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BELLWAY HOMES LIMITED (NORTH WEST) AND ANWYL HOMES

LAND OFF GRESFORD ROAD, LLAY, WREXHAM

NOISE ASSESSMENT REPORT

DECEMBER 2017

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LAND OFF GRESFORD ROAD, LLAY, WREXHAM

NOISE ASSESSMENT REPORT

DECEMBER 2017

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MINING AND MINERAL PROCESSING
MINERAL ESTATES AND QUARRYING
WASTE RESOURCE MANAGEMENT

CONTENTS

1	Introduction	2
2	Assessment Methodology	3
3	Noise Survey	5
4	Noise Impact Assessment	7
5	Noise Attenuation Scheme	11
6	Conclusions	12

APPENDICES

Appendix A	Noise Monitoring Results
Appendix B	Summary of Glazing and Ventilation Requirements
Appendix C	Glazing and Ventilation Specification

DRAWING

LE14078-001	Noise Monitoring Locations
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1 INTRODUCTION

- 1.1.1 By instruction dated 4th July 2017 from Mr Kieron Morley of behalf of Bellway Homes and Anwyl Homes, Wardell Armstrong LLP have prepared a noise assessment report to discharge a planning condition for a residential development on a site on the northern side of Gresford Road, Llay, Wrexham.
- 1.1.2 The proposed development site is located in eastern part of the Llay, adjacent to Home Farm and will comprise 362 dwellings, a roundabout from Straight Mile, access from Gresford Road and associated infrastructure.
- 1.1.3 To the north, the site is bound by Straight Mile (B5102). To the east, the site is bound by open agricultural land. To the south, the site is bound by Gresford Road (B5373) with existing residential houses. To the west the site is bound by The Crown Restaurant, off the junction connecting Gresford Road (B5373), Straight Mile, Chapel Lane and Rackery Lane with Llay industrial estate beyond. The site is currently open agricultural land.
- 1.1.4 Outline planning permission was granted following appeal (Ref No: APP/H6955/A/16/3147116) and ultimately determined by the first Minister for Wales; the decision notice was issued on 26 June 2017. Condition 18 of the Decision Notice states :
- 18. No development shall commence in any phase with a boundary bordering the Straight Mile until a scheme of noise mitigation for the dwellings in that phase has been submitted to and approved in writing by the local Planning Authority. No dwellings shall be occupied until the approved noise mitigation scheme has been implemented.*
- 1.1.5 This noise assessment report uses the provided planning layout (Ref PLA 03 Rev A) and includes predictions of internal noise levels within proposed habitable rooms, together with external noise levels within proposed outdoor living areas, and provides a subsequent glazing, ventilation and mitigation scheme in order to satisfy Condition 18.
- 1.1.6 This report details the results of the noise survey, assesses the results and includes any recommendations for noise mitigation to comply with Condition 18.

2 ASSESSMENT METHODOLOGY

2.1 Noise Survey:

2.1.1 As part of this assessment, Wardell Armstrong LLP has carried out attended noise surveys to assess the current ambient noise levels at specific receptor locations. The methodology of the noise survey is set out in more detail in Section 3 of this report.

2.2 Assessment Methodology Adopted:

2.2.1 To demonstrate compliance with the planning condition, noise from road traffic on Straight Mile will be assessed in accordance with current guidance including:

- The World Health Organisation Guidelines for Community Noise, 1999 (WHO);
- British Standard 8233: 2014 Guidance on sound insulation and noise reduction for buildings (BS8233); and,
- Department of Transport's memorandum, "Calculation of Road Traffic Noise" (CRTN), 1998

2.3 Guidance

2.3.1 The WHO Guidelines for Community Noise 1999 suggest guideline values for internal noise exposure which take into consideration the identified health effects and are set, based on the lowest effect levels for general populations. Guideline values for annoyance which relate to external noise exposure are set at 50 or 55 dB(A), representing day time levels below which a majority of the adult population will be protected from becoming moderately or seriously annoyed respectively.

