



# Sanctuary Acoustics

Acoustic Consultancy

**NOISE ASSESSMENT FOR  
ROSCONN GROUP**

**A NOISE ASSESSMENT CONDUCTED AS  
PART OF A PROSPECTIVE PLANNING  
PROPOSAL  
TO  
DEVELOP LAND  
ADJACENT TO  
STATION ROAD & THE M40 MOTORWAY,  
HATTON**

**DOCUMENT 001  
REVISION 1**

**BY**

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## EXECUTIVE SUMMARY

Sanctuary Acoustics was asked by Mr Nick Carr of Rosconn Group to assess the existing noise environment on the land either side of Station Road, Hatton which is also adjacent to the M40 motorway. The noise survey is required as part of a planning proposal to potentially develop the land for residential use.

To summarise:

1. Noise measurements were undertaken on Station Road which separates the two potential sites in Hatton.
2. Noise measurements were taken on Thursday November 14<sup>th</sup> at 1-hour intervals over a 3 hour period from 10am to 1pm in accordance with the shortened method of the Calculation of Road Traffic Noise (CRTN) and again at 11pm finishing at 2am on Friday November 15<sup>th</sup> to measure night-time noise levels at location 1 during the most significant time for road traffic noise during the night-time period (11pm to 7am).
3. The noise measurements were referenced to the National Planning Policy Framework (NPPF) & the former Planning Policy Guidance (PPG) 24: Planning and Noise. Further reference was also made to BS 8233:1999 Sound Insulation and Noise Reduction for Buildings – Code of Practice and the Calculation of Road Traffic Noise (CRTN).
4. In reference to PPG24, the potential sites either side of Station Road which is in proximity to the M40 motorway has been calculated as having a Planning Policy Guidance 24, Noise Exposure Category C due to traffic noise levels from the M40 motorway both day and night.
5. NEC C states that *'Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.'*
6. PPG24 recommended internal noise levels in bedrooms of 35dB L<sub>Aeq</sub> while BS 8233 recommends a good design range in bedrooms and Living Rooms of 30dB L<sub>Aeq</sub> and a reasonable design range of 35dB L<sub>Aeq</sub> for Bedrooms and 40dB L<sub>Aeq</sub> for Living Rooms.
7. It is recommended that non-habitable rooms within dwellings such as bathrooms, toilets, shower rooms, standalone kitchens, airing cupboards and circulation spaces such as hallways, landings and stairs are positioned towards the motorway façade with habitable rooms such as bedrooms, living rooms, lounges, dining rooms and kitchen/diners positioned facing north away from the motorway and towards the centre of the development.
8. As this site has been allocated a Noise Exposure Category C, it should not be considered suitable for development if there is an alternative quieter site within the vicinity that would achieve an improved Noise Exposure Category A or B.
9. Should a more suitable site not be available then the following methods for mitigation would be required in items 10 through to 12 to provide an adequate level of amenity.
10. Suitable glazing types, including 6.4lam/12/6 double glazing and 6/150/6 secondary glazed units have been modelled using the Marshall Day Acoustics Sound Insulation Prediction Software, *Insul*. Double leaf brick and single leaf brick + single leaf concrete block either side of a 100mm cavity has also been modelled.
11. It is recommended that the glazing at the motorway façade is fixed and should achieve a Weighted Sound Reduction Index, R<sub>w</sub> 30dB to reduce noise

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transfer throughout the rest of the house. Were ventilation by forced, mechanical or trickle means is required the rating should be a minimum  $D_{n,e,w}$  30dB.

12. To achieve a BS 8233 Reasonable Design Range for internal noise levels,  $L_{Aeq}$ , in Bedrooms and Living Rooms when unoccupied, the glazing for Bedrooms should achieve a minimum  $R_w$  40dB and a minimum  $R_w$  35dB for Living Rooms. Similarly ventilation should also be a minimum  $D_{n,e,w}$  40dB and  $D_{n,e,w}$  35dB respectively. The glazing for these habitable rooms should either be fixed or secondary glazed which would also provide the same attenuation requirements but with the secondary glazing it still gives the owner/occupier the choice of natural airflow through open windows or vented airflow depending on their own subjective perception to the motorway traffic.

## 1. INTRODUCTION

Sanctuary Acoustics was asked by Mr Nick Carr of Rosconn Group to assess the existing noise environment on the land either side of Station Road, Hatton which is also adjacent to the M40 motorway. The noise survey is required as part of a planning proposal to potentially develop the land for residential use.

The primary noise source currently impinging on the site is road traffic noise from the M40 motorway which remains consistent throughout the day with a high volume of vehicles comprising of cars, vans, HGV's, motorbikes and coaches. During the night-time period traffic volume was noted to decrease even though traffic remained fairly consistent.

Noise is covered, although briefly, in the new National Planning Policy Framework (NPPF) which states that the planning system should contribute to and enhance the natural and local environment.

