Noise Assessment for Proposed Residential Development on

Station Road, Cropredy, Oxfordshire

For Catesby Estates Ltd






Quality Management

Prepared by:	Peter Barling BSc (Hons) AMIOA	Consultant - Acoustics	[redacted]	17/03/17
Checked and authorised by:	Phil Evans BSc (Hons) MSc FGS MIOA ASA	Senior Director - Acoustics		17/03/17
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Assessment	O:\Jobs_8001-9000\8962e\Rev0\8962e_Assessment_Rev0_20160617.xlsx	*PB*	✓		

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1 Introduction

1.1 The Acoustics Team of RPS Planning and Development (RPS) has been appointed by Catesby Estates Ltd to undertake a noise assessment to accompany an application for outline planning permission residential development of up to a maximum of 37 dwellings (Use Class C3) including means of access into the site (not internal roads) and associated works, with all other matters (relating to appearance, landscaping, scale and layout) reserved, on land to the west of Station Road, Cropredy. The site is located in Cropredy in Oxfordshire and lies within the administrative area of Cherwell District Council (CDC).

1.2 The assessment has been undertaken based upon appropriate information on the proposed development provided by the client and its project team. RPS is a member of the Association of Noise Consultants (ANC), the representative body for acoustics consultancies, having demonstrated the necessary professional and technical competence. The assessment has been undertaken with integrity, objectivity and honesty in accordance with the Code of Conduct of the Institute of Acoustics (IOA) and ethically, professionally and lawfully in accordance with the Code of Ethics of the ANC.

1.3 The technical content of this assessment has been provided by RPS personnel, all of whom are corporate (MIOA) or non-corporate, associate members (AMIOA) of the IOA (the UK's professional body for those working in acoustics, noise and vibration). This report has been peer reviewed within the RPS team to ensure that it is technically robust and meets the requirements of our Quality Management System accredited to BS EN ISO 9001:2015.

2 National and Local Planning Policy and Relevant British Standards

National Planning Policy and Guidance on Noise

2.1 Appendix A provides a complete summary of the relevant guidance on national planning policy contained within the Noise Policy Statement for England (NPSE) [1], the National Planning Policy Framework (NPPF) [2] and published Planning Practice Guidance on Noise (PPG-N) [3]. These documents do not contain guidance in terms of numerical noise levels. Guidance is provided descriptively, which may be transposed to numerical noise levels for site-specific situations, using the methods contained within British Standards (BSs).

Local Planning Policy and Guidance on Noise

2.2 The Cherwell Local Plan 2011-2031 Part 1 (CLP) [4] was formally adopted by CDC on 20 July 2015. The CLP provides the strategic planning policy framework and sets out strategic site allocations for the District to 2031. Policies within the adopted CDC Local Plan 1996 (1996 LP) [5] comprise saved policies that have not been replaced by policies within the CLP. The saved policies remain until they are replaced by Local Plan Part 2 (under preparation). No policy within either the CLP, or the saved polices of the 1996 LP, relate specifically to noise sensitive development.

Consultation

2.3 On Friday 8th April 2016, Peter Barling, Acoustic Consultant with RPS, contacted CDC via telephone and spoke with Neil Witton, Environmental Health Officer, to confirm the assessment requirements. It was confirmed that the suitability of the site for residential development should be assessed following the guidance contained within BS 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' [6].

British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'

2.4 BS 8233:2014 provides guideline values for internal ambient noise levels in spaces when they are unoccupied. A summary of the levels recommended in paragraph 7.7.1 of sub clause 7.7 and Table 4 of BS 8233:2014 for rooms used for resting, dining and sleeping is provided in Table 2.1 below. The guideline values in Table 2.1 are annual average values and do not have to be achieved in all circumstances.

2.5 The guidance in paragraph 7.7.1 of Section 7.7 of BS 8233:2014 applies to external noise as it affects the internal acoustic environment from sources without a specific character. The paragraph states, including the accompanying note:

"… Occupants are usually more tolerant of noise without a specific character than, for example, that from neighbours which can trigger complex emotional reactions. …"

"NOTE Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate."

Table 2.1: BS 8233:2014 Indoor Ambient Noise Levels for Dwellings

Activity	Location	07:00 to 23:00 hours	23:00 to 07:00 hours
Resting	Living room	35 dB $L_{Aeq,16h}$	-
Dining	Dining room / area	40 dB $L_{Aeq,16h}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$

2.6 Note 7 of the following text states the following:

"NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved."

2.7 In relation to external noise levels, the second paragraph of 7.7.3.2 states that:

"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$ with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited."

British Standard 6472-1:2008 'Guide to evaluation of human exposure to vibration in buildings – Part 1: Vibration sources other than blasting'

2.8 The human body is an excellent detector of vibration, which can become perceptible at levels that are substantially lower than those required to cause even cosmetic building damage. The way in which people perceive vibration in buildings depends upon various factors, including the vibration duration, frequency, direction and activity.

2.9 Present knowledge indicates that how people inside a building respond to vibration from sources within and outwith the building, with the exception of blasting, is best evaluated with the Vibration Dose Value (VDV), as promoted through BS 6472-1:2008. VDV defines a relationship that yields

a consistent assessment of intermittent, occasional and impulsive vibration, as well as continuous input, and correlates well with subjective response. The VDV is given by the fourth root of the time integral of the fourth power of the acceleration after it has been frequency weighted. BS 6472-1:2008 [7] provides separate weighting curves related to human response for vibration in the vertical and the horizontal directions.

2.10 The VDV is evaluated at the point of entry to the subject. If direct measurement is not possible, for example, on a building that has not yet been built, then BS 6472-1:2008 states that it will be necessary to estimate the vibration environment to be expected within the building. Appendix C of BS 6472-1:2008 contains guidance on the estimation of building vibration response.

2.11 The VDVs associated with various probabilities of adverse comment within residential buildings are provided in Table 2.2. The criteria are presented as ranges due to the widely differing susceptibility to vibration evident among members of the population and also their differing expectations of the vibration environment. BS 6472-1:2008 states that adverse comment is not expected for VDVs below the ranges in Table 2.2.

Table 2.2: VDV Ranges Which Might Result in Various Probabilities of Adverse Comment

Place	Low probability of adverse comment[1] ($m/s^{1.75}$)	Adverse comment possible ($m/s^{1.75}$)	Adverse comment probable[2] ($m/s^{1.75}$)
Residential building (16 hour day)	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings (8 hour night)	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

1) Below these ranges adverse comment is not expected.
2) Above these ranges adverse comment is very likely.

3 Baseline Noise and Vibration Conditions and 3D Sound Model

3.1 The proposed development site is located approximately 200 m south-west of Cropredy village centre and comprises of undeveloped, agricultural land. A plan of the proposed site is provided in Figure 1.