2.3.2 The following guideline values are suggested by WHO:

- 35 dB L_{Aeq} (16 hour) during the day time in noise sensitive rooms
- 30 dB L_{Aeq} (8 hour) during the night time in bedrooms
- 45 dB L_{Amax} (fast) during the night time in bedrooms
- 55 dB L_{Aeq} (16 hour) to protect majority of population from becoming seriously annoyed

2.3.3 British Standard 8233 "Guidance on sound insulation and noise reduction for buildings" 2014 bases its advice on the WHO Guidelines. In addition, for internal noise levels it recommends a guideline value of 40dB L_{Aeq} (16 hour) for dining areas and also states;

“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.”

2.3.4 Furthermore, with regard to external noise, the Standard states;

“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 guidance value of 55 dB $L_{Aeq,t}$ which would be acceptable in noisier environments. However, it is also recognised 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.

Guidance on Assessment of Road Traffic Noise

2.3.5 The Department of Transport’s memorandum, “Calculation of Road Traffic Noise” (CRTN), 1998 defines a shortened measurement procedure which is used to calculate the $L_{A10,18\text{Hour}}$ noise level from a measured 3-hour period. The method requires the measurement of noise over 3 consecutive hours between 1000 and 1700 hours.

2.3.6 From the 3 measured 1 hour periods, the arithmetic average of the three $L_{A10,1\text{Hour}}$ measurements is taken. The $L_{A10,18\text{Hour}}$ noise level is then determined using the following calculation method;

- $L_{A10,18\text{Hour}} = L_{A10,3\text{Hour}} - 1$

2.3.7 The document “Converting the UK traffic noise index $L_{A10,18\text{hour}}$ to EU noise indices for noise mapping” by P G Abbott and P M Nelson (The TRL Method) provides a calculation method to convert the calculated $L_{A10,18\text{Hour}}$ into a daytime 16 hour L_{Aeq} as described below.

- $L_{\text{day}} = 0.95 \times L_{A10,18\text{Hour}} + 1.44\text{dB}$

3 NOISE SURVEY

3.1.1 On Wednesday 19th and Thursday 20th July 2017 Wardell Armstrong LLP carried out a noise survey at two monitoring locations (MLs) (as shown on drawing LE14078-001), which are locations considered representative of the noise sensitive receptors.

3.1.2 The monitoring locations (MLs) are as follows:

- Monitoring Location 1: On the northern boundary of the site, 3m from Straight Mile and 200m from the Junction north west of the site which connects Straight Mile to Gresford Road to the west. This location was selected to best monitor potential noise from road traffic from Straight Mile.
- Monitoring Location 2: On the northern boundary of the site, 3m from Straight Mile and 100m east along the northern boundary from ML1. This location was selected to best monitor potential noise from road traffic at higher speeds on Straight Mile.

3.1.3 Noise monitoring was carried out between;

- 2325 hours on the 19th July and 1300 hours on the 20th July 2017 at Monitoring Location 1;
- 1535 hours on the 19th July and 1301 hours on the 20th July 2017 at Monitoring Location 2; and,
- Attended noise monitoring was carried out at between 2325 hours and 0000 hours on the 19th July and between 0800 hours and 1300 hours on the 20th July 2017.

3.1.4 Noise measurements were made using two Class 1, integrating sound level meters. Microphones were mounted vertically on tripods 1.2m above the ground and more than 3.5 metres from any other reflecting surfaces. The sound level meters were calibrated to a reference level of 94dB at 1kHz both before, and on completion of, the noise survey. No drift in calibration over 0.6dB was measured during the survey.

3.1.5 For the purpose of this assessment daytime hours are taken to be 0700 to 2300 hours and night-time hours to be 2300 to 0700 hours.