Planning policies and decisions should;

- aim to avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from the new development, including through the use of conditions;
- recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established;
- identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

The Department for the Environment, Food and Rural Affairs have issued an explanatory note to the *Noise Policy Statement for England (NPSE)* which states that the long term vision of Government noise policy is to “*promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.*”

The NPPF guidance however gives no objective, tangible standards or criteria to inform planning decisions in respect to noise. The framework does quote existing guidance to make reference to including *WHO* guidelines and *BS 8233: 1999 Sound insulation and noise reduction for buildings – Code of practice*. The previous guidance repealed in March 2012, *Planning Policy Guidance 24 (PPG24)*, is still often referred to as it can quantify the exposure of a site to noise with regard to residential development.

Furthermore, when the primary noise source is road traffic derived, a shortened method inline with the *Calculation of Road Traffic Noise (CRTN)* is also deemed acceptable to quantify noise and is referred to within the auspices of both *BS 8233* and *PPG24* and its measurement criteria. This method proves valuable as it is often difficult to find a secure location in which to leave noise monitoring equipment unmanned over a continuous 24 hour period or enable identification of specific noise sources.

Applicable guidance divides the 24 hour period into daytime and night-time segments with the daytime period from 07:00 to 23:00 hours and night-time from 23:00 to

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07:00. The CRTN provides a shortened method to ascertain the  $L_{Aeq(16-hour)}$  which requires the  $L_{A10}$  parameter to be measured over three consecutive 1-hour periods between the hours of 10:00 and 17:00 with the three 1-hour measurements arithmetically averaged to provide an assumed  $L_{A10(3-hour)}$ . 1dB is subtracted from the  $L_{A10(3-hour)}$  to produce the  $L_{A10(18-hour)}$ , a further 2dB is subtracted from this  $L_{A10(18-hour)}$  to provide the  $L_{Aeq(16-hour)}$  which equates to the 16 hour daytime period, 07:00 to 23:00.

The main concern for noise has been highlighted as road traffic noise which was confirmed during the noise survey. Traffic flow on the M40 was consistent throughout the day and into the night.

The noise measurement location was chosen to assess noise impinging onto the proposed site.

The measurement durations were as follows; 1-hour noise measurement period between 10am to 11am was conducted with two further 1-hour measurement periods between 11am to 12pm and 12pm to 1pm. As the results show the noise level remains consistent throughout the day. A further three 1-hour measurements from 11pm to 12am, 12am to 1am and 1am to 2am were also undertaken at the same measurement location. Traffic derived noise in areas where it is dominant through the night-time tends to be at its peak between 11pm to 2am and 4am to 7am with the mid-point around 3am being the quietest. Typically traffic noise dominated sites can decrease by as much as 10dB at night-time compared to day.

In order to assess the existing noise environment, the following were investigated:

- Vehicle noise impinging onto the site was assessed from the M40.
- The proposed glazing, façade construction, ventilation methods and room layout at the M40 façade.

The noise measurements taken at the locations were undertaken using a Norsonics 132 Sound Level Meter (Serial Number 1322854) which was calibrated before and after the noise measurements were taken using a Cirrus CR:514 Acoustic Calibrator (Serial Number 60242). Both items of equipment have traceable calibration certificates and are designated as Type 2 instruments which are inline with IEC 60651 & 60804 and IEC 60942 respectively. The Sound Level Meter was mounted on a tri-pod 1.5m above ground level and at least 3.5m from external facades to avoid reflections. The acoustic parameters are detailed at the end of this report in Annex A.

## 2. MEASUREMENTS AND OBSERVATIONS

The six measurements covering both daytime and night-time measurement periods took place during Thursday November 14<sup>th</sup> and Friday November 15<sup>th</sup> 2013. Three 1-hour measurements were conducted between 10am to 11am, 11am to 12pm and 12pm to 1pm at location 1 with a further three 1-hour measurements from 11pm to 12am, 12am to 1am and 1am to 2am also at location 1.

It was noted that road traffic noise was the main noise source impinging onto the site from the M40 motorway.

For each of the six measurements the observations and results are detailed in tabular form including descriptions of the weather conditions and pictorial location.

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A glossary of the acoustic parameters/terms used can be found in Annex A.

Figure 1 depicts the measurement at location 1 at the foot of the road separating the two potential sites. The western site corner is beyond the fence with the M40 motorway in the far ground beyond the trees.



Figure 1: This depicts the location of Measurement Location 1 facing west with the M40 beyond the trees.

The noise results obtained for measurement 1 at the location depicted in the above figure 1 are detailed in table 1.

