decrease toward 6.00 am.



	People noise - number of incidents				
	Wed-Thur	Thur - Fri	Fri-Sat	Sat-Sun	Sun Mon
00:00 - 01:00	25	5	55	17	4
01:00 -02:00	5	25	26	23	0
02:00 - 03:00	15	66	18	15	0
03:00 - 04:00	18	54	24	31	0
04:00 - 05:00	4	44	37	41	0
05:00 – 06:00	1	15	18	13	0

Conclusion

Noise from people in the Town Centre is significant when the bars and clubs are operational and appears to peak around the time the clubs and bars close, decreasing thereafter.

There is also a significant contribution from vehicle noise in Woolmonger Street that also decreases when the bars are less busy.

There is evident music noise from an unidentified source or sources that will require further investigation.

Vehicle pass-by	Count
Wed-Thur	90
Thur - Fri	132
Fri-Sat	162
Sat-Sun	182
Sun Mon	69

The ambient noise in the area and noise generated by people is above guidelines suggested by the WHO that are required for the restorative effects of sleep and could be adversely affecting the health of residents in the area. A general extension of hours to 6.00 am would exacerbate the current situation and is considered contrary to the Licensing Objectives of preventing Public Nuisance and the Government's Noise Policy Statement for England (NPSE) the aims of which are:

1. *Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.*
2. *Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.*
3. *Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.*

Therefore, Regulatory Services objects to the application by Panache, or other bars, to extend their hours to 6.00 am.

P Mallard SEHO 16 September 2013

1. 15 August 2013 - Wednesday Night - Thursday Morning

This is traditionally “Student night” in Northampton, although at the time of this survey the universities and colleges were on their Summer Break, so it is assumed that activity is less than in term time.

Vehicle pass-bys in Woolmonger Street are a significant noise source and have been coded separately. There are perhaps other vehicle noise contributions from more distant vehicle sources but these are not readily identifiable and are not considered significant in relation to the other sources. Accordingly they will have been included in the other measurements.

Noise from people in the street is also significant at times producing loud, sporadic incidents.

Between midnight and 3.00 am, the ambient noise is characterised by vehicle pass-bys, noise from people in the street close by or particularly loud and a melange of bassy music and indistinct voices from more distant sources. After 3.00 am there are some sporadic incidents of noise from people in the street until 4.30 am.

Eleven incidents of empty bottles being tipped were noted between midnight and 6.00 am.

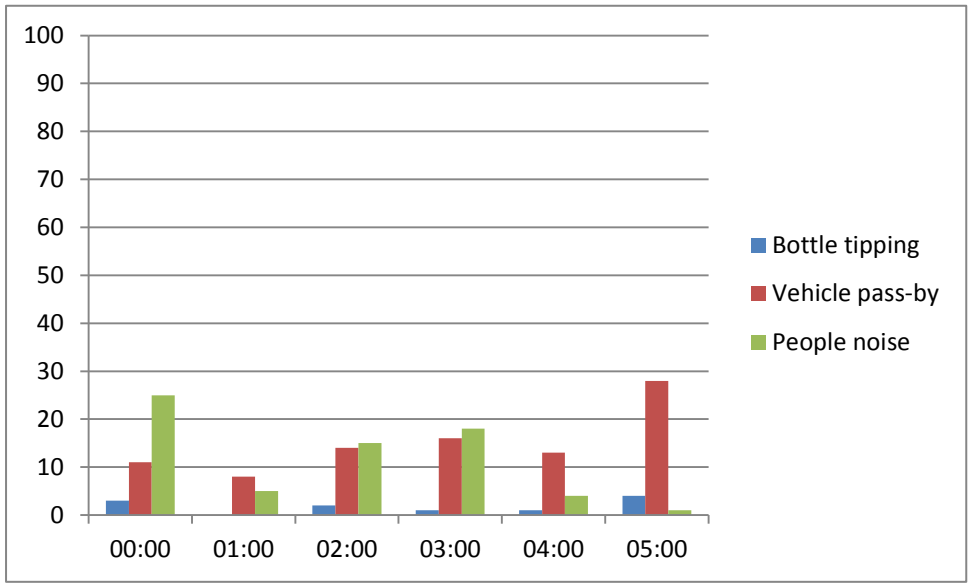
On the time history below;

- the pink peaks are traffic pass-bys
- the yellow peaks are due to people close by speaking loudly or shouting etc.
- the dark blue is the period affected by music and general people noise
- the grey is the residual noise where no obvious activity from bars or people has been noted
- the light blue is due to bottle or refuse tipping

The people noise aspect of the recording falls into two character types.

- Before 3.00 am it is quite ubiquitous and appears to be from sources not in the immediate vicinity of the receiver and are too indistinct and numerous to be identified individually. There are times, however, where the people noise seems to be in close proximity to the receiver and are judged to be intrusive in their own right; these have been coded as “People noise” events.
- After 3.00 am the music is no longer apparent and the general susurration of voices observed earlier has gone. Consequently individual occurrences of people noise, although not necessarily as intrusive as those coded before 3.00 am, have been individually logged as “People noise” where identified.