- 3.1.6 A-weighted¹ L_{eq} ² L_{90} ³ noise levels were measured to comply with the requirements of WHO and BS8233. A-weighted and L_{10} ⁴ noise levels, together with the maximum and minimum sound pressure levels, were also measured 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:
- **Road Traffic Noise:** Road traffic noise from Straight Mile was dominant at all areas of the site with a direct line of sight to the road.
 - **Other Sources:** Noise from bird song, livestock and distant aircraft noise was observed to be audible.
 - **Noise from commercial premises:** No noise was observed to be dominant from any of the commercial premises.

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.

4 NOISE IMPACT ASSESSMENT

4.1 Existing Noise Levels

4.1.1 The measured noise levels for monitoring locations 1 and 2 have been divided into daytime (0700-2300 hours) and night-time (2300-0700 hours) categories. The individual levels have been arithmetically averaged to give a single daytime and night-time level for each location at both facades of the building.

4.1.2 The results for each of the monitoring locations are presented in Table 2.

Table 2: Average Daytime and Night-time Noise Levels		
Monitoring Location	Time Period	Average Measured Noise Level (Figures in dB LAeq)
1	Daytime (0700-2300)	68
	Night-time (2300-0700)	62
2	Daytime (0700-2300)	71
	Night-time (2300-0700)	65

4.1.3 The maximum noise levels, measured during each night-time period of the survey, at each of the monitoring locations, are summarised in Table 3.

Table 3: Summary of the Maximum Night-time Noise Levels (Figures in dB LAmax)	
Monitoring Location	Maximum Measured Noise Level
1	84
2	87

4.1.4 Based on the results obtained, a robust assessment can be made of the noise levels at the proposed site, and of the mitigation necessary to achieve the required internal night-time noise levels for the proposed development to meet with the planning condition.

4.2 Noise at the Location of the Proposed Receptors

4.2.1 The measured noise levels at ML2 were found to be higher than measured levels at ML1. ML1 noise levels are likely to be lower, due to vehicles travelling at lower speeds as the monitoring location is closest to the Junction. For the purpose of this assessment, the higher noise levels from Straight Mile measured at ML2 have been used to assess the impact of road traffic noise on proposed receptors throughout the site.

- 4.2.2 The proposed roundabout on Straight Mile which will be used for site access is likely to have an impact of the road traffic noise on proposed receptors. The reduction of speed and the close proximity of cars travelling west has been considered within the calculations.
- 4.2.3 Road traffic noise at the proposed dwelling at Plot 332 on planning layout (Ref PLA 03 Rev A) was calculated to show an increase of 1dB due to the proposed road layout. Therefore, 1dB has been added on to the measured noise levels.
- 4.2.4 Other dwellings and garden areas at a greater distance to the roundabout were calculated to show a slight decrease in noise levels. However, to ensure a robust assessment, measured levels have been used for the remaining plots.
- 4.2.5 The proposed development (as a residential receptor) will be at a greater distance to the road than ML2. Therefore, the measured noise levels at ML2 should be corrected to reflect the position of the proposed development, to account for the propagation of noise over the greater distance.

Calculation of Road Traffic Noise

- 4.2.6 As detailed in paragraph 2.3.5 of this report, CRTN defines a method to calculate $L_{A10,18\text{Hour}}$ from three consecutive one hour measurements, taken between 1000 and 1700 hours. The assessment is shown below in Table 4;

Table 4: Measured Noise Levels (Figures in dB(A))	
Time	Measured L_{A10}
	ML2
1000 – 1100	69.9
1100 – 1200	69.6
1200 - 1300	69.9
Average $L_{A10,3\text{Hour}}$	69.8
$L_{A10,18\text{Hour}}$	68.8
$L_{Aeq,16\text{Hour}}$ Daytime (Calculated in accordance with TRL)	66.8

- 4.2.7 To ensure a robust assessment, the higher measured noise levels of 70.9 dB(A) at ML2 which includes peak traffic times, has been used for the assessment of road traffic noise at proposed receptors closest to Straight Mile.