Location	1. End of Station Road, Hatton. Measurement location close to the M40 Motorway which runs across and in front of the measurement location with the two potential competing development sites on either side of the measurement location.
Time & Duration	10:00 – 11:00 1 Hour Measurement November 14 <sup>th</sup>
Weather & Site Conditions/Observations	Partly cloudy sky with broken sunshine, 8 <sup>o</sup> C, no perceived wind Site Conditions – Consistent traffic flow on M40 motorway, cars, vans, coaches, HGV's and motorbikes. Some occasional birdsong. Vehicle on M40 provides 71.7dB L <sub>Amax</sub> during 59 <sup>th</sup> minute.
<b>Measurement Parameter</b>	<b>Measurement Reading</b>
L <sub>Aeq</sub>	67.5dB(A)
L <sub>A10</sub>	68.8dB(A)
L <sub>Amin</sub>	61.2dB(A)
L <sub>Amax</sub>	71.7dB(A)
L <sub>A90</sub>	65.6dB(A)

Table 1: The results taken at Measurement Location 1 for 10am to 11am

Table 2 details the 1/1 octave band measurements for the measurement.

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Location	1. End of Station Road, Hatton. Measurement location close to the M40 Motorway which runs across and in front of the measurement location with the two potential competing development sites on either side of the measurement location.							
Time & Duration	10:00 – 11:00 1 Hour Measurement November 14 <sup>th</sup>							
Site Conditions or Observations	Partly cloudy sky with broken sunshine, 8 <sup>o</sup> C, no perceived wind Site Conditions – Consistent traffic flow on M40 motorway, cars, vans, coaches, HGV's and motorbikes. Some occasional birdsong. Vehicle on M40 provides 71.7dB L <sub>Amax</sub> during 59 <sup>th</sup> minute.							
Measurement Parameter	<b>Frequency (Hz) Octave Bands</b>							
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
L <sub>eq</sub> (Ambient Level)	68.9	62.7	51.7	56.6	61.9	50.3	41.2	28.9
L <sub>max</sub> (Maximum Level)	84.9	80.7	65.2	64.5	67.7	56.9	61.0	56.7
L <sub>90</sub> (Background Level)	62.9	58.5	47.9	53.6	59.8	48.0	37.7	22.8

Table 2: The 1/1 Octave Band Data taken at Measurement Location 1 for 10am to 11am

The noise results obtained for measurement 2 at location 1 are detailed in table 3.

Location	1. End of Station Road, Hatton. Measurement location close to the M40 Motorway which runs across and in front of the measurement location with the two potential competing development sites on either side of the measurement location.
Time & Duration	11:00 – 12:00 1 Hour Measurement November 14 <sup>th</sup>
Weather & Site Conditions/Observations	Partly cloudy sky with broken sunshine, 9 <sup>o</sup> C, light occasional breezes with gusts up to 4.5km/h Site Conditions – Consistent traffic flow on M40 motorway, cars, vans, coaches, HGV's and motorbikes. Some occasional birdsong. Vehicle on M40 provides 74.4dB L <sub>Amax</sub> during 55 <sup>th</sup> minute.
<b>Measurement Parameter</b>	<b>Measurement Reading</b>
L <sub>Aeq</sub>	67.8dB(A)
L <sub>A10</sub>	69.2dB(A)
L <sub>Amin</sub>	62.7dB(A)
L <sub>Amax</sub>	74.4dB(A)
L <sub>A90</sub>	66.1dB(A)

Table 3: The results taken for Measurement 2 at Location 1 for 11am to 12pm

Table 4 details the 1/1 octave band measurements for this measurement.

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Location	1. End of Station Road, Hatton. Measurement location close to the M40 Motorway which runs across and in front of the measurement location with the two potential competing development sites on either side of the measurement location.							
Time & Duration	11:00 – 12:00 1 Hour Measurement November 14 <sup>th</sup>							
Site Conditions or Observations	Partly cloudy sky with broken sunshine, 9 <sup>o</sup> C, light occasional breezes with gusts up to 4.5km/h Site Conditions – Consistent traffic flow on M40 motorway, cars, vans, coaches, HGV's and motorbikes. Some occasional birdsong. Vehicle on M40 provides 74.4dB L <sub>Amax</sub> during 55 <sup>th</sup> minute.							
Measurement Parameter	<b>Frequency (Hz) Octave Bands</b>							
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
L <sub>eq</sub> (Ambient Level)	69.6	62.7	52.3	57.5	62.3	50.2	42.6	33.9
L <sub>max</sub> (Maximum Level)	85.3	80.7	62.8	65.7	69.7	57.8	72.7	67.0
L <sub>90</sub> (Background Level)	63.8	58.7	48.9	54.7	60.2	48.2	37.0	22.2

Table 4: The 1/1 Octave Band Data taken at Measurement Location 1 for 11am to 12pm

The noise results obtained for the third measurement at location 1 are detailed in table 5.