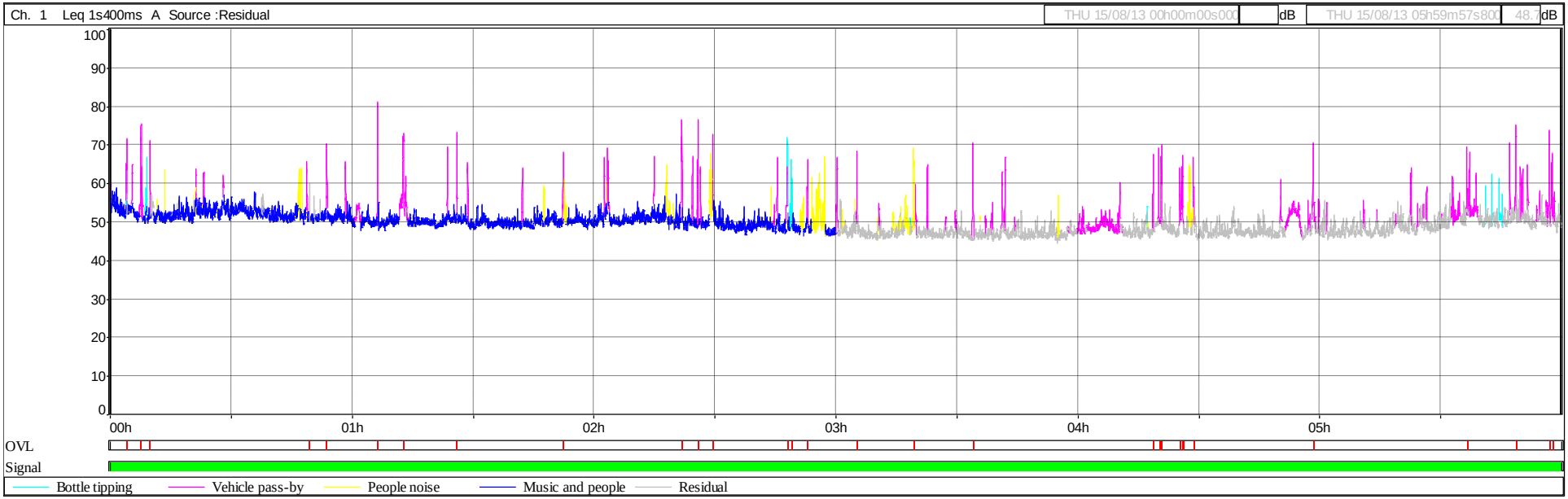
Figure 1 - Wednesday Night - Thursday Morning



Hourly incidence – Wed-Thur			
Source	Bottle tipping	Vehicle pass-by	People noise
Period start	Count	Count	Count
00:00	3	11	25
01:00	0	8	5
02:00	2	14	15
03:00	1	16	18
04:00	1	13	4
05:00	4	28	1
Overall	11	90	68

Wed-Thur	**Count**	L_{A90}	L_{Aeq}	L_{A10}	L_{A1}	L_{Amax}	**Duration**
Source		dB	dB	dB	dB	dB	h:m:s:ms
Bottle tipping	11	48	58	58	70	78	00:01:44:600
Vehicle pass-by	90	48	59	61	71	85	00:49:47:000
People noise	68	47	56	58	67	73	00:23:07:700
Music and people	Midnight to 3.00 am	48	51	53	56	65	02:31:36:900
Residual	**Midnight to 6.00 am - main source of data 3.00 am to 6.00 am**	**46**	49	51	54	69	02:13:43:800

Figure 2 – 15-16 August - Wednesday night - Thursday morning



2. 16 August 2013 - Thursday Night - Friday Morning

This is not thought to be a night particularly given over to attendance at bars being between the student night and the week-end.

Vehicle pass-bys in Woolmonger Street are a significant noise source and have been coded separately. There are perhaps other vehicle noise contributions from more distant vehicle sources but these are not readily identifiable and are not considered significant in relation to the other sources. Accordingly they will have been included in the other measurements.

Noise from people in the street is also significant at times producing loud, sporadic incidents.

Between midnight and 2.00 am, the ambient noise is characterised by a melange of bass music and indistinct voices. After 2.00 am the music is no longer apparent and there appears to considerably more activity in the streets than the night before tapering off until 5.30 am, an hour later than the night before. Although an attempt has been made to consolidate people noise events into a single occurrence where there are a number of discrete events close together there are still a considerable number of occurrences between 2 and 3.00 am.

The period around 1.30 am and the periods between 3.45 and 5.30 am coded as residual are dominated by noise from within the flat (conversation). It was not possible to distinguish people noise during those periods, although they will provide data on the Background noise level.

Four incidents of empty bottles being tipped were noted between midnight and 6.00 am.

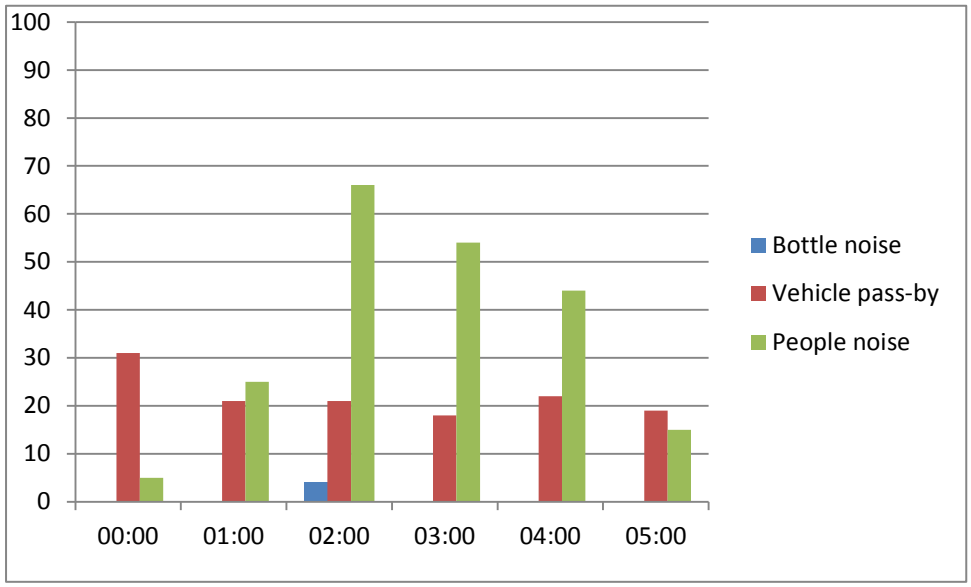
On the time history below;

