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GLADMAN DEVELOPMENTS LTD

Land off Kirkdale Road, Kirkbymoorside

Noise Assessment

October 2013

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GLADMAN DEVELOPMENTS LTD**Land of Kirkdale Road, Kirkbymoorside****Noise Assessment****October 2013****PREPARED BY:**

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1 INTRODUCTION

- 1.1.1 By written instruction from Gladman Developments Limited, Wardell Armstrong LLP was commissioned to undertake a noise assessment to support an outline planning application for a proposed residential development located off Kirkdale Road (A170), Kirkbymoorside.
- 1.1.2 The proposed development site is bound to the northwest by open land; to the northeast by residential properties on Poplar Avenue, Beech Drive and West Pasture; to the southeast by Kirkbymoorside Community Primary School, a lay-by and the A170; and to the southwest by the residential property of Broad View and open land. A number of recycling banks, comprising paper, glass, food tins/cans, clothes, plastic bottles and food carton recycling facilities, are located within the A170 lay-by immediately to the southeast of the site.
- 1.1.3 The proposed development will comprise 225 residential dwellings as shown on masterplan drawing 4751-L-02 rev I. An area of land including structural landscape is envisaged to be provided for the expansion of Kirkbymoorside Community Primary School. Vehicular access to the development site will be gained via the A170, to the south of the site. In order to accommodate the site access, it is understood that the recycling banks within the lay-by to the southwest of the site will be relocated.
- 1.1.4 This report details the results of a noise assessment undertaken in support of the outline planning application for the proposed residential development. The report assesses the results of the noise survey carried out in accordance with current guidance, and includes recommendations for noise mitigation as appropriate.

2 ASSESSMENT METHODOLOGY

2.1 Consultation and Scope of Assessment

- 2.1.1 Prior to carrying out the noise assessment the potential impacts of the proposed development and general principles of the assessment methodology were discussed and agreed with Mr Paul Hunt, of the Environmental Health Department of Ryedale District Council (RDC).
- 2.1.2 An assessment is required to consider any potentially noise sensitive areas of the site, i.e. the proposed residential properties. The dominant noise sources across the development site are road traffic on the A170 Kirkdale Road.
- 2.1.3 The potential impacts of the existing sources of noise on the proposed residential area of the development have been assessed with reference to the National Planning Policy Framework (NPPF), the Noise Policy Statement for England (NPSE) and the World Health Organisation Guidelines for Community Noise, 1999 (WHO 1999).

2.2 Assessment Methodology

National Planning Policy Framework

- 2.2.1 In March 2012 the 'National Planning Policy Framework' (NPPF) was introduced as the current planning policy guidance within England. Paragraph 123 of the NPPF states:

'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 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; 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.'

2.2.2 In terms of 'adverse effects' the NPPF refers to the 'National Policy Statement for England' (NPSE), which defines three categories, as follows:

'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 health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

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

SOAEL – Significant Observed Adverse Effect Level

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

2.2.3 However, whilst the above terms are provided in NPSE, paragraph 2.22 acknowledges that these terms require further research in order to establish what is meant in terms of 'adverse impact'.

'2.22 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.'

2.2.4 The Noise Policy Statement for England refers to the World Health Organisation when discussing health and quality of life. British Standard 8233: 1999: "Sound Insulation and Noise Reduction for Buildings - Code of Practice" (BS8233) also identifies appropriate internal noise levels for residential and office premises. Therefore the standards set out in the WHO guidance document and BS8233 have been used for setting appropriate noise limits.

2.2.5 The National Planning Practice Guidance states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. In both cases, the

potential noise impact needs to be addressed. Opportunities should also be taken, where possible, to achieve improvements to the acoustic environment.

World Health Organisation (WHO) Guidelines for Community Noise:

2.2.6 RDC have indicated that appropriate external and internal noise levels across the developed site should be set in accordance with the World Health Organisation Guidelines for Community Noise, 1999 (WHO 1999). The guidelines suggest appropriate criteria and noise limits for outdoor living areas and habitable rooms of residential dwellings.