Location	1. End of Station Road, Hatton. Measurement location close to the M40 Motorway which runs across and in front of the measurement location with the two potential competing development sites on either side of the measurement location.
Time & Duration	12:00 – 13:00 1 Hour Measurement November 14 <sup>th</sup>
Weather & Site Conditions/Observations	Partly cloudy sky with broken sunshine, 9 <sup>o</sup> C, light occasional breezes with gusts up to 1.4km/h Site Conditions – Consistent traffic flow on M40 motorway, cars, vans, coaches, HGV's and motorbikes. Some occasional birdsong. Vehicle on M40 provides 74.1dB L <sub>Amax</sub> during 9 <sup>th</sup> minute.
<b>Measurement Parameter</b>	<b>Measurement Reading</b>
L <sub>Aeq</sub>	68.2dB(A)
L <sub>A10</sub>	69.6dB(A)
L <sub>Amin</sub>	63.6dB(A)
L <sub>Amax</sub>	74.1dB(A)
L <sub>A90</sub>	66.5dB(A)

Table 5: The results taken at the measurement location 1 during 12pm to 1pm

Table 6 details the 1/1 octave band measurements for this measurement.



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Location	1. End of Station Road, Hatton. Measurement location close to the M40 Motorway which runs across and in front of the measurement location with the two potential competing development sites on either side of the measurement location.							
Time & Duration	12:00 – 13:00 1 Hour Measurement November 14 <sup>th</sup>							
Site Conditions or Observations	Partly cloudy sky with broken sunshine, 9 <sup>o</sup> C, light occasional breezes with gusts up to 1.4km/h Site Conditions – Consistent traffic flow on M40 motorway, cars, vans, coaches, HGV's and motorbikes. Some occasional birdsong. Vehicle on M40 provides 74.1dB L <sub>Amax</sub> during 9 <sup>th</sup> minute.							
Measurement Parameter	<b>Frequency (Hz) Octave Bands</b>							
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
L <sub>eq</sub> (Ambient Level)	69.3	62.5	52.7	57.9	62.9	50.4	39.6	26.3
L <sub>max</sub> (Maximum Level)	81.0	75.5	66.2	67.2	70.2	56.0	51.0	40.5
L <sub>90</sub> (Background Level)	64.1	58.6	49.4	55.2	60.7	48.4	36.6	21.8

Table 6: The 1/1 Octave Band Data taken at Measurement Location 1 for 12pm to 1pm

The noise results obtained for measurement 4 at location 1, the 1-hour night-time measurement between 11pm to 12am are detailed in table 7.

Location	1. End of Station Road, Hatton. Measurement location close to the M40 Motorway which runs across and in front of the measurement location with the two potential competing development sites on either side of the measurement location.
Time & Duration	23:00 – 00:00 1 Hour Measurement November 14 <sup>th</sup>
Weather & Site Conditions/Observations	Clear sky, 3 <sup>o</sup> C, no perceivable wind. Site Conditions – Consistent traffic flow on M40 motorway, cars, vans, coaches, HGV's and motorbikes. Vehicle on M40 provides 74.3dB L <sub>Amax</sub> during 25 <sup>th</sup> minute.
<b>Measurement Parameter</b>	<b>Measurement Reading</b>
L <sub>Aeq</sub>	65.9dB(A)
L <sub>A10</sub>	68.4dB(A)
L <sub>Amin</sub>	54.9dB(A)
L <sub>Amax</sub>	74.3dB(A)
L <sub>A90</sub>	61.9dB(A)

Table 7: The results taken at Measurement Location 1 for 11.00pm to 12am

Table 8 details the 1/1 octave band measurements for this measurement.

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Location	1. End of Station Road, Hatton. Measurement location close to the M40 Motorway which runs across and in front of the measurement location with the two potential competing development sites on either side of the measurement location.							
Time & Duration	23:00 – 00:00 1 Hour Measurement November 14 <sup>th</sup>							
Site Conditions or Observations	Clear sky, 3 <sup>o</sup> C, no perceivable wind. Site Conditions – Consistent traffic flow on M40 motorway, cars, vans, coaches, HGV's and motorbikes. Vehicle on M40 provides 74.3dB L <sub>Amax</sub> during 25 <sup>th</sup> minute.							
Measurement Parameter	<b>Frequency (Hz) Octave Bands</b>							
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
L <sub>eq</sub> (Ambient Level)	67.1	58.6	50.2	57.0	59.9	47.2	34.8	21.8
L <sub>max</sub> (Maximum Level)	82.2	76.4	61.7	67.6	69.7	58.1	53.1	44.0
L <sub>90</sub> (Background Level)	57.3	49.7	45.0	51.4	55.0	42.3	25.2	19.8

Table 8: The 1/1 Octave Band Data taken at Measurement Location 1 for 11pm to 12am

The noise results obtained for measurement 5 at location 1, the 1-hour night-time measurement between 12am to 1am are detailed in table 9.