3.2 The area is largely rural in nature with no large industrial sources of sound in the vicinity. It is considered that train movements on the railway line directly adjacent to the western boundary and road traffic movements on Station Road adjacent to the eastern boundary, will be the dominant sources of sound and, potentially, vibration from the railway, affecting the site.

Baseline Sound Level Survey

3.3 One long term baseline sound level survey (LT1) was deployed on site and ran from 15:25 hours on Thursday 3rd April 2014 until 09:25 hours on Friday 4th April 2014. The survey was carried out to determine the existing level of environmental sound, primarily from the railway, affecting the proposed development site. In addition, two short-term sound level surveys (ST1 and ST2) were undertaken on Thursday 10th March 2016 between 10:04 to 13:15 hours. A plan showing the approximate locations of the measurement positions and site boundary is provided in Figure 1.

3.4 The long term survey (LT1) was located towards the north-western part of the site, approximately 25 m east of the railway line. During the time spent on site setting up the long term survey, the following sound sources were noted affecting the site: train movements on the railway and road traffic movements on Station Road.

3.5 The sound level measurements were made using Class 1 Rion NL-31 sound level meters (SLMs) in accordance with BS 7445-2:1991 [8]. Both SLMs were calibrated before and checked after use with a Norsonic Type 1251 calibrator with no significant drift occurring.

3.6 The short-term survey (ST1) was located towards the south-western part of the site, approximately 15 m east of the railway line. During the time spent on site setting up the short-term survey, the following sound sources were noted affecting the site: train movements on the railway and road traffic movements on Station Road.

3.7 The short-term survey (ST2) was located towards the south-eastern part of the site, approximately 10 m west of Station Road. During the time spent on site setting up the short-term survey, the following sound sources were noted affecting the site: train movements on the railway and road traffic movements on Station Road.

3.8 A summary of the measured data is provided in Table 3.1 below; further details are provided in Appendix B. Numbers are rounded to the nearest whole number.

Table 3.1: Summary of Baseline Sound Level Data

Location	Period	Start	Duration (hh:mm)	$L_{Aeq,T}$ (dB)	$L_{A90,T}$ (dB)
LT1	Daytime (07:00 - 23:00)	03/04/2014 15:25	07:35	56	37
		04/04/2014 07:00	02:25	56	43
	Night-time (23:00 - 07:00)	03/04/2014 23:00	08:00	56	28
ST1	Daytime (07:00 - 23:00)	10/03/2016 10:04	03:00	65	-
ST2		10/03/2016 10:15	03:00	57	39

Baseline Vibration Level Survey

3.9 A short-term baseline vibration level survey was undertaken on Thursday 10th March 2016 between 10:04 to 13:04 hours. A plan showing the approximate location of the measurement position is provided in Figure 1.

3.10 The survey (VM1) was located towards the south-western part of the site, approximately 15 m east of the railway line.

3.11 Vibration level measurements were made using a Svantek 958 vibration level meter (VLM) with a Dytran 3233AT tri-axial accelerometer. Survey data were logged of the 5-minute $VDV_{b/d,5min}$ for each of the three axis.

3.12 A summary of the measured data, with numbers presented to one decimal place, is provided in Table 3.2 below. Further details are provided in Appendix D.

Table 3.2: Summary of Short-Term Baseline Vibration Level Data

Period	Start	Duration (hrs)	$VDV_{b/d,T}$ ($m/s^{1.75}$)		
			x-axis (horizontal)	y-axis (horizontal)	z-axis (vertical)
Daytime (07:00 - 23:00)	10/03/2016 10:04	3	0.0[1]	0.0[1]	0.1[2]

Notes:
1. 0.01 to two decimal places.
2. 0.09 to two decimal places.

3D Sound Model

3.13 In order to determine levels of road and rail traffic noise across the development site, a 3D sound model has been produced using SoundPLAN 7.4 acoustic modelling software. The model has been constructed based upon publically available topographical data which was noted to accord with subjective observations of local topography carried out whilst on site during the surveys.

3.14 It has been established that the dominant sources of sound affecting the site during both daytime and night-time periods is train movements on the railway and road traffic on Station Road. The model has therefore been calibrated based upon the results obtained during the long term and short-term surveys.

3.15 Figures 2 and 3 show the predicted daytime and night-time sound levels across the development site, respectively. Daytime sound levels have been predicted at a height of 1.5 m Above Ground Level (AGL) and night-time sound levels at a height of 4 m AGL representative of ground floor and first floor windows respectively.

3.16 As indicated in Figures 2 and 3, and with reference to the Sketch Masterplan drawing (Drawing No. CAT101 4001 issued by Urban Design Box in March 2017), external environmental sound levels on site within the areas allocated for dwellings are up to 60 dB $L_{Aeq,16h}$ and 60 dB $L_{Aeq,8h}$ for those dwellings closest to the railway; external sound levels further towards the centre part of the site away from the railway and road are up to 10 dB lower.

4 Noise and Vibration Assessment

Internal Sound Levels

4.1 With reference to paragraph G.1 of BS 8233:2014, an estimate of the internal sound levels within typical dwellings may be determined on the basis of the sound reduction provided by the windows. Research contained within Report NANR 116 [9] finds that a window partially open to provide background ventilation provides approximately 15 dB $D_{A,road}$ of attenuation to road traffic noise.

4.2 On this basis, and with reference to the design targets contained within BS 8233:2014 that are reproduced in Table 2.1 of this report, satisfactory internal acoustic environments are likely to be achievable with no acoustic treatments in areas of the site where the external environmental noise level is no greater than 50 dB $L_{Aeq,16h}$ and 45 dB $L_{Aeq,8h}$ during the daytime and night-time periods, respectively. Where external sound levels exceed these criteria, habitable rooms (living rooms and bedrooms) are likely to require suitable ventilation systems as an alternative to opening the windows.

4.3 The specific acoustic performance requirements of the glazing and ventilation system are dependent on the exact layout and orientation of the buildings, room size, wall and roof design etc. However, an estimation of the sound level difference across a 'standard' façade design[1] for a typical dwelling room type and size is around 25 dB $D_{2m,n}$. For dwellings built with this façade attenuation, satisfactory internal acoustic environments are likely to be achieved where the external sound level is no greater than 60 dB $L_{Aeq,16h}$ and 55 dB $L_{Aeq,8h}$ during the daytime and night-time periods, respectively.

4.4 Where external sound levels are greater than 60 dB $L_{Aeq,16h}$ or 55 dB $L_{Aeq,8h}$, then an 'enhanced façade design' would be required. This normally entails the specification of an alternative means of ventilation, such as passive acoustic trickle ventilators and, if necessary, the specification of windows with enhanced sound reduction performance. For a typical dwelling with standard double glazed windows, the specification of passive acoustic trickle vents with a sound reduction of 40 dB $D_{n,e,w}$ would achieve an overall façade sound reduction value of around 30 dB $D_{2m,n}$.