- the pink peaks are traffic pass-bys
- the yellow peaks are due to people close by speaking loudly or shouting etc.
- the dark blue is the period affected by music and general people noise
- the grey is the residual noise where no obvious activity from bars or people has been noted
- the light blue is due to bottle tipping

The people noise aspect of the recording falls into two character types.

- Before 2.00 am it is quite ubiquitous, is indistinct and appears to be from sources not in the immediate vicinity of the receiver and are too indistinct and numerous to be identified individually. There are times, however, where the people noise seems to be in close proximity to the receiver and are judged to be intrusive in their own right; these have been coded as “People noise” events.

- After 2.00 am the music is no longer apparent and the general susurration of voices observed earlier has gone but there is a noticeable increase in the occurrence and intrusiveness of people noise incidents.

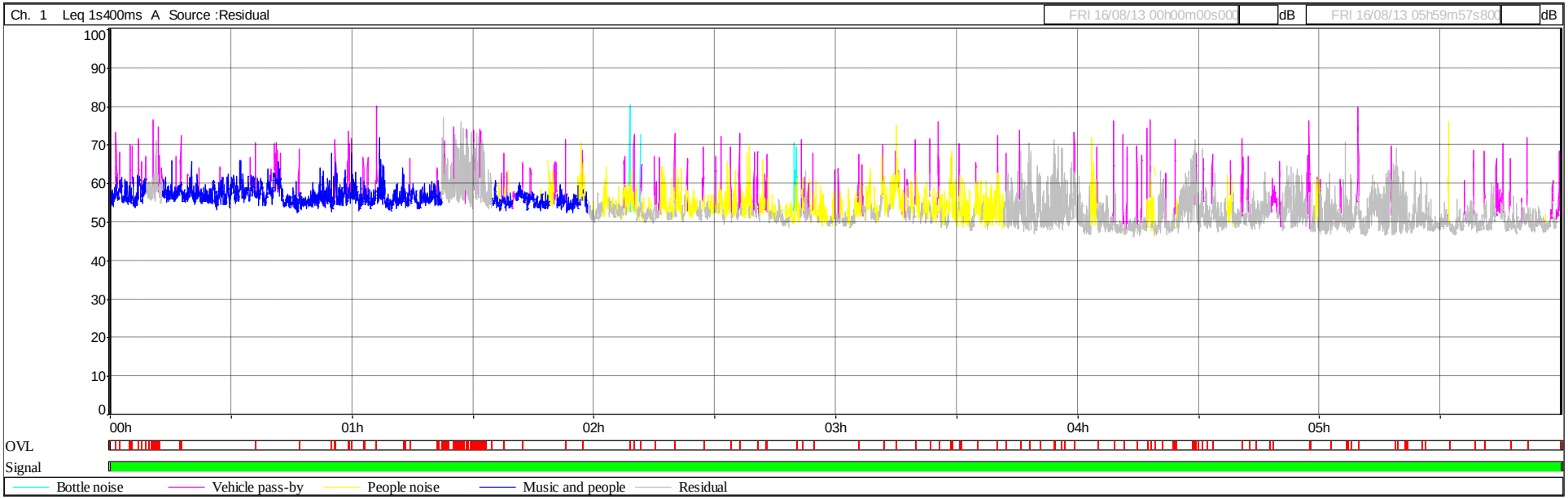


Hourly Incidence – Thur-Fri			
Source	Bottle tipping	Vehicle pass-by	People noise
Period start	Count	Count	Count
00:00	0	31	5
01:00	0	21	25
02:00	4	21	66
03:00	0	18	54
04:00	0	22	44
05:00	0	19	15
Overall	4	132	209

Thur-Fri	Count	L_{A90}	L_{Aeq}	L_{A10}	L_{A1}	L_{Amax}	Duration
Bottle noise	4	52	67	66	80	85	00:00:51:900
Vehicle pass-by	132	52	64	66	75	88	00:34:50:100
People noise	209	50	56	58	65	86	01:06:37:100
Music and people	Midnight to 2.00 am	54	57	59	63	77	01:30:32:800
Residual	**Midnight to 6.00 am - main source of data 3.00 am to 6.00 am**	**48**	56	57	67	83	02:47:08:100

Figure 3 - Thursday night - Friday morning

Figure 4 - 16 -17 August 2013 - Thursday Night - Friday Morning



3. 17 August – Friday night Saturday morning

Vehicle pass-bys in Woolmonger Street are a significant noise source and have been coded separately. There are perhaps other vehicle noise contributions from more distant vehicle sources but these are not readily identifiable and are not considered significant in relation to the other sources. Accordingly they will have been included in the other measurements.

Noise from people in the street is also significant at times producing loud, sporadic incidents.

Between midnight and 3.50 am, the ambient noise is characterised by vehicle pass-bys, people noise and a melange of bass music and indistinct voices. After 3.50 am the music is no longer apparent and there is continued activity in the streets than the night before tapering off until 5.30 am, similar to the night before. There is a particularly significant incident involving a number of people that appear to be in close proximity to the receiver around 4.45 am. The majority of people noise events take place around midnight and 4.00 am.