Location	1. End of Station Road, Hatton. Measurement location close to the M40 Motorway which runs across and in front of the measurement location with the two potential competing development sites on either side of the measurement location.
Time & Duration	00:00 – 01:00 1 Hour Measurement November 15 <sup>th</sup>
Weather & Site Conditions/Observations	Clear sky, 0 <sup>o</sup> C, no perceivable wind. Site Conditions – Regular flow of traffic on M40 motorway, but a decrease in cars, vans, coaches with HGV's seeming more prominent. Vehicle on M40 provides 73.9dB L <sub>Amax</sub> during 2 <sup>nd</sup> minute.
<b>Measurement Parameter</b>	<b>Measurement Reading</b>
L <sub>Aeq</sub>	63.6dB(A)
L <sub>A10</sub>	66.6dB(A)
L <sub>Amin</sub>	51.1dB(A)
L <sub>Amax</sub>	73.9dB(A)
L <sub>A90</sub>	57.3dB(A)

Table 9: The results taken at Measurement Location 1 for 12am to 1am

Table 10 details the 1/1 octave band measurements for this measurement.

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Location	1. End of Station Road, Hatton. Measurement location close to the M40 Motorway which runs across and in front of the measurement location with the two potential competing development sites on either side of the measurement location.							
Time & Duration	00:00 – 01:00 1 Hour Measurement November 15 <sup>th</sup>							
Site Conditions or Observations	Clear sky, 0 <sup>o</sup> C, no perceivable wind. Site Conditions – Regular flow of traffic on M40 motorway, but a decrease in cars, vans, coaches with HGV's seeming more prominent. Vehicle on M40 provides 73.9dB L <sub>Amax</sub> during 2 <sup>nd</sup> minute.							
Measurement Parameter	<b>Frequency (Hz) Octave Bands</b>							
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
L <sub>eq</sub> (Ambient Level)	65.2	56.9	48.5	54.8	57.2	45.2	32.5	18.3
L <sub>max</sub> (Maximum Level)	79.1	71.6	59.3	65.3	69.6	58.2	49.9	37.9
L <sub>90</sub> (Background Level)	54.3	43.0	42.4	47.1	51.0	37.0	19.9	19.8

Table 10: The 1/1 Octave Band Data taken at Measurement Location 1 for 12am to 1am

The noise results obtained for measurement 6 at location 1, the 1-hour night-time measurement between 1am to 2am are detailed in table 11.

Location	1. End of Station Road, Hatton. Measurement location close to the M40 Motorway which runs across and in front of the measurement location with the two potential competing development sites on either side of the measurement location.
Time & Duration	01:00 – 02:00 1 Hour Measurement November 15 <sup>th</sup>
Weather & Site Conditions/Observations	Clear sky, 0 <sup>o</sup> C, no perceivable wind. Site Conditions – Regular flow of traffic on M40 motorway, but a decrease in cars, vans, coaches with HGV's seeming more prominent. Vehicle on M40 provides 76.0dB L <sub>Amax</sub> during 5 <sup>th</sup> minute.
<b>Measurement Parameter</b>	<b>Measurement Reading</b>
L <sub>Aeq</sub>	62.8dB(A)
L <sub>A10</sub>	65.9dB(A)
L <sub>Amin</sub>	48.5dB(A)
L <sub>Amax</sub>	76.0dB(A)
L <sub>A90</sub>	55.4dB(A)

Table 11: The results taken at Measurement Location 1 for 1am to 2am

Table 12 details the 1/1 octave band measurements for this measurement.

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Location	1. End of Station Road, Hatton. Measurement location close to the M40 Motorway which runs across and in front of the measurement location with the two potential competing development sites on either side of the measurement location.							
Time & Duration	01:00 – 02:00 1 Hour Measurement November 15 <sup>th</sup>							
Site Conditions or Observations	Clear sky, 0 <sup>o</sup> C, no perceivable wind. Site Conditions – Regular flow of traffic on M40 motorway, but a decrease in cars, vans, coaches with HGV's seeming more prominent. Vehicle on M40 provides 76.0dB L <sub>Amax</sub> during 5 <sup>th</sup> minute.							
Measurement Parameter	<b>Frequency (Hz) Octave Bands</b>							
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
L <sub>eq</sub> (Ambient Level)	66.3	56.6	48.3	54.8	56.4	43.9	31.8	18.9
L <sub>max</sub> (Maximum Level)	78.3	68.9	60.5	73.2	70.0	53.5	49.1	41.4
L <sub>90</sub> (Background Level)	56.0	43.7	41.0	46.0	48.0	34.5	19.9	19.8

Table 12: The 1/1 Octave Band Data taken at Measurement Location 1 for 1am to 2am

### 3. REFERENCE TO GUIDANCE

The previous guidance repealed in March 2012, Planning Policy Guidance 24 (PPG24), does still contain useful information and many local authorities are still referring to this guidance for reference purposes, although PPG24 did also make reference to other guidance such as BS 8233, CRTN and WHO guidance on sleep disturbance.

Planning Policy Guidance 24 categorised a site's suitability for residential development by its noise environment. Four noise exposure categories are used to describe the suitability of the proposed site and are labelled from A to D. Category A states the site is desirable from a noise perspective while category D would mean planning permission would normally be refused on grounds of noise.

Table 13 provides the complete description for all the categories.