2.2.7 In accordance with the requirements of WHO 1999 the following daytime and night-time noise limits will need to be met for noise from external sources within sensitive areas of the residential dwellings:

- 50dB $L_{Aeq (16 \text{ hour})}$ during the daytime in outdoor living areas.
- 35dB $L_{Aeq (16 \text{ hour})}$ during the daytime in noise sensitive rooms other than bedrooms.
- 30dB $L_{Aeq (8 \text{ hour})}$ during the night-time in bedroom areas.
- 45dB L_{AMAX} should not be exceeded during the night-time in bedroom areas.

3 NOISE SURVEY

3.1.1 On the 17th, 22nd and 23rd August 2011 Wardell Armstrong LLP carried out a noise survey to assess the noise levels across the development site.

3.1.2 Noise measurements were taken at four monitoring locations, considered to be representative of the residential properties at the site. The monitoring locations are as follows, and are shown on Drawing Number LE11256/001:

- Monitoring Location 1: In the southern part of the site, approximately 10m from the southeastern site boundary.
- Monitoring Location 2: In the southern part of the site, approximately 6m from the southeastern site boundary.
- Monitoring Location 3: In the northern part of the site.
- Monitoring Location 4: In the southeastern part of the site, approximately 15m to the north of the Kirkbymoorside Community Primary High School.

3.1.3 Attended noise monitoring was carried out during the following periods:

- Between 1000 and 1500 hours on the 17th August 2011. This time period is considered to be representative of the daytime period.
- Between 1800 and 2200 hours on the 22nd August 2011. This time period is considered to be representative of the evening period.
- Between 0400 and 0700 hours on the 23rd August July 2011. This time period is considered to be representative of the worst case levels of transportation noise during the night-time period.
- Between 0700 and 0920 hours on the 23rd August July 2011. This time period is considered to be representative of the peak hour transportation noise during the daytime period.

3.1.4 The noise measurements were made using a Type 1, integrating sound level meter. The sound level meter was mounted vertically on a tripod 1.2m above the ground and more than 3.5 metres from any other reflecting surfaces.

3.1.5 All noise monitoring took place during dry and calm weather conditions. The sound level meter was calibrated to a reference level of 94dB at 1kHz both before, and on completion of, the noise survey. No drift in calibration was recorded during the survey.

3.1.6 The attended noise measurements were taken over 15 minute periods during the survey. A-weighted¹ L_{eqs} ² were recorded to comply with the requirements of WHO 1999. A-weighted L_{90s} ³ and L_{10s} ⁴, together with the maximum and minimum sound pressure levels, were also recorded to provide additional information. The measured noise levels are set out in full in Appendix A.

3.1.7 Attended noise monitoring allows observations and detailed notes to be made of the significant noise sources which contribute to each of the measured levels. The observations identified the following significant noise sources at the site:

Road Traffic: Noise from road traffic on the A170 and to a lesser extent the local road network, was audible and continuous, throughout the survey, at all of the monitoring locations. A drop in the level of road traffic on the A170 was noted during the night-time period.

Birdsong: There are a number of trees and shrubs in the vicinity of the survey locations and birdsong was audible during the measurements; during both the daytime and night-time periods.

A170 Lay-By Recycling Banks: Noise from local residents using the recycling bank within the A170 lay-by was occasionally audible at monitoring location 1, during the daytime period. To accommodate the proposed site access it is understood that the recycling banks are to be relocated within the lay-by and at a greater distance from noise sensitive areas of the development. The noise generated by local residents using these facilities, at the proposed development site, will be less than that measured throughout the survey at monitoring location 1.

Other sources: Noise was audible from aircraft during the daytime at all of the monitoring locations.

¹ A' Weighting	An electronic filter in a sound level meter which mimics the human ear's response to sounds at different frequencies under defined conditions
² L_{eqs}	Equivalent continuous noise level; the steady sound pressure which contains an equivalent quantity of sound energy as the time-varying sound pressure levels.
³ L_{90}	The noise level which is exceeded for 90% of the measurement period.
⁴ L_{10}	The noise level which is exceeded for 10% of the measurement period.