4.5 Table 4.1 below provides a summary of the external sound levels and the façade type required to achieve suitable internal sound levels for typical habitable room types and sizes. On the basis of the predicted external sound levels (as indicated on Figures 2 and 3), the design targets contained within BS 8233:2014 and the façade sound reduction values detailed below, Figure 4 provides a presentation of areas of the proposed site requiring either an enhanced or standard façade design. Note that the façade requirements indicated are based on achieving an internal sound level within habitable rooms of 30 dB $L_{Aeq,8h.}$

[1] 'Brick and block' external wall; '4-(6)-6 double glazing'; and 0.08 m^2 trickle ventilator.

Table 4.1: Façade Reduction with Various Façade Elements

External Sound Level (Day / Night)	Façade Type	Façade Sound Reduction (dB)
>60 dB $L_{Aeq,16h}$ or > 55 dB $L_{Aeq,8h}$	Enhanced[1]	30
50 – 60 dB $L_{Aeq,16h}$ or 45 – 55 dB $L_{Aeq,8h}$	Standard[2]	25
<50 dB $L_{Aeq,16h}$ and < 45 dB $L_{Aeq,8h}$	Partially Open Windows	15

NOTES:
1 Based on brick and block' external wall; '4-(6)-6 double glazing; and 0.08 m^2 acoustic trickle ventilator achieving 40 dB $D_{n,e,w.}$
2 Based on brick and block' external wall; '4-(6)-6 double glazing'; and 0.08 m^2 standard trickle ventilator.

4.6

4.7 As indicated on Figure 4, for dwellings built on the eastern half of the site, facades of habitable rooms should be provided with an alternative method of ventilation, such as standard trickle ventilators, as indicated as a Standard façade type in Table 4.1. For dwellings built on the western half of the site, facades of habitable rooms should be provided with an alternative method of ventilation, such as acoustically treated trickle ventilators, as indicated as an Enhanced façade type in Table 4.1.

4.8 On the basis of the above, through appropriate design, internal sound levels will meet the guideline values contained within BS 8233:2014.

External Sound Levels

4.9 With reference to Figure 2, daytime external sound levels at 1.5 m AGL across the proposed development site range between 50 and 60 dB $L_{Aeq,16h}$. Whilst external levels do exceed 55 dB $L_{Aeq,16h}$ (the upper guideline value for external amenity areas from BS 8233:2014), the external sound levels indicated in Figure 2 are based on an open site, i.e. without the presence of potential noise barriers or bunds, proposed dwellings or other local acoustic screening from garden fences etc. all of which would have the effect of attenuating sound levels from the railway and road. Therefore, the model has been run with the inclusion of proposed dwellings (on the basis of the Sketch Masterplan drawing CAT101 4001). Figure 5 shows the predicted daytime sound levels, at 1.5 m AGL, across the development site, with the proposed dwellings included.

4.10 With reference to the Concept Masterplan drawing and Figure 5, the external sound level within the majority of external amenity areas is below 50 dB $L_{Aeq,16h}$, and for all other areas, apart from one, the external sound level is below 55 dB $L_{Aeq,16h}$. For proposed dwellings in the north-west part of the site, the external sound level does exceed 55 dB $L_{Aeq,16h}$; however this is by only 1 dB. Furthermore, as indicated above, the external sound levels indicated in Figure 5 do not take account of local screening that will occur with the development in place from garden fencing etc. and, as such, with the inclusion of such features, levels within gardens would likely be at least 2 to 3 dB lower than those indicated.

4.11 On this basis, and with reference to paragraph 2.7, it is considered likely that sound levels within proposed external amenity areas would not exceed the BS 8233:2014 upper guideline value of

55 dB $L_{Aeq,T}$ and, for the majority of areas, sound levels would be below the desirable level of 50 dB $L_{Aeq,T}$.

Vibration Levels

4.12 The vibration criteria contained within BS 6472-1:2008 are set in terms of the VDV 'at the point of entry to the subject', i.e. evaluated on the floors of the building. Attenuation occurs due to mass-loading provided by buildings and amplification occurs due to floor resonance. These effects are highly variable and depend upon site, source and project specific vibration characteristics, ground conditions, foundation types, building and floor constructions. Table 4.2 below provides a summary of the likely effects of mass-loading and floor resonance, and the resultant maximum external vibration level such that the vibration level at the point of entry does not result in a 'Low probability of adverse comment' with respect to BS 6472-1:2008. Further details are provided Appendix C.

Table 4.2: Vibration Assessment Criteria

		Daytime (07:00 to 23:00)	**Night-time (23:00 to 07:00)**
Internal Vibration Assessment Criteria[1]	$VDV_{d/b,day/night}$ ($m/s^{1.75}$)	0.2	0.1
Transfer Functions	Mass Loading	0.6	0.6
	Floor Resonance	4.0	4.0
External Horizontal Vibration Assessment Criteria[2]	$VDV_{d,day/night}$ ($m/s^{1.75}$)	0.3	0.2
External Vertical Vibration Assessment Criteria[3]	$VDV_{b,day/night}$ ($m/s^{1.75}$)	0.1	0.0[4]

Notes:
1. This is the level above which there would be a 'Low probability of adverse comment' and below which 'adverse comment is not expected' with respect to BS 6472-1:2008.
2. This is the corresponding maximum external horizontal (x and y-axis) vibration level above which there would be a 'Low probability of adverse comment' and below which 'adverse comment is not expected'.
3. This is the corresponding maximum external vertical (z-axis) vibration level above which there would be a 'Low probability of adverse comment' and below which 'adverse comment is not expected'.
4. 0.04 to two decimal places.

4.13 With reference to Table 4.2 above and Table 3.2, external daytime VDVs at VM1 do not exceed 0.3 $ms^{-1.75}$ $VDV_{d,day}$ or 0.1 $ms^{-1.75}$ $ms^{-1.75}$ $VDV_{b,day}$ in either the horizontal or vertical directions, respectively, and hence adverse comment would not be expected.

4.14 With reference to Table 4.2 above and Table 3.2, external night-time VDVs at VM1 do not exceed 0.2 $ms^{-1.75}$ $VDV_{d,night}$ in either the horizontal or vertical directions, respectively, and hence adverse comment would not be expected.

4.15 On this basis, vibration levels within proposed dwellings should be acceptable throughout the proposed development in accordance with the guidance contained within BS 6472-1:2008.

5 Summary and Conclusions

5.1 The Acoustics Team of RPS Planning and Development (RPS) has been appointed by Catesby Estates Ltd to undertake a noise assessment to accompany an application for outline planning permission residential development of up to a maximum of 37 dwellings (Use Class C3) including means of access into the site (not internal roads) and associated works, with all other matters (relating to appearance, landscaping, scale and layout) reserved, on land to the west of Station Road, Cropredy. The site is located in Cropredy in Oxfordshire and lies within the administrative area of Cherwell District Council (CDC).