NEC	
A	Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as a desirable level.
B	Noise should be taken into account when determining planning applications and where appropriate, conditions imposed to ensure an adequate level of protection against noise.
C	Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.
D	Planning permission should normally be refused.

Table 13: Description of Noise Exposure Categories

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The noise levels and the range of noise associated with these noise categories are detailed in table 14.

Noise Levels Corresponding to the Noise Exposure Categories for New Dwellings				
$L_{Aeq,T}$ dB				
Noise Source	Noise Exposure Category			
	A	B	C	D
Road Traffic				
07.00 – 23.00	<55	55 – 63	63 – 72	>72
23.00 – 07.00	<45	45 – 57	57 - 66	>66
Rail Traffic				
07.00 – 23.00	<55	55 – 66	66 – 74	>74
23.00 – 07.00	<45	45 – 59	59 – 66	>66
Mixed Sources				
07.00 – 23.00	<55	55 – 63	63 – 72	>72
23.00 – 07.00	<45	45 – 57	57 - 66	>66

Table 14: Noise Exposure Categories by Equivalent Continuous Noise Levels  $L_{Aeq,T}$

Road traffic noise is the primary and therefore dominant noise source within the vicinity outweighing any noise produced by any other source. Table 10 details the noise values for the road traffic category which are the same as the mixed source category.

The Calculation of Road Traffic Noise (CRTN) as stated in the Introduction provides for a shortened method which requires that the measured  $L_{A10}$  noise levels undertaken over three consecutive 1-hour measurement durations between 10:00 and 17:00 hours are arithmetically averaged to provide an assumed  $L_{A10(3-hour)}$  which is then followed by the following subtractions.

CRTN states:

$$L_{A10(18-hour)} = L_{A10(3-hour)} - 1dB$$

This is then corrected to provide a 16 hour  $L_{Aeq}$  as the shortened method states:

$$L_{Aeq(16-hour)} = L_{A10(18-hour)} - 2dB$$

By following this process using the daytime  $L_{A10}$  measurements from location 1 at Station Road in between the two prospective sites which were subject to noise levels from road traffic on the nearby M40 we attain the following;

$$(68.8 + 69.2 + 69.6)/3 = 69.2dB \ L_{A10(3-hour)}$$

$$69.2dB - 1dB = 68.2dB \ L_{A10(18-hour)}$$

$$68.2dB - 2dB = 66.2dB \ L_{Aeq(16-hour)}$$

This Daytime  $L_{Aeq(16-hour)}$  66.2dB places the site into a Category C;

The Night-time average of the three Night-time 1-hour  $L_{Aeq}$  measurements taken between 11pm and 2am was 64.1dB which would also place the site into a Category C during this Night-time period.

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The overall noise measurements with traffic noise impinging onto the site from the M40 motorway over a 24-hr period would put the prospective development on this site into a Category C.

Category C states;

*Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.*

PPG24 recommends the following internal noise criteria to which the conditions and commensurate levels of protection should achieve:

35dB  $L_{Aeq}$  in Bedrooms

45dB  $L_{Aeq}$  in Living Rooms

PPG 24 like the NPPF also made reference to *BS 8233:1999 Sound Insulation and Noise Reduction for Buildings – Code of Practice*

In *BS 8233 Sound insulation and noise reduction for buildings – Code of practice*, Table 5 of this standard listed on page 19 gives both a Good and a Reasonable design range to provide for reasonable resting/sleeping conditions. The Good Design Range states 30dB  $L_{Aeq,T}$  for both Bedrooms and Living Rooms while the Reasonable Design Range states 35dB  $L_{Aeq,T}$  for Bedrooms and 40dB  $L_{Aeq,T}$  for Living Rooms

This standard also states “*For a reasonable standard in bedrooms at night, individual noise events measured with F time-weighting) should not normally exceed 45 dB  $L_{Amax}$ .*”

The prospective dwelling façades that have been raised as a possible concern are the proposed facades overlooking the M40 which require some attention to detail to provide adequate sound insulation although this should not be purely restricted to just those facades.

From the results obtained from the noise survey the following conclusions have been drawn and referenced to guidance;

- Any proposed layout and access for the dwellings should be such that the entrance to the houses will be from the south, i.e. the M40 motorway façade. This will create increased distance from the motorway for the rear garden/amenity spaces which will subsequently face north. This will allow the house to provide some shielding of noise from the M40 to the rear gardens.
- The internal room layout will be devised as such that habitable rooms, i.e. bedrooms, living rooms, dining rooms, lounges and kitchen diners will also be facing the north which is the façade in the direction away from the motorway. To the south or front of the houses, which is the M40 façade, this should be reserved for non-habitable rooms and circulation spaces such as bathrooms, standalone kitchens, shower rooms, toilets, airing cupboards, hallways, landings and stairs.
- Adequate glazing is required for the proposed residential dwellings with the glazed facade overlooking the M40 to the south being of a fixed glazing type with attenuated trickle vents and/or wall vents fitted to provide the necessary air circulation.