4.3 Assessment of Daytime Noise Levels in Outdoor Living Areas

- 4.3.1 The measured noise levels at ML2 are greater than the guideline noise level for outdoor living areas at both monitoring locations during the daytime. Therefore, some form of mitigation measures are required for garden areas closest to Straight Mile.

4.4 Assessment of Daytime Noise Levels in Living Rooms and Bedrooms

- 4.4.1 Before internal noise levels can be calculated, 3dB(A) must be added to the free-field measured levels to allow for the reflection of noise from the development façades when the building is in place.
- 4.4.2 The measured daytime noise levels at ML2, as detailed in Table 2, have been used to determine the noise levels likely at the façades of the development in the vicinity of the monitoring locations during the daytime period.
- 4.4.3 The calculated noise levels at the façades of the development, together with the level of attenuation required to achieve 35dB L_{Aeq} in the living room and bedroom areas, are summarised in Table 5.

Table 5: Façade Noise Level at Properties in the Vicinity of the Monitoring Locations and Level of Attenuation Required to Achieve the Internal Daytime Guideline Noise Level (Figures in dB(A))		
Residential Properties	Noise Level at the Façade of the Property dB	Level of Attenuation Needed to Achieve Noise Limit in Living Room Areas
Closest proposed dwelling in direct line of sight of Straight Mile (20m from the Road)	63	28

- 4.4.4 The calculated noise levels at the facades of noise sensitive rooms using attenuation provided by distance, and screening of the buildings have been used to determine the glazing and ventilation requirements on a plot by plot basis, as detailed in Section 5 of this report.

4.5 Assessment of Night-time Noise Levels in Bedrooms

- 4.5.1 The measured night-time noise levels, as detailed in Tables 2 and 3, 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. Noise monitoring at ML2 was carried out during the night-time, and has therefore been included into the assessment.
- 4.5.2 To be robust, the noise levels at these façades are based on the highest $L_{Af,Max}$ noise level measured during the night-time survey. Before internal noise levels can be calculated 3dB(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.

- 4.5.3 The calculated noise levels at the façades of properties, together with the level of attenuation required to achieve 30dB L_{Aeq} and 45dB $L_{Amax,f}$ in the bedrooms, are summarised in Table 6.

Table 6: Façade Noise Level at Properties in the Vicinity of the Monitoring Locations and Level of Attenuation Required to Achieve the Internal Night-time Guideline Noise Levels (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 Guideline Noise Levels in Bedrooms
Closest proposed dwelling in direct line of sight of Straight Mile (20m from the Road)	56	72	27

- 4.5.4 The calculated noise levels at the facades of noise sensitive rooms using attenuation provided by distance, and screening of the buildings have been used to determine the glazing and ventilation requirements on a plot by plot basis.

5 NOISE ATTENUATION SCHEME

5.1 Outdoor Living Areas

5.1.1 The housing layout has been designed such that garden areas in the northern part of the site closest to Straight Mile, are located on the screen side of buildings. The provision of a 1.8m barrier between houses and garages will ensure that any garden areas with a direct line of sight to Straight Mile will achieve the 55dB $L_{Aeq,16Hour}$ recommended noise guideline level for external garden areas.

5.2 Living Room and Bedroom Areas

5.2.1 The guideline values are:

- Living room and bedroom areas during the daytime is 35dB L_{Aeq} ;
- Dining areas during the daytime is 40dB L_{Aeq} ;
- Kitchen areas during the daytime 45dB L_{Aeq} ; and,
- Bedrooms at night is 30 dB L_{Aeq} .

5.2.2 The noise levels likely at each facade of each property in the vicinity of Straight Mile have been determined, during the daytime and night time periods due to road traffic and other sources of noise, as detailed in Section 3 of this report. Detailed break in calculations have been undertaken for all noise sensitive rooms for each plot type. The glazing and ventilation required to achieve required guideline values are detailed in Appendix B.