3.1.8 During term time, the Kirkbymoorside Community School also has the potential to generate noise in the southeastern part of the development site. Activities at the school which have the potential to generate noise include children playing during break-times. As the noise survey was carried out during the schools summer holiday, the level of noise generated by the children during break-times could not be determined. However, it is considered that the noise generated by the children during break-times, would not significantly affect the ambient noise levels in the southeastern part of the development site, when considered over a 16-hour daytime period.

4 NOISE IMPACT ASSESSMENT

4.1 Existing Noise Levels

4.1.1 The measured noise levels for each monitoring location have been divided into daytime (0700-2300 hours) and night-time (2300-0700 hours) categories. The individual levels have been arithmetically averaged and then rounded up to give a single daytime and night-time level for each location. The results for each of the monitoring locations are presented in Table 1.

Table 1: Average Daytime and Night-time Noise Levels (Figures in dB L _{Aeq})		
Time	Monitoring Location	Average Measured Noise Level
0700-2300	1	56.0
2300-0700		45.3
0700-2300	2	64.1
2300-0700		55.3
0700-2300	3	40.6
2300-0700		36.9
0700-2300	4	45.4
2300-0700		36.2

4.1.2 Based on the results obtained, a robust assessment can be made of the noise levels at the site, and of the mitigation necessary to achieve the required noise levels at the development.

4.1.3 The maximum noise levels recorded during each night-time period of the survey, at each of the monitoring locations, are summarised in Table 2.

Table 2: Summary of the Maximum Night-time Noise Levels (Figures in dB L _{Amax})	
Monitoring Location	Maximum Measured Noise Level
1	61.9-65.8
2	74.4-76.3
3	51.3-55.6
4	56.5-56.7

4.2 WHO 1999 Assessment of Daytime Noise Levels in Outdoor Living Areas

- 4.2.1 The daytime noise levels in outdoor living areas have been assessed in accordance with WHO 1999. In accordance with WHO 1999 the acceptable daytime noise level within outdoor living areas is 50dB L_{Aeq} .
- 4.2.2 The measured daytime noise levels (as detailed in Table 1) indicate that mitigation measures will be required along the southern site boundary, located nearest to the A170, to ensure that external noise limits, in accordance with the WHO 1999, are achieved across the proposed development site.

4.3 WHO 1999 Assessment of Daytime Noise Levels in Living Rooms

- 4.3.1 In accordance with the WHO 1999 the appropriate daytime noise level within living room areas is 35dB L_{Aeq} .
- 4.3.2 The measured daytime noise levels (as detailed in Table 1) have been used to determine the noise levels likely at the façades of properties in the vicinity of the monitoring locations during the daytime period.
- 4.3.3 Before internal noise levels can be calculated 2.5dB(A) must be added to the freefield measured levels to allow for the reflection of noise from the proposed housing façades when the buildings are in place.
- 4.3.4 The calculated noise levels at the façades of the properties, together with the level of attenuation required to achieve 35dB L_{Aeq} in the living room areas, are summarised in Table 3.

Table 3: Façade Noise Level at Properties in the Vicinity of the Monitoring Locations and Level of Attenuation Required to Achieve the Internal Daytime Noise Limit (Figures in dB(A))		
Residential Properties	Noise Level at the Façade of the Property	Level of Attenuation Needed To Achieve Noise Limit in Living Room Areas
Residential properties in the southern part of the site, i.e. Monitoring Location 1	58.5	23.5
Residential properties in the southern part of the site, i.e. Monitoring Location 2	66.6	31.6
Residential properties in the northern part of the site, i.e. Monitoring Location 3	43.1	8.1
Residential properties in the southeastern part of the site, i.e. Monitoring Location 4	47.9	12.9

4.3.5 The facades of the properties further into the site will be protected by the buildings themselves and/or screened by other buildings. It is considered that the noise levels at these facades, and therefore the level of attenuation the facades would need to provide, to achieve 35dB L_{Aeq} in the living room areas, is likely to be less than those detailed in Table 3.