## 4. RECOMMENDATIONS

The proposed residential development on land adjacent to Station Road, Hatton has been assessed in which the former Planning Policy Guidance 24, (PPG24), has placed this site into a Noise Exposure Category C.

This site off Station Road should only be considered for development if a more appropriate site within the vicinity is not available. If an alternative site can be located within the vicinity that is exposed to a lower level of noise in which it would be likely to attain an improved Noise Exposure Category A or B then the alternate quieter site should take precedent over this one.

Should a more appropriate site with an NEC A or B not be available then the following mitigated construction detailing would be required for proposed dwellings on this site.

Assuming a brick or brick/block cavity façade, the glazing will be the weakest point for noise ingress. Using the equivalent continuous noise levels ( $L_{Aeq,T}$ ) measured on site, suitable glazing can be specified by cross-referencing these noise levels measured with the predicted weighted sound reduction index ( $R_w$ ) of typical glazing types using the commercially available sound insulation prediction software, *Insul*, which is produced by Marshall Day Acoustics.

The table below details the glazing types modelled for the non-habitable and habitable rooms in the proposed houses overlooking the M40 and the northern facades.

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Construction	Weighted Sound Reduction Index ( $R_w$ ) (dB)
Single Leaf Outer Brick + 100mm Cavity with 50mm Rockwool 33kg/m <sup>3</sup> + 140mm Concrete Block with 12.5mm Plasterboard internally by dot + dab with plaster skim finish	57
Single Leaf of Brick either side of 100mm cavity with 50mm Rockwool in cavity and plaster skim internal finish	54
Double Glazed Unit – 6.4mm Laminated Glass/10mm Air gap/6mm Glass	37
Double Glazed Unit – 6.4mm Laminated Glass/12mm Air gap/6.4mm Laminated Glass	37
Double Glazed Unit – 6.4mm Laminated Glass/12mm Air gap/10mm Glass	38
Double Glazed Unit – 12mm Laminated Glass/10mm Air gap/16mm Laminated Glass	39
Double Glazed Unit – 6mm Laminated Glass/12mm Air gap/11mm Laminated Glass	39
Double Glazed Unit – 6mm Glass/20mm Air gap/12mm Glass	39
Double Glazed Unit – 6mm Glass/50mm Air gap/6mm Glass	43
Double Glazed Unit – 6.4mm Laminated Glass/50mm Air gap/6.4mm Laminated Glass	45
Secondary Glazed Unit – 6mm Glass/100mm Air gap/6mm Glass	46
Secondary Glazed Unit – 6mm Glass/150mm Air gap/6mm Glass	47
Triple Glazed Unit – 6.4mm Laminated Glass/8mm Air gap/4mm Glass/150mm Air gap/6mm Glass	47

Table 15: Glazing & Brick/Block Specifications

The façade overlooking the motorway is the façade most susceptible to road traffic noise.

It is recommended that fixed glazing with acoustic ventilation were required is installed to the non-habitable rooms i.e. bathrooms, standalone kitchens etc., that will occupy the façade overlooking the motorway. Although non-habitable rooms are required to provide for suitable sleeping/resting conditions, it is recommended that such glazing should be rated a minimum  $R_w$  30dB to reduce noise transfer through the rest of the house.

It is recommended that the habitable rooms in dwellings close to the motorway will front away from the motorway in the direction of the centre of the development.

To achieve the BS 8233 Reasonable Design Range of 40dB  $L_{Aeq}$  in Living Rooms and 35dB  $L_{Aeq}$  in Bedrooms, it is recommended that the glazing for the Living Rooms should have a minimum  $R_w$  35dB with an  $R_w$  40dB for Bedrooms. Although these are facing away from the motorway, unlike light, sound does bend around corners.



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Should fixed glazing be fitted with acoustic ventilation, then penetrative acoustic ventilation through the external wall should be specified with a minimum  $D_{n,e,w}$  35dB to achieve a BS 8233 Reasonable Design Range, preferably  $D_{n,e,w}$  40dB. Comparable ventilation products have been attached along with this report for guidance.

To give owner/occupiers a choice of natural ventilation through an open window or forced ventilation through wall vents or mounted vents in the glazed units, secondary glazing could be fitted as an option. This would give the required attenuation when closed with ventilation being provided by the wall vents etc., but also give the owner/occupier the choice of opening both sets of glazing to allow natural airflow.

Further analysis was conducted using the Building Research Establishment's (BRE) Noise Ingress Calculator using a brick/block façade with a passive attenuated inwall vent 4000mm<sup>2</sup>.

Table 16 details predicted internal ambient noise levels in unoccupied Living Rooms and Bedrooms. The volume of the Living Rooms was set at 40m<sup>3</sup> and the Bedrooms at 28m<sup>3</sup>.