5.2.3 The sound reduction data, of the glazing and ventilation specified, is detailed in Appendix C.

5.2.4 As an alternative to passive trickle ventilators, Positive Input Ventilation (PIV) can be installed in dwellings where ventilation is required. PIV is a mechanical ventilation system which allows for whole house ventilation by continuously introducing fresh air in to the dwelling via a fan located within the loft space, details in Appendix C.

6 CONCLUSIONS

- 6.1.1 Wardell Armstrong has carried out a noise assessment to accompany an application to discharge condition 18 of the outline planning permission for residential development on the Land off Gresford Road, Llay, Wrexham. This report aims to demonstrate compliance with Condition 18.
- 6.1.2 A noise survey has been undertaken on the site adjacent to the Straight Mile to assess mitigation requirements for dwellings, to comply with Condition 18.
- 6.1.3 Recommended mitigation, comprising specific glazing and ventilation provision for the noise sensitive rooms of each dwelling, is detailed in Appendix B.
- 6.1.4 A suitable external and internal noise environment that meets the relevant guideline level will be achieved with the implementation of the mitigation measures and comply with Condition 18.
- 6.1.5 The mitigation measures must be considered in the context of the wider environmental, economic and social benefits of the proposed development, as are detailed in the Planning Statement that accompanies the planning application.

Appendix A
Noise Monitoring Results

Appendix A

Noise Monitoring Results

ML1– Road Traffic Noise (Unattended) – Approx. 5m from Straight Mile (B5102) and 200m from junction						
Time	L _{Aeq} (dB)	L _A min (dB)	L _A max (dB)	L _{A90} (dB)	L _{A10} (dB)	Comments
19/07/2017 – 20/07/2017 – Night time						
23:30 - 23:45	54.4	34.1	77.8	35.4	52.8	Dominant road traffic noise from Straight Mile (B5102), distant audible noise coming from industrial complex to the west, however not dominant. Aircraft and birdsong occasionally audible.
23:45 - 00:00	56.3	31.6	78.2	33.3	50.8	
00:00 - 00:15	57.9	30.4	80.6	31.8	50.1	
00:15 - 00:30	59.2	31.4	79.4	32.4	52.7	
00:30 - 00:45	51.6	31.2	77.3	32.1	41.7	
00:45 - 01:00	54	31.3	79.9	32.8	43.2	
01:00 - 01:15	48.8	31	74.4	32.3	38.5	
01:15 - 01:30	56.9	31.2	79.8	32.4	44.2	
01:30 - 01:45	48.4	32.6	73.2	34.2	48.5	
01:45 - 02:00	52.8	34.5	78.4	37.3	51.1	
02:00 - 02:15	48.6	34.2	72.8	36.3	46	
02:15 - 02:30	53.5	34.8	75.1	36.4	46.2	
02:30 - 02:45	51	33.9	77.3	36.2	45.3	
02:45 - 03:00	54.3	34.9	80	36.7	48.2	
03:00 - 03:15	57.7	33.5	81	36.1	50.1	
03:15 - 03:30	54.7	33.4	79.5	34.7	41.6	
03:30 - 03:45	49.4	34.3	74	36	46.8	
03:45 - 04:00	54.8	33.3	76.6	35.2	46.2	
04:00 - 04:15	56.1	33.2	79.1	35.5	50.3	
04:15 - 04:30	57.5	33	82.4	35.8	48.4	
04:30 - 04:45	58.6	35.5	81.8	37.1	52	
04:45 - 05:00	60.2	37.3	84	39.8	57.9	
05:00 - 05:15	57.7	36.2	78.1	38.9	55.3	
05:15 - 05:30	62.5	36.3	84.1	39.9	60.3	
05:30 - 05:45	64.1	38.6	82.4	41.3	66.5	
05:45 - 06:00	66.2	37.6	82.4	42	70.1	
06:00 - 06:15	67.4	36.2	82.4	41.5	71.6	
06:15 - 06:30	67.1	39.1	84.4	42.2	71.4	
06:30 - 06:45	69	41.3	83.8	45	74	
06:45 - 07:00	68.7	42.3	82.9	45.9	73.7	
Overall	61.6	30.4	84.4	34	58	