Music noise becomes more intrusive between 2.30 am and 3.50 am.

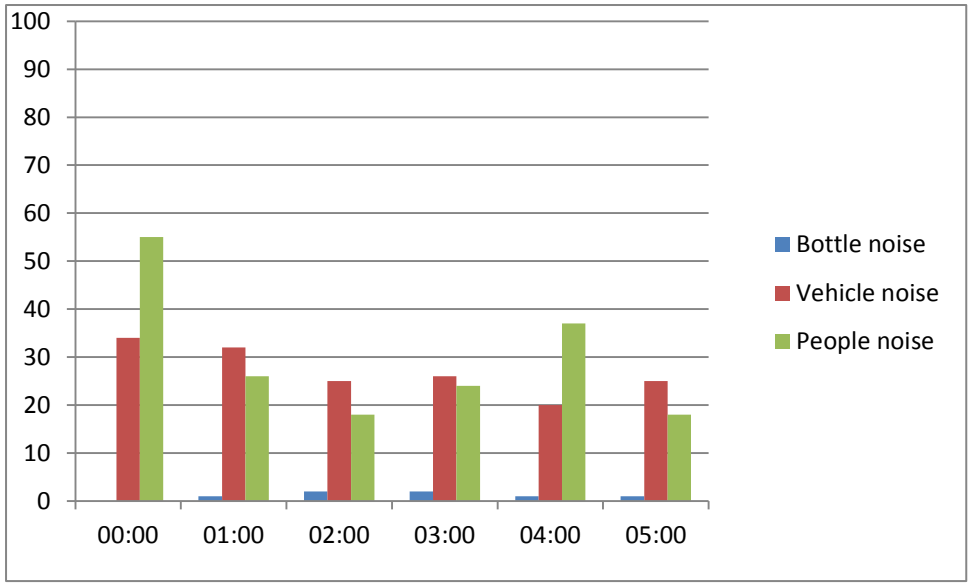
Seven incidents of empty bottles being tipped were noted between midnight and 6.00 am.

On the time history below;

- the pink peaks are traffic pass-bys
- the yellow peaks are due to people close by speaking loudly or shouting etc.
- the dark blue is the period affected by music and general people noise
- the grey is the residual noise where no obvious activity from bars or people has been noted
- the light blue is due to bottle tipping

The people noise aspect of the recording falls into two character types.

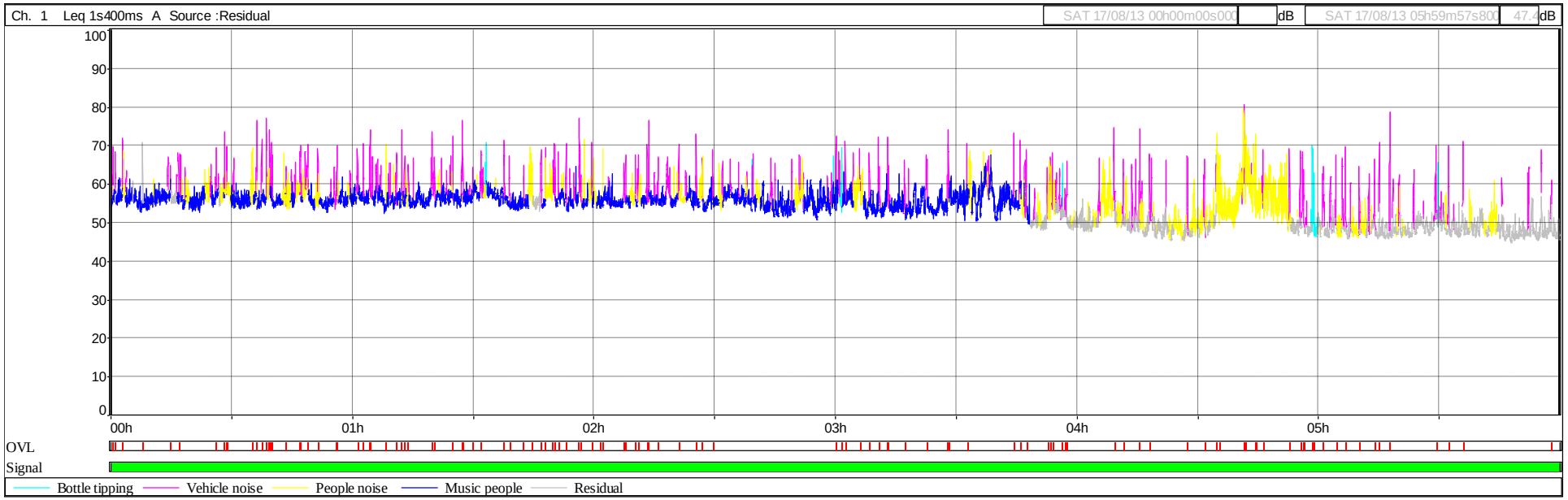
- Before 4.00 am it is quite ubiquitous, is indistinct and appears to be from sources not in the immediate vicinity of the receiver and are too indistinct and numerous to be identified individually. There are times, however, where the people noise seems to be in close proximity to the receiver and are judged to be intrusive in their own right; these have been coded as “People noise” events.
- After 4.00 am the music is no longer apparent and the general susurration of voices observed earlier has gone but there is a noticeable increase in the occurrence and intrusiveness of people noise incidents.