4.4 WHO 1999 Assessment of Night-time Noise Levels in Bedrooms

4.4.1 In accordance with the WHO 1999 the acceptable night-time noise levels, in bedroom areas are 30dB L_{Aeq} and 45dB L_{AMAX} .

4.4.2 The measured night-time noise levels, as detailed in Tables 1 and 2, have been used to determine the noise levels likely at the façades of properties in the vicinity of the monitoring locations, during the night-time period. To be robust, the calculated maximum noise levels at these façades are based on the highest maximum noise levels recorded during the night-time survey.

4.4.3 Before internal noise levels can be calculated 2.5dB(A) must be added to the freefield measured levels to allow for the reflection of noise from the proposed housing facades when the buildings are in place.

- 4.4.4 The calculated noise levels at the façades of properties, together with the level of attenuation required to achieve 30dB L_{Aeq} and 45dB L_{AMAX} in the bedrooms, are summarised in Table 4.

Table 4: Façade Noise Level at Properties in the Vicinity of the Monitoring Locations and Level of Attenuation Required to Achieve the Internal Night-time Noise Limit (Figures in dB(A))			
Residential Properties	Noise Level at the Façade of the Property (L_{Aeq})	Maximum Noise Level at the Façade of the Property (L_{AMAX})	Level of Attenuation Needed To Achieve the Noise Limits in Bedrooms
Residential properties in the southern part of the site, i.e. Monitoring Location 1	47.8	68.3	23.3
Residential properties in the southern part of the site, i.e. Monitoring Location 2	57.8	78.8	33.8
Residential properties in the northern part of the site, i.e. Monitoring Location 3	39.4	58.1	13.1
Residential properties in the southeastern part of the site, i.e. Monitoring Location 4	38.7	59.2	14.2

- 4.4.5 The facades of the properties further into the site will be protected by the buildings themselves and/or screened by other buildings. It is considered that the noise levels at these facades, and therefore the level of attenuation the facades would need to provide to achieve the 30dB L_{Aeq} and 45dB L_{AMAX} in the bedrooms, is likely to be less than those detailed in Table 4.

5 NOISE ATTENUATION SCHEME

5.1 Introduction

- 5.1.1 The results of the WHO 1999 assessment indicates that noise mitigation measures would need to be incorporated into the proposed site design to ensure that the required external and internal noise levels are achieved at the proposed residential areas of the development.

5.2 Daytime Noise Levels in Outdoor Living Areas

- 5.2.1 The Indicative Site Layout Plan 4751-L-02 rev I shows that the majority of outdoor living areas in the southern part of the site, located nearest to and with a direct line of sight of the A170, will be screened by the buildings themselves. Prediction calculations indicate that the proposed residential buildings will therefore screen the outdoor living areas from road traffic and ensure that the required external noise limit of 50dB L_{Aeq} is met. These calculations assume that the centre of gardens would be 25m from the carriageway of the A170. It is however recommended that any outdoor living areas located closest to, and with a direct line of sight of the A170, be provided with local mitigation comprising a close boarded fence or wall.
- 5.2.2 Properties further into the site will be screened by the proposed residential buildings themselves and would therefore be likely to achieve the required daytime noise levels.

5.3 Glazing Requirements for Living Room Areas

- 5.3.1 When assessing daytime noise levels in living rooms the noise attenuation provided by the overall building facade should be considered. To mitigate noise levels the composition of the building facade can be designed to provide the level of attenuation required. Glazing is generally the building element which attenuates noise the least, so the proportion of glazing in a building facade is an important consideration when assessing overall noise attenuation.
- 5.3.2 In the absence of design details for the building facades, it has been assumed that the glazing to noise sensitive rooms would comprise about 25% of the facade area. To calculate the overall attenuation provided by this percentage of glazing in a brick or block facade, a non-uniform partition calculation can be used.