ML1– Road Traffic Noise (Attended) – Approx. 5m from Straight Mile and 200m from junction						
Time	L _{Aeq} (dB)	L _A min (dB)	L _A max (dB)	L _{A90} (dB)	L _{A10} (dB)	Comments
20/07/2017 – Daytime						
07:00-08:00	69.1	41.1	84.6	48.5	74.3	Dominant road traffic noise from Straight Mile (B5102), distant audible noise coming from industrial
08:00-09:00	69.1	43.1	84.2	49.6	74.2	
09:00-10:00	68	39.3	84.7	46.4	72.8	

10:00-11:00	66.7	38.8	82.4	44.1	71.6	complex to the west, however not dominant. Aircraft and birdsong occasionally audible.
11:00-12:00	66.6	39.7	85.3	46.2	71.4	
12:00-13:00	67.2	40.5	83.7	47.7	71.6	
Overall	67.9	38.8	85.3	46.9	72.7	

ML2– Road Traffic Noise (Unattended) – Approx. 5m from Straight Mile and 100m from ML1						
Time	L _{Aeq} (dB)	L _A min (dB)	L _A max (dB)	L _{A90} (dB)	L _{A10} (dB)	Comments
19/07/2017 – 20/07/2017 – Night time						
23:45 - 00:00	59.5	31.4	82.2	33.1	46.5	Dominant road traffic noise from Straight Mile (B5102), distant audible noise coming from industrial complex to the west, however not dominant. Aircraft and birdsong occasionally audible.
00:00 - 00:15	61.1	29.7	83.7	31.2	50.6	
00:15 - 00:30	61.9	30.4	83.5	31.7	53.6	
00:30 - 00:45	55.1	29.3	80.6	30.7	36.2	
00:45 - 01:00	57.6	29.6	83.7	31.5	40.3	
01:00 - 01:15	52.3	30.3	78.7	31.7	37.4	
01:15 - 01:30	60.7	30.3	84.7	32	44.6	
01:30 - 01:45	49.4	31.6	78.1	32.8	39.7	
01:45 - 02:00	54.4	33.5	82.4	35.1	40	
02:00 - 02:15	37.1	32.3	53.8	34.4	38.6	
02:15 - 02:30	55.6	32.8	80.7	34.4	39.6	
02:30 - 02:45	52.8	33.1	80.4	34.5	38.8	
02:45 - 03:00	57.3	34	84.4	35.4	39.5	
03:00 - 03:15	60	33.2	83.1	34.9	46.6	
03:15 - 03:30	58.8	32.1	84.1	33.7	38.8	
03:30 - 03:45	50.7	33	77.4	34.6	38.8	
03:45 - 04:00	58.1	32.6	80.4	33.9	46.8	
04:00 - 04:15	58.9	31.8	82.7	34.4	49.6	
04:15 - 04:30	60.6	32.8	86.1	34.2	48.4	
04:30 - 04:45	61.4	33.5	86.2	35.5	43.6	
04:45 - 05:00	62.4	36.2	86.6	37.9	54.3	
05:00 - 05:15	62	35.3	84.5	37.7	55	
05:15 - 05:30	65.5	36.8	86.7	39	60.6	
05:30 - 05:45	67.6	38.7	86.3	40.5	71.4	
05:45 - 06:00	69	37.2	87.4	40.5	72.1	
06:00 - 06:15	70.6	36.4	85.2	39.5	76.7	
06:15 - 06:30	69.6	38.3	86.4	40.5	74.8	
06:30 - 06:45	71	40.2	86.6	43.6	76.6	
06:45 - 07:00	71.7	41	86.9	44.7	77	
Overall	64.5	29.3	87.4	33.2	58.5	