5.2 Environmental sound levels were determined from one long term surveys and two short-term surveys. The main sound sources affecting the site are train movements on the adjacent railway and road traffic on Station Road. Environmental vibration levels were determined from one short-term survey.

5.3 Through appropriate design, the proposed residential development would be subject to satisfactory internal and external acoustic environments with respect to British Standard (BS) 8233:2014 ‘Guidance on Sound Insulation and Noise Reduction for Buildings’ and appropriate levels of external amenity (in terms of noise) will be achieved. Vibration levels within dwellings would not exceed a level at which adverse impact would be expected with respect to BS 6472-1:2008 ‘Guide to evaluation of human exposure to vibration in buildings – Part 1: Vibration sources other than blasting’.

5.4 On the basis of the above, the proposed development accords with both national (Noise Policy Statement for England, National Planning Policy Framework and Planning Practice Guidance on noise) and local planning guidance) and there are no reasons, with regards to noise or vibration, why planning permission should not be granted for the proposed development.

References

1 Department for Environment, Food and Rural Affairs. Noise Policy Statement for England. Defra. 2010.

2 Department for Communities and Local Government. National Planning Policy Framework: HMSO. March 2012.

3 Department for Communities and Local Government. National Planning Practice Guidance.

4 Cherwell District Council. The Cherwell Local Plan 2011-2031 Part 1. 2015.

5 Cherwell District Council. Local Plan 1996. 1996.

6 British Standards Institution. British Standard 8233:2014 Guidance on sound insulation and noise reduction for buildings. 2014.

7 British Standards Institution. British Standard 6472-1:2008. Guide to evaluation of human exposure to vibration in buildings - Part 1: Vibration sources other than blasting.

8 British Standards Institution. British Standard 7445-2:1991 Description and measurement of environmental noise - Part 2: Guide to the acquisition of data pertinent to land use. 1991.

9 Defra Report NANR116. Open/Closed Window Research – Sound Insulation through Ventilated Domestic open Windows. The Building Performance Centre, School of the Built Environment, Napier University. 2007.

Figures

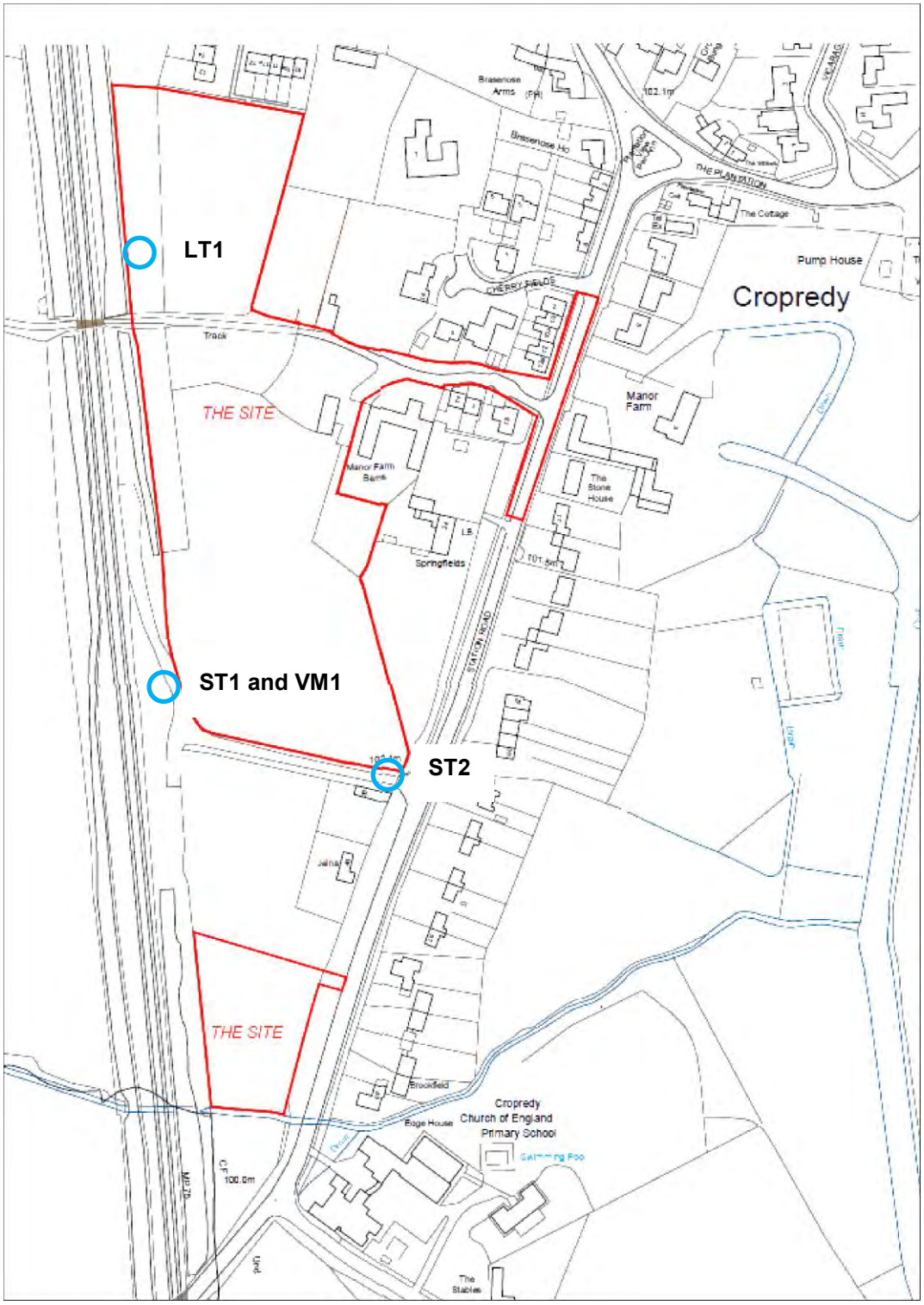

Figure 1: Baseline Survey Locations and Site

Project Number	**JAE8962**	**Project Title**	**Land off Station Road, Cropredy**		
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RPS
6-7 Lovers Walk
Brighton East Sussex BN1 6AH