Hourly Incidence – Fri - Sat			
Source	Bottle tipping	Vehicle noise	People noise
Period start	Count	Count	Count
00:00	0	34	55
01:00	1	32	26
02:00	2	25	18
03:00	2	26	24
04:00	1	20	37
05:00	1	25	18
Overall	7	162	178

Fri-Sat	Count	L_{A90}	L_{Aeq}	L_{A10}	L_{A1}	L_{Amax}	Duration
Source		dB	dB	dB	dB	dB	h:m:s:ms
Bottle tipping	7	47	60	60	72	79	00:03:01:800
Vehicle noise	162	52	62	64	72	87	00:56:41:900
People noise	178	48	59	60	68	84	01:13:28:300
Music people	Midnight to 3.50 am	53	56	58	62	71	02:34:15:300
Residual	**Midnight to 6.00 am - main source of data 4.00 am to 6.00 am**	**46**	50	52	57	75	01:12:32:700

Figure 5 – 17 – 18 August – Friday night Saturday morning



4. 18 August –Saturday - Sunday morning

Vehicle pass-bys in Woolmonger Street are a significant noise source and have been coded separately. There are perhaps other vehicle noise contributions from more distant vehicle sources but these are not readily identifiable and are not considered significant in relation to the other sources. Accordingly they will have been included in the other measurements.

Noise from people in the street is also significant at times producing loud, sporadic incidents.

Between midnight and 4.00 am, the ambient noise is characterised by vehicle pass-bys, people noise and a melange of bass music and indistinct voices. After 4.00 am the music is no longer apparent and there is continued activity in the streets before tapering off until 6.00 am, similar to the night before.

Music noise becomes more intrusive between 2.30 am and 4.00 am.

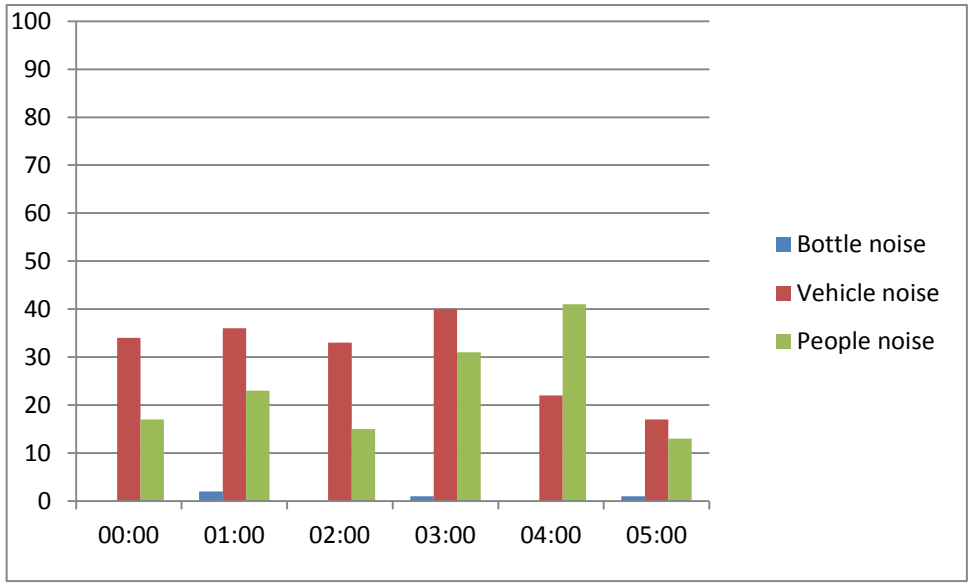
Four incidents of empty bottles being tipped were noted between midnight and 6.00 am.

On the time history below;

- the pink peaks are traffic pass-bys
- the yellow peaks are due to people close by speaking loudly or shouting etc.
- the dark blue is the period affected by music and general people noise
- the grey is the residual noise where no obvious activity from bars or people has been noted
- the light blue is due to bottle tipping

The people noise aspect of the recording falls into two character types.

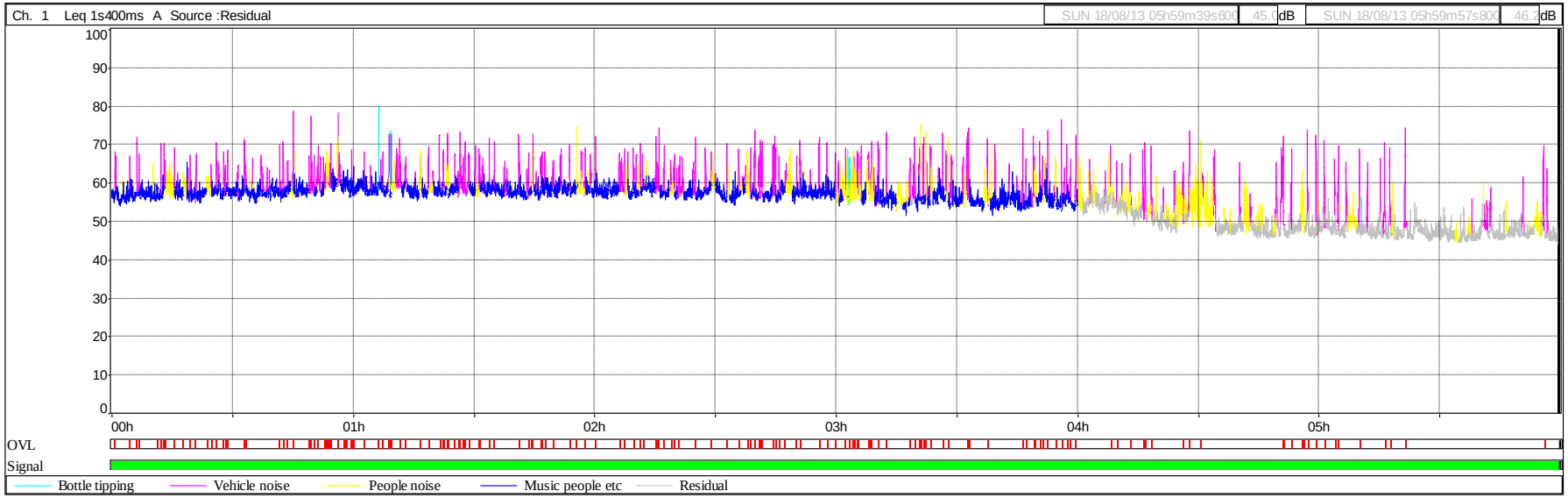
- Before 4.00 am it is quite ubiquitous, is indistinct and appears to be from sources not in the immediate vicinity of the receiver and are too indistinct and numerous to be identified individually. There are times, however, where the people noise seems to be in close proximity to the receiver and are judged to be intrusive in their own right; these have been coded as “People noise” events.
- After 4.00 am the music is no longer apparent and the general susurration of voices observed earlier has gone but there is a noticeable increase in the occurrence and intrusiveness of people noise incidents.