- 5.3.3 The calculation combines the different degrees of attenuation of the wall element and the window element. A facade element comprising a solid brick or blockwork, will attenuate by 45-50dB (British Standard 8233: "Sound insulation and noise reduction for buildings – Code of practice" 1999) whereas standard double glazing will attenuate road traffic noise by 26-29dB(A) (BRE Digest 379 "Double glazing for heat and sound insulation"). The overall noise attenuation provided by this combination is, therefore, between 31.9dB(A) and 34.9dB(A).
- 5.3.4 A number of types of glazing would be able to achieve between 26-29dB. For example a 6/12/6 Pilkington glazing would achieve 26dB(A) attenuation and a 10/12/4 glazing would achieve 29dB(A) attenuation.
- 5.3.5 The noise attenuation requirements for living rooms in properties in different areas of the site are summarised in Table 3. Table 3 indicates that standard thermal double glazing would ensure that internal noise levels are met with the windows closed. However, with windows open, the attenuation provided by the façade will be approximately 15dB(A). This would allow the recommended internal noise limit to be exceeded in a number of living room areas located nearest to and with a direct line of sight of the A170.
- 5.3.6 On occasions this may be acceptable to the resident, but when quiet conditions are required, the resident should be able to close the windows whilst maintaining adequate ventilation. Some form of acoustic ventilation would therefore need to be installed in some of the living rooms located nearest to and with a direct line of sight of the A170. Alternatively, to meet the required noise levels, living rooms could be located on the screened side of the building.
- 5.3.7 Some facades will also be protected by the buildings themselves and/or screened by other buildings. Therefore noise levels at these façades are likely to be no more than 50dB L_{Aeq} . To achieve 35dB L_{Aeq} in living rooms the façades would therefore only need to attenuate 15dB(A) and this can be provided with standard thermal double glazing, even with windows open.
- 5.3.8 At this stage a detailed layout has not yet been confirmed. Glazing requirements can be confirmed on a plot by plot basis at reserved matters stage.

5.4 Glazing Requirements for Bedroom Areas

- 5.4.1 The noise attenuation requirements for bedrooms in properties in different areas of the site are summarised in Table 4. Table 4 indicates that standard thermal double glazing could ensure that internal noise levels are met with the windows closed. However with windows open the attenuation provided by the facade will fall to approximately 15dB(A).
- 5.4.2 Some form of acoustic ventilation would therefore need to be installed in some of the bedrooms located nearest to and with a direct line of sight of the A170. Alternatively, to meet the required noise levels, bedrooms could be located on the screened side of the building.
- 5.4.3 Some facades will also be protected by the buildings themselves and/or screened by other buildings. Therefore noise levels at these façades are likely to be no more than 45dB L_{Aeq} and 60dB L_{AMAX} . To achieve 30dB L_{Aeq} and 45dB L_{AMAX} in bedrooms the façades would therefore only need to attenuate 15dB(A) and this can be provided with standard thermal double glazing, even with windows open.
- 5.4.4 At this stage a detailed layout has not yet been confirmed. Glazing requirements will be confirmed on a plot by plot basis at reserved matters stage.

5.5 Acoustic Ventilation Requirements

- 5.5.1 It is recommended that the acoustic ventilation proposed at the site should, as a minimum, comply with Building Regulations 2000 Approved Document F1 Means of Ventilation and British Standard BS5925 1991: "Code of Practice for Ventilation Principles and Designing for Natural Ventilation".
- 5.5.2 The implementation of the recommended glazing together with acoustic ventilation should ensure that the required internal daytime and night-time noise limits are met in noise sensitive rooms.
- 5.5.3 The façades of some of the properties further into the site will be protected by the buildings themselves and/or screened by other buildings. Therefore, acoustic ventilation may not need to be installed in some of the living room areas and/or bedrooms of these properties. The requirement for acoustic ventilation can be confirmed on a plot by plot basis at reserved matters stage.