T 01273 546800 F 01273 546801
E rpsbn@rpsgroup.com W rpsgroup.com

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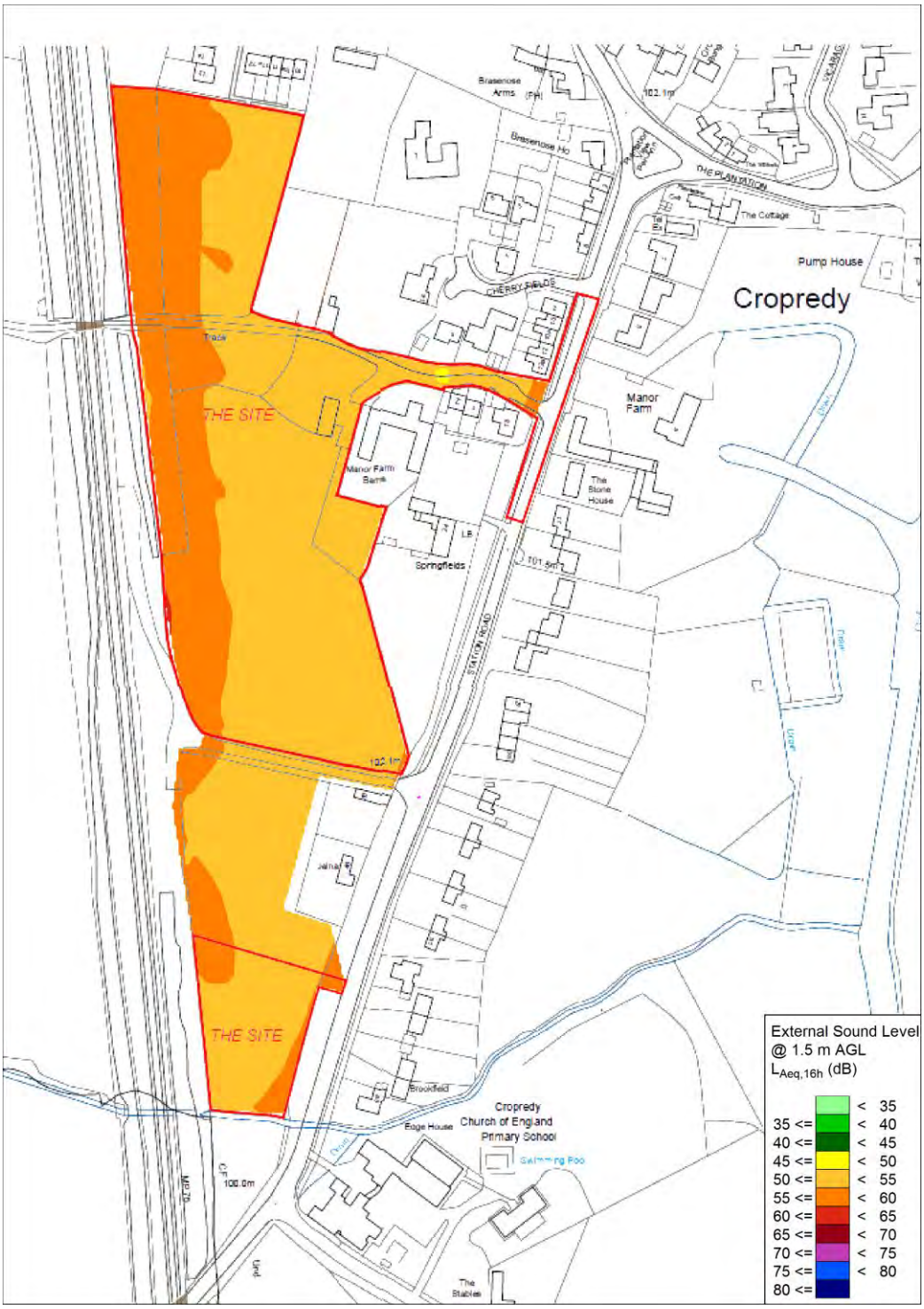

Figure 2: Daytime External Sound Levels

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6-7 Lovers Walk
Brighton East Sussex BN1 6AH

T 01273 546800 F 01273 546801
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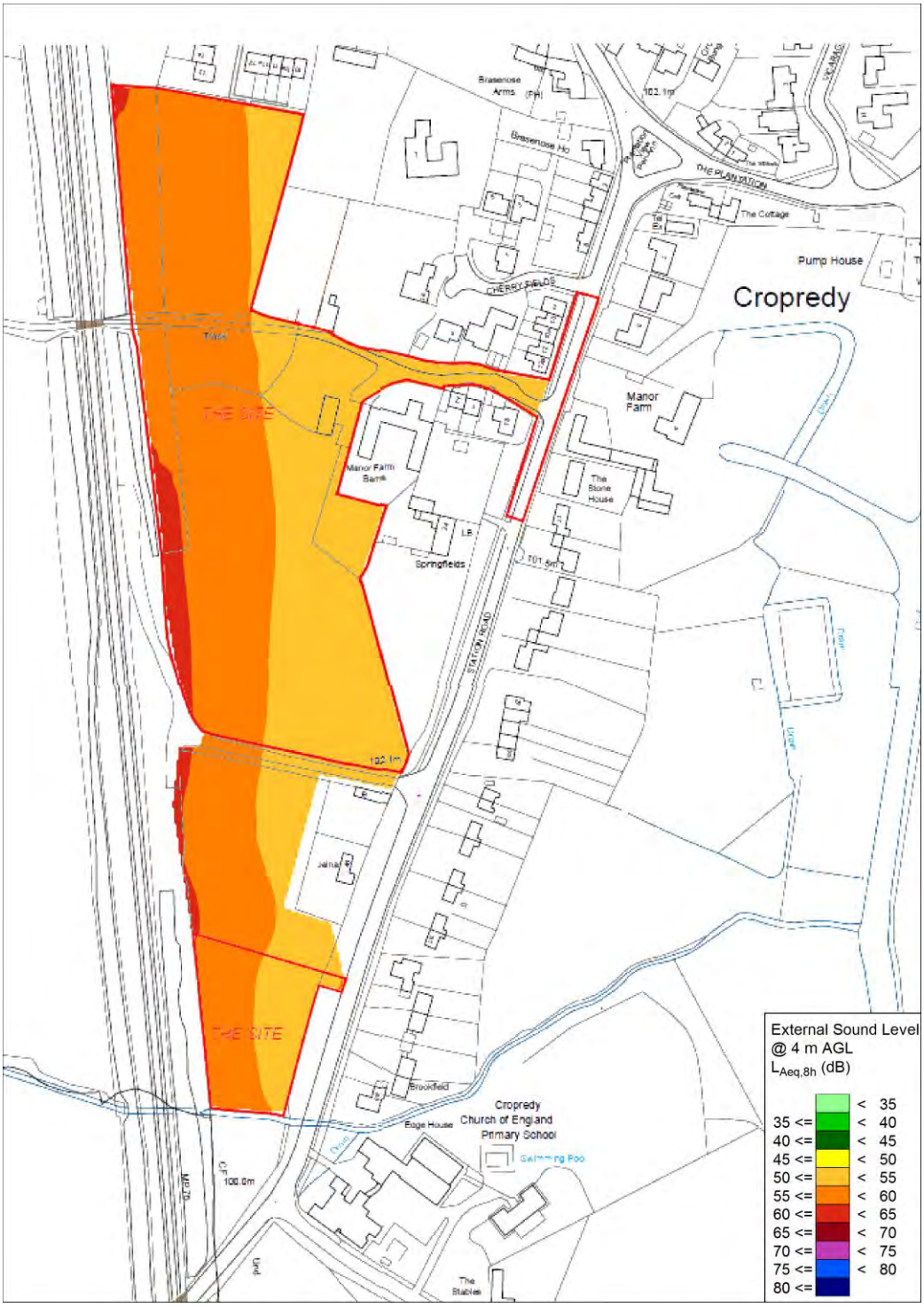