Hourly Incidence – Sat - Sun			
Source	Bottle tipping	Vehicle noise	People noise
Period start	Count	Count	Count
00:00	0	34	17
01:00	2	36	23
02:00	0	33	15
03:00	1	40	31
04:00	0	22	41
05:00	1	17	13
Overall	4	182	140

Sat - Sun	Count	L_{A90}	L_{Aeq}	L_{A10}	L_{A1}	L_{Amax}	Duration
Source		dB	dB	dB	dB	dB	h:m:s:ms
Bottle tipping	4	53	67	69	80	85	00:00:55:400
Vehicle noise	182	53	63	65	72	83	01:14:08:100
People noise	140	48	58	60	67	82	00:56:26:700
Music people etc	Midnight to 4.00 am	55	58	59	62	74	02:30:53:300
Residual	**Midnight to 6.00 am - main source of data 4.00 am to 6.00 am**	**46**	50	53	57	63	01:17:36:500

Figure 6 - 18 August - Saturday Night - Sunday Morning



5. 19 August – Sunday night – Monday morning

Vehicle pass-bys in Woolmonger Street are a significant noise source and have been coded separately. It is noted that the number of vehicle movements is significantly reduced, compare with other nights. There are perhaps other vehicle noise contributions from more distant vehicle sources but these are not readily identifiable and are not considered significant in relation to the other sources. Accordingly they will have been included in the other measurements.

Apart from four minor incidents just after midnight, there was no noise from people in the street detected although some minor incidents might have been masked by noise within the flat. It is understood that the occupant of the flat works nights from time to time.

No music noise was detected on this occasion

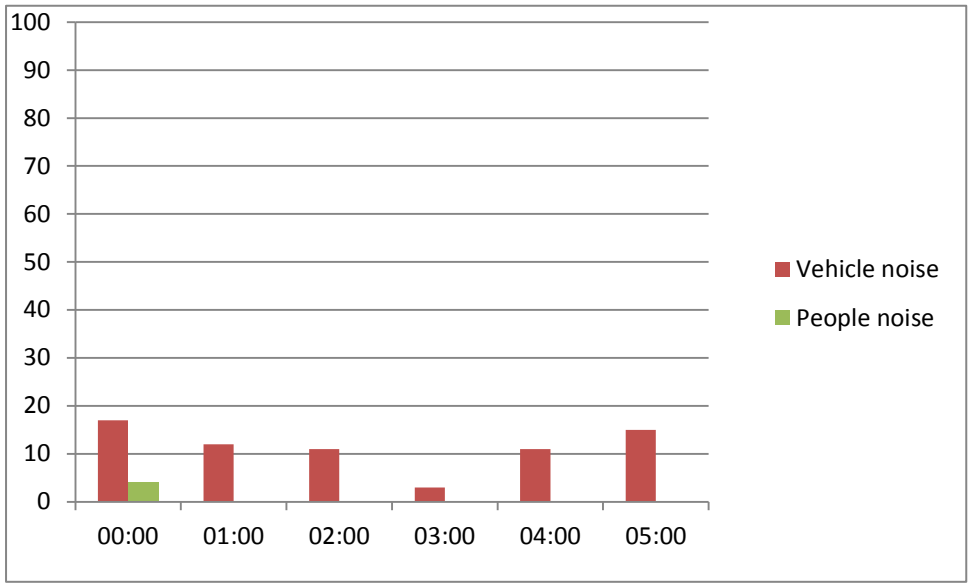
No incidents of empty bottles being tipped were noted between midnight and 6.00 am.

Unfortunately, the occupant of the flat where the survey was carried out chose to watch Lord of the Rings overnight and the noise from the TV is dominant for much of the survey period.

There are probably few venues very active or even trading on Sunday night into Monday morning and this would account for the reduced activity in the area observed during this period.