6 CONCLUSIONS

- 6.1.1 Wardell Armstrong has carried out a noise assessment for the proposed development site, located off Kirkdale Road (A170), in Kirkbymoorside.
- 6.1.2 The dominant source of existing noise at the residential areas of the proposed development is road traffic noise on the A170. The following discussion relates to the properties which will be most affected by the noise, i.e. those at the boundaries of the residential area of the development. All properties which are partially or wholly screened by intervening buildings will require less (or no) attenuation.
- 6.1.3 The assessment indicates that on-site mitigation measures will need to be implemented to ensure that noise from road traffic is reduced to an acceptable level. The requirements include the external noise limit of 50dB L_{Aeq} , together with the internal noise levels of 35dB L_{Aeq} during the daytime, and 30dB L_{Aeq} and 45dB L_{AMAX} during the night-time period.
- 6.1.4 The proposed residential properties will screen the majority of outdoor living areas from road traffic on the A170. It is however recommended that any outdoor living areas located closest to, and with a direct line of sight of the A170, be provided with local mitigation comprising a close boarded fence or wall to ensure that the required external noise limit of 50dB L_{Aeq} will be met in outdoor living areas of the development.
- 6.1.5 To achieve the internal noise levels required in living rooms and bedrooms of properties across the site, standard thermal double glazing (which attenuates road traffic noise by 26-29dB(A)), in a solid brick or blockwork façade, would be sufficient.
- 6.1.6 This should ensure that internal noise levels are met in living rooms and bedrooms with the windows closed. However, with the windows open the attenuation provided by the façade will be no more than approximately 15dB(A), which would allow the internal noise limit to be exceeded in a number of living rooms and bedrooms. Acoustic ventilation would therefore need to be installed in some of the rooms.
- 6.1.7 The facades of the properties further into the site will be protected by the buildings themselves and/or screened by other buildings. Acoustic ventilation may not need

to be installed in the living rooms and/or bedrooms of these properties.

- 6.1.8 The requirement for acoustic ventilation can be confirmed on a plot by plot basis once a detailed design layout is available.

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Appendix A
Noise Monitoring Results

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Appendix A: Noise Monitoring Results

Time	L _{Aeq} (dB(A))	L _{AMIN} (dB(A))	L _{AMAX} (dB(A))	L _{A90} (dB(A))	L _{A10} (dB(A))	Comments
Monitoring Location 1 – 17/08/2011						
Daytime Period						
1001-1016	58.1	40.1	69.2	50.0	61.0	Road traffic noise from vehicle movements on A170. Aircraft noise audible. Noise generated from van unloading glass bottles at recycling facility.
1157-1213	56.5	43.6	67.1	51.0	59.5	Road traffic noise from vehicle movements on A170. Noise generated by two vehicles stopping at recycling facility. Occasional distant aircraft noise. Noise from an electric saw from direction of school was occasionally audible.
1357-1412	56.2	36.1	71.1	46.5	59.5	Road traffic noise from vehicle movements on A170. Occasional banging from direction of school. Noise generated by three vehicles stopping at recycling facility. Occasional distant aircraft noise.
Monitoring Location 1 – 22/08/2011						
Daytime Period						
1753-1808	57.4	40.1	68.7	49.5	60.5	Road traffic noise from vehicle movements on A170. Occasional distant aircraft noise. Sound of gunshot in distance. Noise from crashing of pushbike into bottle bank at recycling facility.
1939-1954	54.2	36.9	64.6	44.5	58.5	Road traffic noise from intermittent vehicle movements on A170. Noise generated by two vehicles stopping at recycling facility. Sound of strimmer from direction of farm in the direction of monitoring location 2.
2113-2128	53.1	34.7	73.0	40.0	57.5	Road traffic noise from intermittent vehicle movements on A170. Unidentified bang from direction of recycling facility (Max: 73.0 dB). Noise from owls occasionally audible.
Monitoring Location 1 – 23/08/2011						
Night-time Period						
0358-0414	41.1	21.5	61.9	22.0	40.0	Road traffic noise from occasional vehicle movements on A170 (Max: 61.9 dB).
0534-0549	49.4	26.1	65.8	33.5	53.0	Road traffic noise from occasional vehicle movements on A170. Birdsong.
Daytime Period						
0706-0722	54.9	35.6	68.6	42.5	59.0	Road traffic noise from intermittent vehicle movements on A170 (Max: 68.6 dB). Noise from person using recycling facility.