Figure 3: Night-time External Sound Levels

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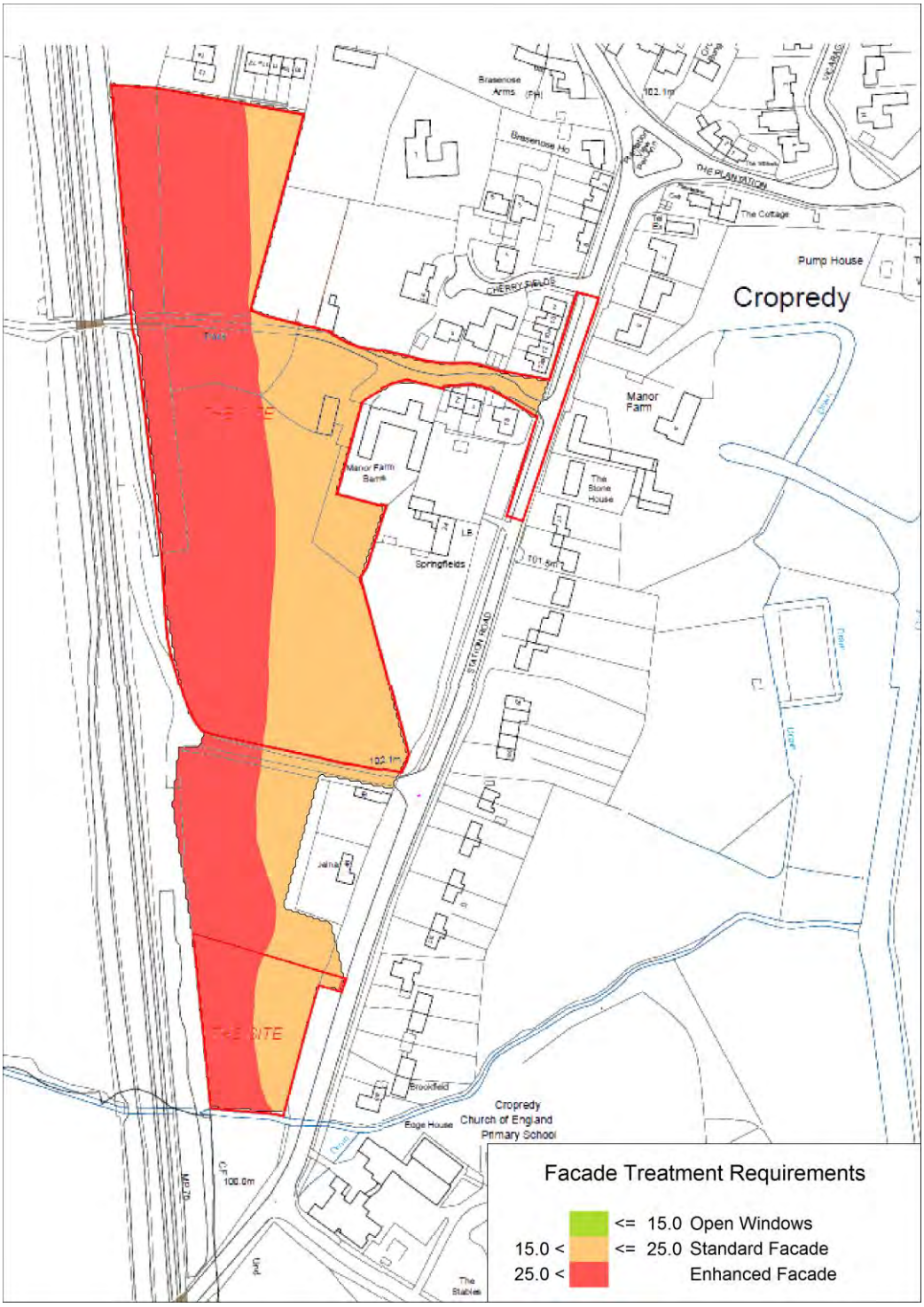

Figure 4: Façade Requirements

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RPS
6-7 Lovers Walk
Brighton East Sussex BN1 6AH