On the time history below;

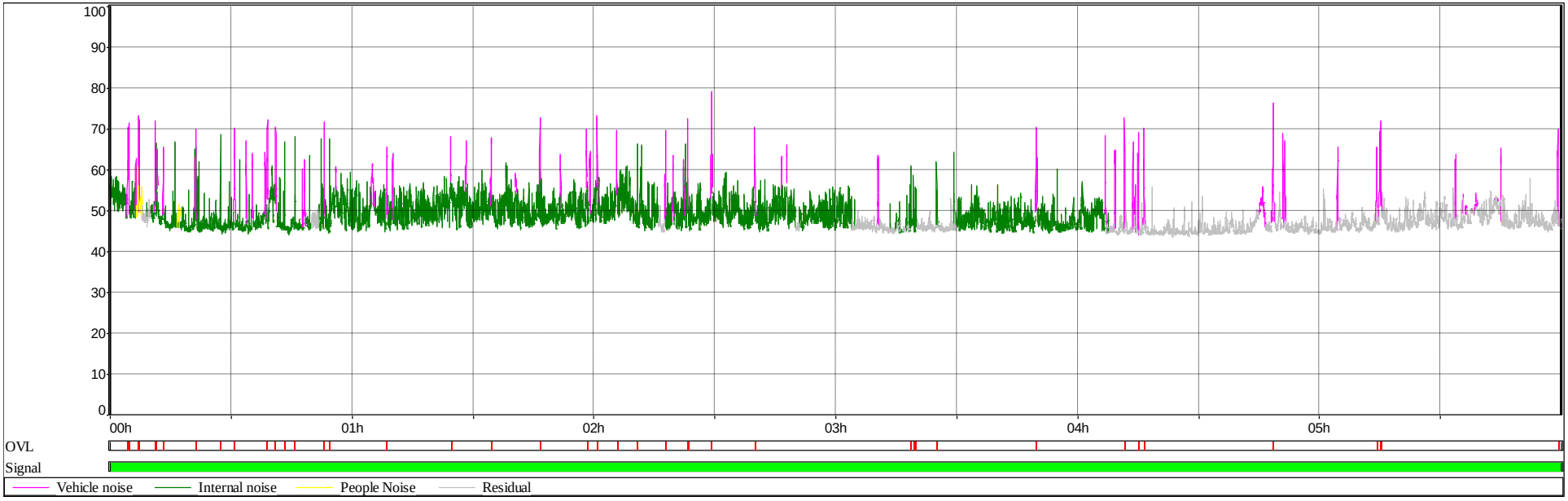
- the pink peaks are traffic pass-bys
- the yellow peaks are due to people close by speaking loudly or shouting etc.
- the dark green is the period affected by noise in the flat
- the grey is the residual noise where no obvious activity from bars or people has been noted



Hourly Incidence – Sun - Mon		
Source	Vehicle noise	People Noise
Period start	Count	Count
00:00	17	4
01:00	12	0
02:00	11	0
03:00	3	0
04:00	11	0
05:00	15	0
Overall	69	4

Sun - Mon	Count	L_{A90}	L_{Aeq}	L_{A10}	L_{A1}	L_{Amax}	Duration
Source		dB	dB	dB	dB	dB	h:m:s:ms
Vehicle noise	69	48	61	63	71	86	00:22:38:000
People Noise	4	47	52	54	63	67	00:01:25:000
Residual	Midnight to 6.00 am	45	47	49	53	65	02:09:51:400

Figure 7 - Sunday - Monday



Consolidated results

Bottle tipping	Count	L_{A90}	L_{Aeq}	L_{A10}	L_{A1}	L_{Amax}	Duration
Wed-Thur	4	52	67	66	80	85	00:00:51:900
Thur - Fri	67	85	4	52	66	80	00:00:51:900
Fri-Sat	7	47	60	60	72	79	00:03:01:800
Sat-Sun	4	53	67	69	80	85	00:00:55:400
Sun Mon	0	NA	NA	NA	NA	NA	NA

Vehicle pass-by	Count	L_{A90}	L_{Aeq}	L_{A10}	L_{A1}	L_{Amax}	Duration
Wed-Thur	90	48	59	61	71	85	00:49:47:000
Thur - Fri	132	52	64	66	75	88	00:34:50:100
Fri-Sat	162	52	62	64	72	87	00:56:41:900
Sat-Sun	182	53	63	65	72	83	01:14:08:100
Sun Mon	69	48	61	63	71	86	00:22:38:000

People noise	Count	L_{A90}	L_{Aeq}	L_{A10}	L_{A1}	L_{Amax}	Duration
Wed-Thur	68	47	56	58	67	73	00:23:07:700
Thur - Fri	209	50	56	58	65	86	01:06:37:100
Fri-Sat	178	48	59	60	68	84	01:13:28:300
Sat-Sun	140	48	58	60	67	82	00:56:26:700
Sun Mon	4	47	52	54	63	67	00:01:25:000

Music and People	L_{A90}	L_{Aeq}	L_{A10}	L_{A1}	L_{Amax}		
Wed-Thur	48	51	53	56	65	02:31:36:900	
Thur - Fri	54	57	59	63	77	01:30:32:800	
Fri-Sat	53	56	58	62	71	02:34:15:300	
Sat-Sun	55	58	59	62	74	02:30:53:300	
Sun Mon	NA	NA	NA	NA	NA	NA	

Residual	L_{A90}	L_{Aeq}	L_{A10}	L_{A1}	L_{Amax}
Wed-Thur	46	49	51	54	69
Thur - Fri	48	56	57	67	83
Fri-Sat	46	50	52	57	75
Sat-Sun	46	50	53	57	63
Sun Mon	45	47	49	53	65

Source	Bottle tipping	Vehicle pass-by	People noise
Wed-Thur	11	90	68
Thur - Fri	4	132	209
Fri-Sat	7	162	178
Sat-Sun	4	182	140
Sun Mon	0	69	4

1. Annex

	Standard description	Possible objective effect	Subjective impression
Increasing severity ↓	Noise inaudible		
	Noise barely audible	Check Frequency content	Noise is difficult to make out.
	Noise audible	≡ Residual ≤ 3dB increase	Noise is definitely there but it is difficult to distinguish by measurement from the residual Bass and beat only?
	Noise clearly audible	Residual +5 dB	Noise is clearly audible and is having a noticeable effect on the residual levels. Bass, beat and vocals – may be able to identify songs.
	Noise intrusive	Residual + 10 dB	Noise excludes a lot of the residual noise. Bass, beat and vocals – songs easily identified.
	Noise dominant	Residual +20 dB	Noise excludes all other residual noise, may be heavy bass with induced resonance effects affecting windows and ornaments etc.