Time	L _{Aeq} (dB(A))	L _{AMIN} (dB(A))	L _{AMAX} (dB(A))	L _{A90} (dB(A))	L _{A10} (dB(A))	Comments
0904-0919	57.8	45.4	67.6	52.5	60.5	Road traffic noise from vehicle movements on A170. Noise of grass cutter on opposite side of A170 and behind recycling facility. Noise generated from two vehicles unloading glass bottles at recycling facility. Occasional banging audible from direction of school and engineering works.

Time	L _{Aeq} (dB(A))	L _{AMIN} (dB(A))	L _{AMAX} (dB(A))	L _{A90} (dB(A))	L _{A10} (dB(A))	Comments
Monitoring Location 2 – 17/08/2011						
Daytime Period						
1033-1048	64.4	38.8	74.2	49.0	68.5	Road traffic noise from vehicle movements on A170. Occasional aircraft audible. Van doors slamming and engine starting at residential property to south of monitoring location.
1218-1233	64.2	38.4	73.4	50.5	68.5	Road traffic noise from vehicle movements on A170. Noise of truck engine starting at residential property to south of monitoring location.
1416-1431	63.9	37.4	76.9	49.0	68.0	Road traffic noise from vehicle movements on A170. Occasional aircraft audible.
Monitoring Location 2 – 22/08/2011						
Daytime Period						
1816-1831	67.9	40.0	92.2	49.5	70.0	Road traffic noise from vehicle movements on A170. Sound of gunshot in distance.
1958-2013	63.1	35.8	77.4	41.0	68.5	Road traffic noise from intermittent vehicle movements on A170. Noise of vehicle leaving residential property to south of monitoring location. Distant sound of person whistling.
2132-2148	60.7	33.9	73.6	37.0	66.0	Road traffic noise from intermittent vehicle movements on A170.
Monitoring Location 2 – 23/08/2011						
Night-time Period						
0419-0434	52.8	21.3	76.3	22.5	45.0	Road traffic noise from occasional vehicle movements on A170, including HGV (Max: 76.3 dB).
0552-0608	57.8	29.4	74.4	33.0	58.5	Road traffic noise from intermittent vehicle movements on A170 (Max: 74.4 dB). Birdsong.
Daytime Period						
0727-0742	63.8	34.8	76.8	47.0	68.5	Road traffic noise from vehicle movements on A170 (Max: 76.8 dB). Car door slamming and engine starting at residential property to south of monitoring location.
0846-0901	64.5	40.8	74.7	49.5	69.5	Road traffic noise from vehicle movements on A170, including tractor (Max: 74.7 dB). Noise of grass cutter from direction of lay-by adjacent to monitoring location 1. Occasional banging audible from direction of engineering works. Distant noise of saw from residential property to south of monitoring location.