T 01273 546800 F 01273 546801
E rpsbn@rpsgroup.com W rpsgroup.com

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rpsgroup.com/uk

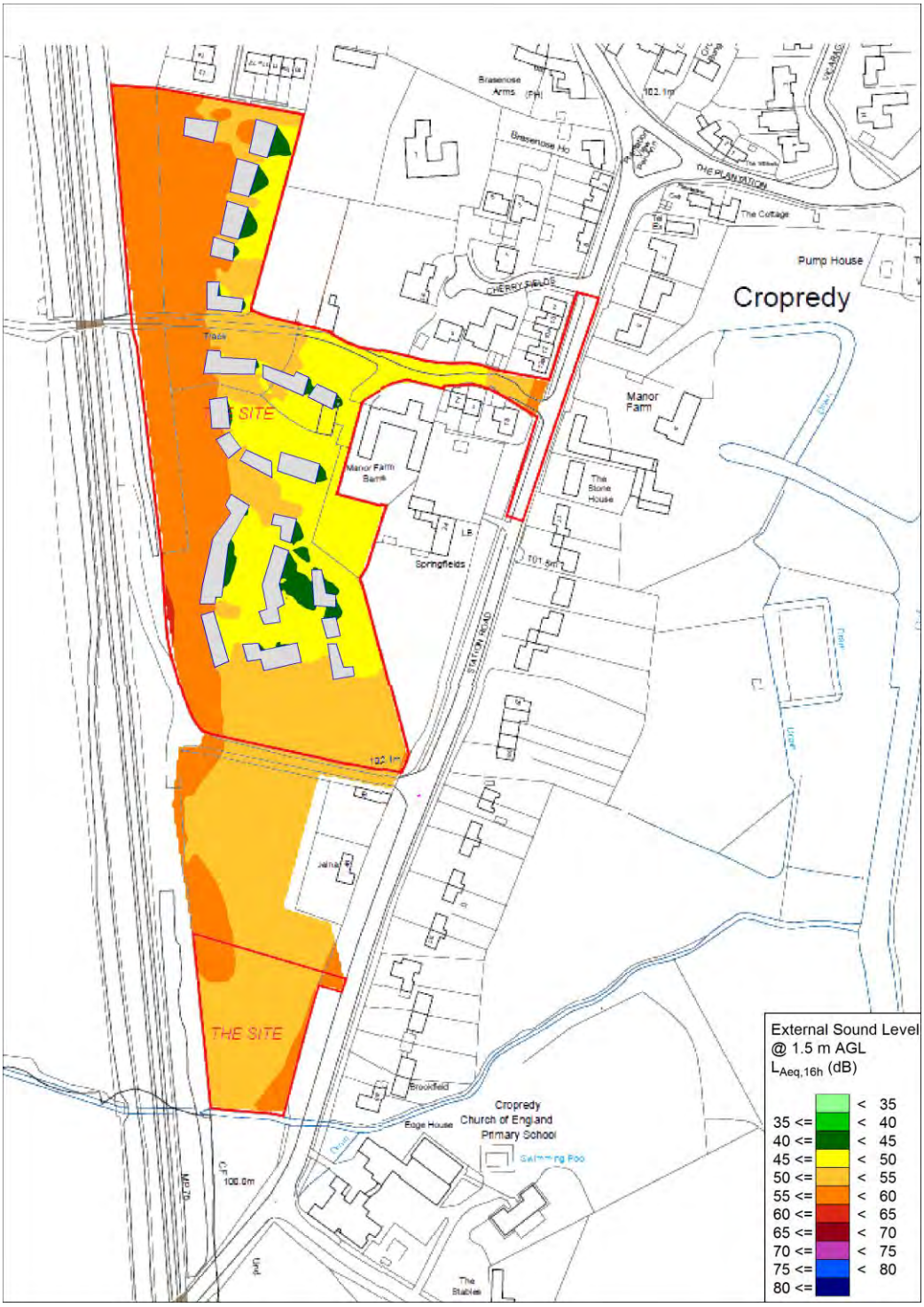

Figure 5: Daytime External Sound Levels with Proposed Dwellings

Project Number	**JAE8962**	**Project Title**	**Land off Station Road, Cropredy**		
Client:	**Catesby Estates Ltd**	**Rev :**	**3**	**Drawn By:**	**PB**
		Date:	**03/17**	**Checked By:**	
File location:	**O:\Jobs_8001-9000\8962e\Rev0**				

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RPS
6-7 Lovers Walk
Brighton East Sussex BN1 6AH

T 01273 546800 F 01273 546801
E rpsbn@rpsgroup.com W rpsgroup.com

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Appendices

Appendix A: National Planning Policy and Guidance

National Planning Policy Framework

A.1 The National Planning Policy Framework (NPPF) [1], published in March 2012, sets out the Governments planning policies for England. The document does not contain any specific noise policy, or noise limits but it provides a framework for local people and local authorities to produce their own local and neighbourhood plans, which reflect the needs and priorities of their communities.

A.2 In Section 11, 'Conserving and enhancing the natural environment', paragraph 123 relates to noise and states:

'123. Planning policies and decisions should aim to:

- *avoid noise from giving rise to significant adverse impacts[27] on health and quality of life as a result of new development;*
- *mitigate and reduce to a minimum other adverse impacts[27] on health and quality of life arising from noise from 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;[28] and*
- *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.'*

27 See Explanatory Note to the Noise Policy Statement for England (Department for the Environment, Food and Rural Affairs).
28 Subject to the provisions of the Environmental Protection Act 1990 and other relevant law.'

A.3 The first bullet point refers to 'significant adverse impacts' which relates to the 'significant observed adverse effect level' (SOAEL) in the Noise Policy Statement for England (NPSE) [2], though the term 'effect' is used instead of the term 'impact' although these have been deemed to be interchangeable in this context. Therefore, given the comments above on the NPSE with regard to assessment methods and criteria, the current content of the NPPF does not require any change in previously adopted approaches.

1 Department for Communities and Local Government. National Planning Policy Framework: HMSO. March 2012.
2 Department for Environment, Food and Rural Affairs. Noise Policy Statement for England. Defra. 2010.

Noise Policy Statement for England

A.4 The Noise Policy Statement for England (NPSE) [3], published in March 2010 by Defra, aims to provide clarity regarding current policies and practices to enable noise management decisions to be made within the wider context, at the most appropriate level, in a cost-effective manner and in a timely fashion.

A.5 Paragraph 1.6 of the NPSE sets out the long-term vision and aims of Government noise policy:

"Noise Policy Vision

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development."

"Noise Policy Aims

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life."*

A.6 The aims require that all reasonable steps should be taken to avoid, mitigate and minimise adverse effects on health and quality of life whilst also taking into account the guiding principles of sustainable development, which include social, economic, environmental and health considerations.

A.7 With regard to the terms 'significant adverse' and 'adverse' included in the 'Noise Policy Aims', these are explained further in the 'Explanatory Note' as relating to established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation which are:

'NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on human health and quality of life due to noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.'

A.8 Defra has then extended these concepts for the purpose of the NPSE to introduce the concept of:

'SOAEL – Significant Observed Adverse Effect Level

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3 Department for Environment, Food and Rural Affairs. Noise Policy Statement for England. Defra. 2010.

This is the level above which significant adverse effects on health and quality of life occur.'

A.9 The accompanying explanation states:

'It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available'.

A.10 With regard to 'further evidence', Defra has commissioned research to try and identify the levels at which the above effects occur but this is not yet in the public domain. However, early indications are that this research has been largely inconclusive. On this basis, and until further guidance becomes available, and given that there is no specific guidance in the NPPF on noise, there is no justification to vary assessment methods and criteria from those previously adopted from British Standards etc.

Planning Practice Guidance - Noise (PPGN)

A.11 The Government has published Planning Practice Guidance on a range of subjects including noise [4].The guidance forms part of the NPPF and provides advice on how to deliver its policies. The PPGN reiterates general guidance on noise policy and assessment methods provided in the NPPF, NPSE and British Standards (BSs) and contains examples of acoustic environments commensurate with various effect levels. Paragraph 006 of the PPGN explains that:

'The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation.'

A.12 According to the PPGN, factors that can influence whether noise could be of concern include:

- the source and absolute level of the noise together with the time of day it occurs;
- for non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;
- the spectral content and the general character of the noise;
- the local topology and topography along with the existing and, where appropriate, the planned character of the area.

4 Department for Communities and Local Government. National Planning Practice Guidance

- where applicable, the cumulative impacts of more than one source should be taken into account along with the extent to which the source of noise is intermittent and of limited duration;
- whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time;
- in cases where existing noise sensitive locations already experience high noise levels, a development that is expected to cause even a small increase in the overall noise level may result in a significant adverse effect occurring even though little to no change in behaviour would be likely to occur;
- where relevant, Noise Action Plans, and, in particular the Important Areas identified through the process associated with the Environmental Noise Directive and corresponding regulations;
- the effect of noise on wildlife;
- if external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces; and
- the potential effect on an existing business of a new residential development being located close to it as the existing noise levels from the business may be regarded as unacceptable by the new residents and subject to enforcement action.