Ambient Noise

Noise from all sources both near and far. It is usually defined in terms of $\mathbf{L_{Aeq,T}}$.

$\mathbf{L_{eq,T}}$

The equivalent continuous level. The sound pressure level of a continuous, steady sound that, within a specified time interval T, has the same mean square sound pressure as a sound under consideration whose level varies with time.

Specific Noise

The noise under investigation. It is usually defined in terms of $L_{Aeq,T}$. When defined as part of a **BS 4142** assessment it may be penalised by adding 5 dB to produce a **Rating Level**. In other circumstances, where no set procedure has been laid down, judgement must be used to determine an appropriate descriptor. For example music, which may have an impulsive quality in the bass beat, the $\mathbf{L_{10}}$ or the $\mathbf{L_1}$ as an **A-weighted level,** or as a level in a particular **Octave** or **Third Octave band,** may be a more appropriate guide to the intrusiveness of the noise.

Residual Noise

This is the **ambient noise** in the absence of the **Specific Noise.**

Background Noise

This is a particular description of the **Residual Noise**. It is defined as the level that is exceeded for 90% of the time and denoted $\mathbf{L_{90}}$.

The terms **Ambient Noise** and **Background Noise** cannot, therefore, be interchanged

$\mathbf{L_{n,T}}$

The **n** subscript denotes the percentage of the time that the following noise level is exceeded for the time **T**. Therefore, $\mathbf{L_{90,10\ minutes}}$ 30 dB means that the noise level at a given location for ten minutes exceeded 30 dB for 90% of the time.

A-weighted level

The human ear does not respond equally to all frequencies. The difference in these responses will also vary depending on how loud a noise is. At quiet listening levels it is more sensitive to frequencies associated with speech than low or high frequencies. As the volume increases the sensitivity to the range of frequencies becomes more even until at levels associated with loud Discos the response is linear.

In order to provide a single-figure measurement of a noise that takes into account the frequency content, a sound level meter can apply a weighting. There are several weightings that might be applied, depending on the noise level, but historically, the **A-weighting** has come to be the one most commonly used.

Loudness

This is a subjective assessment of noise. How loud a noise sounds does not always correlate well with its **A-weighted** level. This because an **A-weighed** figure does not accurately represent noise if, for example, it has a large amount of energy around a particular frequency, e.g. the bass beat from music or the whine of a circular saw.

How intrusive a noise is will depend on the differences between it and the residual noise. The factors that make it different are its frequency content, its character, how much louder it is than the residual and the absolute noise levels in a given situation. In a quiet environment the noise level difference between the specific noise and the residual noise could be much more significant than the same difference at high noise levels.

Reference Noise levels

World Health Organisation, WHO 1999

Internal steady noise levels

Daytime – L_{Aeq} 35 dB

Night L_{Aeq} 30 dB

Peak levels at night – noise levels should exceed L_{Amax} 45 dB as little as possible

Night Noise offence – between the hours of 23:00 and 07:00

The type of noise that this applies to is not defined and could apply to music, banging shouting, subject to the constraints below.

The permitted level is now set at L_{Aeq},5 min 34 dB if the underlying level of noise is no more than (L_{A90}?) 24 dBA, or 10 dBA above the underlying level of noise where this exceeds 24 dBA. Extraneous noises can be "paused out" of the measurement but the $L_{Aeq,5min}$ must be obtained within a 15 minute window.

This is measured in the receiving room with the windows shut at least 0.5 m from any wall.

If the noise is music and "continuous", then the underlying level of noise can be obtained by the use of a statistical parameter (such as $L_{A99.8,\ 5min}$, $L_{A99.5,\ 2min}$ or $L_{A99,\ 1min}$) as a proxy for the underlying level of noise.

Low Frequency Noise

The table below contains the low frequency noise threshold from various countries and well as those given by Defra.

1/3-oct centre freq, Hz	25	31.5	40	50	63	80	100
German DIN 45680 curve - sum any exceedences in the bands and compare with limit of 25 dB	63	55.5	48	40.5	33.5	33	33.5

	International Thresholds						
	Germany	Denmark	Sweden	Poland	Netherlands	ISO	DEFRA
8	103						
10	95	90.4		80.4			92
12.5	87	83.4		73.4			87
16	79	76.7		66.7			83
20	71	70.5		60.5	74	78.5	74
25	63	64.7		54.7	64	68.7	64
31.5	55.5	59.4	56	49.3	55	59.5	56
40	48	54.6	49	44.6	46	51.1	49
50	40.5	50.2	43	40.2	39	44	43
63	33.5	46.2	41.5	36.2	33	37.5	42
80	33	42.5	40	32.5	27	31.5	40
100	33.5	39.1	38	29.1	22	26.5	38
125		36.1	36	26.1		22.1	36
160		33.4	34	23.4		17.9	34
200			32	20.9		14.4	
250				18.6		11.4	
315							