Time	L _{Aeq} (dB(A))	L _{AMIN} (dB(A))	L _{AMAX} (dB(A))	L _{A90} (dB(A))	L _{A10} (dB(A))	Comments
Monitoring Location 3 – 17/08/2011						
Daytime Period						
1101-1116	40.7	32.1	70.0	34.5	41.5	Distant road traffic noise from vehicle movements on A170. Occasional aircraft audible. Birdsong.
1251-1310	43.5	32.8	65.0	35.5	46.5	Distant road traffic noise from vehicle movements on A170. Noise from aircraft overhead (Max: 65.0 dB). Distant noise from helicopter. Birdsong.
1312-1327	37.7	33.2	58.8	35.0	39.0	Distant road traffic noise from vehicle movements on A170. Occasional distant aircraft audible. Birdsong.
Monitoring Location 3 – 22/08/2011						
Daytime Period						
1853-1908	40.2	35.1	52.0	38.0	42.0	Distant road traffic noise from vehicle movements on A170. Noise from church chimes. Occasional sound of sheep bleating. Occasional birdsong. Distant voices from direction of residential properties to east of monitoring location occasionally audible.
2027-2042	42.0	34.9	61.6	38.0	43.0	Distant road traffic noise from vehicle movements on A170. Occasional distant sound of sheep bleating. Noise generated by distant combine harvester working in field occasionally audible.
Monitoring Location 3 – 23/08/2011						
Night-time Period						
0449-0504	35.0	21.7	55.6	23.0	35.0	Occasional sound of sheep bleating (Max: 55.6 dB). Distant road traffic noise from occasional vehicle movements on A170. Noise from church chimes.
0622-0637	38.8	30.4	51.3	33.5	41.0	Distant road traffic noise from occasional vehicle movements on A170 and from direction of village to east. Birdsong.
Daytime Period						
0807-0822	39.4	35.4	63.0	37.5	40.5	Distant road traffic noise from vehicle movements on A170. Birdsong. Occasional bang audible from direction of village to east.

Time	L _{Aeq} (dB(A))	L _{AMIN} (dB(A))	L _{AMAX} (dB(A))	L _{A90} (dB(A))	L _{A10} (dB(A))	Comments
Monitoring Location 4 – 17/08/2011						
Daytime Period						
1130-1145	40.6	32.5	66.6	37.0	42.0	Distant road traffic noise from vehicle movements on A170. Occasional banging from direction of the residential properties to east of the monitoring location. Occasional dog barking from direction of residential properties to south of monitoring location. Birdsong. Distant occasional sound of sheep bleating.
1334-1349	41.3	34.0	62.9	37.0	43.5	Distant road traffic noise from vehicle movements on A170. Occasional distant aircraft noise. Occasional distant noise of electric tool from direction of school. Noise from residential properties to east of monitoring location occasionally audible, including distant voices and dog barking.
1440-1449	60.6	33.9	89.7	38.5	46.0	Distant road traffic noise from vehicle movements on A170. Fighter jet flying overhead (Max: 89.7 dB). Occasional distant aircraft noise. Occasional banging from direction of residential properties to south of monitoring location. Distant sound of person whistling. Noise from residential properties to east of monitoring location occasionally audible, including distant voices and door shutting.
Monitoring Location 4 – 22/08/2011						
Daytime Period						
1916-1931	45.5	36.9	66.8	41.5	48.0	Distant road traffic noise from vehicle movements on A170. Birdsong. Sound of gunshot in distance. Occasional distant dog barking from direction of residential properties to south of monitoring location.
2049-2103	42.1	36.0	59.3	38.5	44.5	Distant road traffic noise from vehicle movements on A170. Occasional distant sound of sheep bleating from northerly direction. Noise generated by distant combine harvester working in field occasionally audible.
Monitoring Location 4 – 23/08/2011						
Night-time Period						
0512-0527	33.1	22.6	56.5	25.0	37.0	Distant road traffic noise from occasional vehicle movements on A170. Birdsong.
0644-0700	39.2	30.4	56.7	34.5	41.5	Occasional noise from sheep bleating (Max: 56.7 dB). Birdsong. Distant road traffic noise from occasional vehicle movements on A170 and from direction of village to east.

Time	L _{Aeq} (dB(A))	L _{AMIN} (dB(A))	L _{AMAX} (dB(A))	L _{A90} (dB(A))	L _{A10} (dB(A))	Comments
Daytime Period						
0826-0841	42.5	37.1	51.1	40.0	44.0	Distant road traffic noise from vehicle movements on A170 and from direction of village to east. Occasional banging and dog barking from direction of residential properties to south of monitoring location. Occasional distant sound of sheep bleating.

Drawing LE11256-001
Noise Monitoring Location Plan

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