ML2– Road Traffic Noise (Attended) – Approx. 5m from Straight Mile and 100m from ML1						
Time	L_{Aeq} (dB)	L_A min (dB)	L_A max (dB)	L_{A90} (dB)	L_{A10} (dB)	Comments
20/07/2017 – Daytime						
07:00-08:00	72.1	42.3	87.2	48.6	77.5	Dominant road traffic noise from Straight Mile (B5102), distant audible noise coming from industrial complex to the west, however not dominant. Aircraft and birdsong occasionally audible.
08:00-09:00	71.9	42.9	87.8	48.9	77.1	
09:00-10:00	71	39.7	87.9	45.8	76.1	
10:00-11:00	69.9	37	87.7	42.8	75.1	
11:00-12:00	69.6	39.7	86.8	44.5	74.8	
12:00-13:00	69.9	39.3	87.8	45.2	75.0	
Overall	70.9	37.0	86.1	45.6	76.1	

Appendix B
Glazing and Ventilation Requirements

Plot Number	House Type	Room	Glazing and Ventilation Requirements (PIV may be used in place of passive window frame vents)
1	LARCH	Kitchen/Dining Lounge Family Room Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None 10/12/6 & PIV 10/12/6 & PIV 10/12/6 & PIV 10/12/6 & PIV 4/12/4 & PIV 4/12/4 & PIV
2	LEWIS	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4 Bedroom 5	None 10/12/6 & PIV 4/12/4 & PIV 10/12/6 & PIV 4/12/4 & PIV 10/12/6 & PIV 4/12/4 & PIV
3	LARCH	Kitchen/Dining Lounge Family Room Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None 10/12/6 & PIV 10/12/6 & PIV 10/12/6 & PIV 10/12/6 & PIV 4/12/4 & PIV 4/12/4 & PIV
4	FAIRHAVEN	Living Room Kitchen/Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	10/12/6 & PIV None 10/12/6 & PIV 10/12/6 & PIV 4/12/4 & PIV 4/12/4 & PIV
5	FAIRHAVEN	Living Room Kitchen/Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	10/12/6 & PIV None 10/12/6 & PIV 10/12/6 & PIV 4/12/4 & PIV 4/12/4 & PIV
6	LARCH	Kitchen/Dining Lounge Family Room Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None 10/12/6 & PIV 10/12/6 & PIV 10/12/6 & PIV 10/12/6 & PIV 4/12/4 & PIV 4/12/4 & PIV
7	WESTON	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	None 10/12/6 & PIV 10/12/6 & PIV 4/12/4 & PIV 4/12/4 & PIV
8	LARCH	Kitchen/Dining Lounge Family Room Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None 4/12/4 & PIV 10/12/6 & PIV 4/12/4 & PIV 10/12/6 & PIV None None
9	LEWIS	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	None 10/12/6 & PIV None 4/12/4 & PIV None

		Bedroom 4 Bedroom 5	10/12/6 & PIV None
10	GORDON ALT	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	4/12/4 & PIV 4/12/4 & PIV None 4/12/4 & PIV None
11	LARCH	Kitchen/Dining Lounge Family Room Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None None None None None None None
12	COVENTRY	Kitchen/Dining Lounge Bedroom 1 Bedroom 2	None None None None
13	COVENTRY	Kitchen/Dining Lounge Bedroom 1 Bedroom 2	None None None None
14	LARCH	Kitchen/Dining Lounge Family Room Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None None None None None None None
15	LEWIS	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4 Bedroom 5	None 4/12/4 & XS13 4400 None None None None 4/12/4 & XS13 4400
16	LARCH	Kitchen/Dining Lounge Family Room Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None None 4/12/4 & XS13 4400 None None None 4/12/4 & XS13 4400
17	OAKWOOD	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None None None None None 4/12/4 & XS13 4400
18	GORDON ALT	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	None None 4/12/4 & XS13 4400 None 4/12/4 & XS13 4400
19	LARCH	Kitchen/Dining Lounge Family Room Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None 4/12/4 & PIV 10/12/6 & PIV 10/12/6 & PIV 10/12/6 & PIV 4/12/4 & PIV 4/12/4 & PIV
20	WESTON	Kitchen/Dining Lounge	None 4/12/4 & PIV