A.13 The PPGN provides a relationship between various perceptions of noise, effect level and required action in accordance with the NPPF. This is reproduced in Table 2, below.

Table 2: Noise Exposure Hierarchy Based On the Likely Average Response

Perception	Increasing Effect Level	Action
Not noticeable	No Observed Effect	No specific measures required
Noticeable and not intrusive	No Observed Adverse Effect	No specific measures required
LOAEL		
Noticeable and intrusive	Observed Adverse Effect	Mitigate and reduce to a minimum
SOAEL		
Noticeable and disruptive	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Unacceptable Adverse Effect	Prevent

A.14 The PPGN describes noise that is not noticeable to be at levels below the NOEL. It describes a range of noise exposure that is noticeable but not to the extent there is a perceived change in quality of life. Noise exposures in this range are below the LOAEL and need no mitigation. On this basis, the audibility of noise from a development is not, in itself, a criterion to judge noise effects that is commensurate with national planning policy.

A.15 The PPGN suggests that noise exposures above the LOAEL cause small changes in behaviour. Examples of noise exposures above the LOAEL provided in the PPGN is having to turn up the volume on the television; needing to speak more loudly to be heard; where there is no alternative ventilation, closing windows for some of the time because of the noise; or, a potential for some reported sleep disturbance. In line with the NPPF and NPSE, the PPGN states that consideration needs to be given to mitigating and minimising effects above the LOAEL but taking account of the economic and social benefits being derived from the activity causing the noise.

A.16 The PPGN suggests that noise exposures above the SOAEL cause material changes in behaviour. Examples of noise exposures above the SOAEL provided in the PPGN are, where there is no alternative ventilation, keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present; and/or there is a potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. In line with the NPPF and NPSE, the PPGN states that effects above the SOAEL should be avoided and that whilst the economic and social benefits being derived from the activity causing the noise must be taken into account, such exposures are undesirable.

A.17 The PPGN suggests that a noise impact may be partially offset if the residents of affected dwellings have access to a relatively quiet part of their dwelling, private external amenity area and/or external public or private amenity space nearby.

Appendix B: Baseline Survey Data

Sound Level Survey Record (Attended Baseline Survey)

Location			Land off Station Road, Cropredy ST1										
Purpose of Monitoring			Baseline										
Relevant Guidance / Standard			BS 7445-1:2003 / BS 7445-2:1991 / BS 4142:2014 / BS 8233:2014										
Sound Measurement System													
RPS ID	Manufacturer / Model		Serial Number		Last Lab Verification		Filename		Memory Card ID				
92	SVANTEC SVAN 958		15811		20/11/2014		0001		-				
Microphone Height	Measurement Interval	Dynamic Range (dB)	Time Weighting		Frequency Weighting		Façade / Freefield		Photo?				
~1.5 m	100 ms	20 - 130	F		A		Freefield		☒				
			START				**END**						
Personnel			PB				PB						
Date / time			10/03/2016 10:04				10/03/2016 13:04						
Calibrator	RPS ID		15				15						
	Manufacturer / Model		RION NC-74				RION NC-74						
	Serial Number		110090				110090						
	Date last verification		19/10/2015				19/10/2015						
	Reference level		94.0				94.0						
	Meter reading		94.0				94.0						
Weather	Wind speed (m/s) & dir'n 1		0.0 - 3.1	E			0.0 - 3.1	E					
	Cloud cover (100%= 8 oktas)		7 oktas				7						
	Temperature (degrees Celsius)		~10 ºC				~10 ºC						
	Relative Humidity (%)		~ 60 %				~ 60 %						
	Likely temp. inversion / Precipitation / Fog / Wet ground / Frozen ground / Snow cover? (tick boxes)		TI	P	F	W	Fr	Sn	TI	P	F	W	Fr	Sn
	Subjective description / additional details		Dry, overcast				Dry, overcast						
Description of site (location of equipment, general surroundings, nature of ground between NSR and sound source(s) (hard/ soft ground, topography, intervening features, reflecting surfaces))													
Approximatley 15 m east of the railway line. Soft flat ground between survey and trainline.													
Description of sound environment at start of survey (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)													
Train movements on the railway and road traffic movements on Station Road.													

Sound Level Survey Record (Attended Baseline Survey)

Location				Land off Station Road, Cropredy ST2									
Purpose of Monitoring				Baseline									
Relevant Guidance / Standard				BS 7445-1:2003 / BS 7445-2:1991 / BS 4142:2014 / BS 8233:2014									
Sound Measurement System													
RPS ID	Manufacturer / Model		Serial Number	Last Lab Verification	Filename	Memory Card ID							
112	Rion NL-52		943363	28/01/2015	0001	-							
Microphone Height	Measurement Interval	Dynamic Range (dB)	Time Weighting	Frequency Weighting	Façade / Freefield	Photo?							
~1.5 m	100 ms	20 - 130	F	A	Freefield	☒							
			START				**END**						
Personnel			PB				PB						
Date / time			10/03/2016 10:15				10/03/2016 13:15						
Calibrator	RPS ID		15				15						
	Manufacturer / Model		RION NC-74				RION NC-74						
	Serial Number		110090				110090						
	Date last verification		19/10/2015				19/10/2015						
	Reference level		94.0				94.0						
	Meter reading		94.0				94.0						
Weather	Wind speed (m/s) & dir'n 1		0.0 - 3.1	E			0.0 - 3.1	E					
	Cloud cover (100%= 8 oktas)		7 oktas				7						
	Temperature (degrees Celsius)		~10 ºC				~10 ºC						
	Relative Humidity (%)		~ 60 %				~ 60 %						
	Likely temp. inversion / Precipitation / Fog / Wet ground / Frozen ground / Snow cover? (tick boxes)		TI	P	F	W	Fr	Sn	TI	P	F	W	Fr	Sn
	Subjective description / additional details		Dry, overcast				Dry, overcast						
Description of site (location of equipment, general surroundings, nature of ground between NSR and sound source(s) (hard/ soft ground, topography, intervening features, reflecting surfaces))													
Approximatley 10 m west of Station Road. Hard flat ground between survey and road.													
Description of sound environment at start of survey (principal environmental and natural sound sources, which sources are dominant, character of the sound environment cf. to the character of the new source)													
Train movements on the railway and road traffic movements on Station Road.													

RPS

Contact

RPS Planning & Development
6-7 Lovers Walk
Brighton
East Sussex
BN1 6AH
T: +44 (0) 1273 546 800
rpsbn@rpsgroup.com