<b>Room Type</b>	<b>Glazed Construction</b>	<b>Predicted Internal <math>L_{Aeq}</math> in Unoccupied Room</b>
Bedroom	6.4mm Laminated Glass/12mm Air gap/6mm Glass	35.8dB
Bedroom	12mm Laminated Glass/10mm Air gap/16mm Laminated Glass	35.5dB
Bedroom	6mm Glass/150mm Air gap/6mm Glass	34.9dB
Living Room	6mm Glass/12mm Air gap/6mm Glass	36.1dB
Living Room	6mm Glass/150mm Air gap/6mm Glass	33.4dB
Living Room	6.4mm Laminated Glass/12mm Air gap/6mm Glass	34.2dB

Table 16: Predicted Internal Noise Levels in Unoccupied Rooms with Alternate Glazing Specifications

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## 5. SUMMARY.

Sanctuary Acoustics was asked by Mr Nick Carr of Rosconn Group to assess the existing noise environment on the land either side of Station Road, Hatton which is also adjacent to the M40 motorway. The noise survey is required as part of a planning proposal to potentially develop the land for residential use.

To summarise:

1. Noise measurements were undertaken on Station Road which separates the two potential sites in Hatton.
2. Noise measurements were taken on Thursday November 14<sup>th</sup> at 1-hour intervals over a 3 hour period from 10am to 1pm in accordance with the shortened method of the Calculation of Road Traffic Noise (CRTN) and again at 11pm finishing at 2am on Friday November 15<sup>th</sup> to measure night-time noise levels at location 1 during the most significant time for road traffic noise during the night-time period (11pm to 7am).
3. The noise measurements were referenced to the National Planning Policy Framework (NPPF) & the former Planning Policy Guidance (PPG) 24: Planning and Noise. Further reference was also made to BS 8233:1999 Sound Insulation and Noise Reduction for Buildings – Code of Practice and the Calculation of Road Traffic Noise (CRTN).
4. In reference to PPG24, the potential sites either side of Station Road which is in proximity to the M40 motorway has been calculated as having a Planning Policy Guidance 24, Noise Exposure Category C due to traffic noise levels from the M40 motorway both day and night.
5. NEC C states that *'Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.'*
6. PPG24 recommended internal noise levels in bedrooms of 35dB  $L_{Aeq}$  while BS 8233 recommends a good design range in bedrooms and Living Rooms of 30dB  $L_{Aeq}$  and a reasonable design range of 35dB  $L_{Aeq}$  for Bedrooms and 40dB  $L_{Aeq}$  for Living Rooms.
7. It is recommended that non-habitable rooms within dwellings such as bathrooms, toilets, shower rooms, standalone kitchens, airing cupboards and circulation spaces such as hallways, landings and stairs are positioned towards the motorway façade with habitable rooms such as bedrooms, living rooms, lounges, dining rooms and kitchen/diners positioned facing north away from the motorway and towards the centre of the development.
8. As this site has been allocated a Noise Exposure Category C, it should not be considered suitable for development if there is an alternative quieter site within the vicinity that would achieve an improved Noise Exposure Category A or B.
9. Should a more suitable site not be available then the following methods for mitigation would be required in items 10 through to 12 to provide an adequate level of amenity.
10. Suitable glazing types, including 6.4lam/12/6 double glazing and 6/150/6 secondary glazed units have been modelled using the Marshall Day Acoustics Sound Insulation Prediction Software, *Insul*. Double leaf brick and single leaf brick + single leaf concrete block either side of a 100mm cavity has also been modelled.
11. It is recommended that the glazing at the motorway façade is fixed and should achieve a Weighted Sound Reduction Index,  $R_w$  30dB to reduce noise transfer throughout the rest of the house. Were ventilation by forced,

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mechanical or trickle means is required the rating should be a minimum  $D_{n,e,w}$  30dB.

12. To achieve a BS 8233 Reasonable Design Range for internal noise levels,  $L_{Aeq}$ , in Bedrooms and Living Rooms when unoccupied, the glazing for Bedrooms should achieve a minimum  $R_w$  40dB and a minimum  $R_w$  35dB for Living Rooms. Similarly ventilation should also be a minimum  $D_{n,e,w}$  40dB and  $D_{n,e,w}$  35dB respectively. The glazing for these habitable rooms should either be fixed or secondary glazed which would also provide the same attenuation requirements but with the secondary glazing it still gives the owner/occupier the choice of natural airflow through open windows or vented airflow depending on their own subjective perception to the motorway traffic.

## 6. ANNEX A

### Acoustics Glossary of Terms

$L_{Aeq,T}$  – Equivalent continuous sound pressure level. This is the A-weighted sound pressure level in decibels (dB) of a continuous, steady sound that within a specified time interval, T, has the same mean squared sound pressure as a sound that varies with time.

$L_{A10}$  – The A-weighted mean square sound pressure level that is exceeded for 10% of the time.

$L_{A90}$  – The A-weighted mean square sound pressure level that is exceeded for 90% of the time. Referred to as the background noise level.

$L_{Amin}$  – The lowest A-weighted noise level recorded during a noise event.

$L_{Amax}$  – The highest A-weighted noise level recorded during a noise event.