		Bedroom 1 Bedroom 2 Bedroom 3	4/12/4 & PIV None None
21	LARCH	Kitchen/Dining Lounge Family Room Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None 4/12/4 & PIV 4/12/4 & PIV 4/12/4 & PIV 4/12/4 & PIV None None
22	OAKWOOD	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None 4/12/4 & PIV 4/12/4 & PIV 4/12/4 & PIV None None
23	FAIRHAVEN	Living Room Kitchen/Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	10/12/6 & PIV None 4/12/4 & PIV 10/12/6 & PIV None None
24	LARCH	Kitchen/Dining Lounge Family Room Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None 4/12/4 & PIV 4/12/4 & PIV 4/12/4 & PIV 4/12/4 & PIV None None
25	LARCH	Kitchen/Dining Lounge Family Room Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None 4/12/4 & PIV 4/12/4 & PIV 4/12/4 & PIV 4/12/4 & PIV None None
26	FAIRHAVEN	Living Room Kitchen/Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	10/12/6 & PIV None 10/12/6 & PIV 10/12/6 & PIV 4/12/4 & PIV 4/12/4 & PIV
27	SHELLEY	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	4/12/4 & XS13 4400 None None None 4/12/4 & XS13 4400
28	BYRON	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	None 4/12/4 & XS13 4400 10/12/6 & XS13 4400 None None
29	OAKWOOD	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None 4/12/4 & PIV 4/12/4 & PIV 4/12/4 & PIV None None
30	LARCH	Kitchen/Dining Lounge Family Room Bedroom 1 Bedroom 2	None 4/12/4 & PIV 10/12/6 & PIV 4/12/4 & PIV 4/12/4 & PIV

		Bedroom 3 Bedroom 4	None None
31	FAIRHAVEN	Living Room Kitchen/Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	10/12/6 & PIV None 10/12/6 & PIV 10/12/6 & PIV 4/12/4 & PIV 4/12/4 & PIV
32	FAIRHAVEN	Living Room Kitchen/Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	10/12/6 & PIV None 10/12/6 & PIV 10/12/6 & PIV 4/12/4 & PIV 4/12/4 & PIV
33	OAKWOOD	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None 4/12/4 & PIV 4/12/4 & PIV 4/12/4 & PIV None None
34	LARCH	Kitchen/Dining Lounge Family Room Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None None None None None None None
43	CHATSWORTH	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	None None None None None
44	HAMPTON	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	None None None None None
67	BYRON	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	None 4/12/4 & XS13 4400 4/12/4 & XS13 4400 None None
68	SHELLEY	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	None 4/12/4 & PIV None 4/12/4 & PIV 4/12/4 & PIV
81	GORDON ALT	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	None 4/12/4 & XS13 4400 None 4/12/4 & XS13 4400 None
82	LARCH	Kitchen/Dining Lounge Family Room Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None 4/12/4 & PIV 4/12/4 & PIV 4/12/4 & PIV 4/12/4 & PIV None None
83	STUDLEY	Kitchen/Dining Lounge Bedroom 1 Bedroom 2	None 4/12/4 & XS13 4400 4/12/4 & XS13 4400 None

84	STUDLEY	Kitchen/Dining Lounge Bedroom 1 Bedroom 2	None 4/12/4 & XS13 4400 4/12/4 & XS13 4400 None
85	STUDLEY	Kitchen/Dining Lounge Bedroom 1 Bedroom 2	None 4/12/4 & XS13 4400 4/12/4 & XS13 4400 None
86	STUDLEY	Kitchen/Dining Lounge Bedroom 1 Bedroom 2	None 4/12/4 & XS13 4400 4/12/4 & XS13 4400 None
87	GORDON ALT	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	None 4/12/4 & PIV 4/12/4 & PIV None 4/12/4 & PIV
97	Monmouth	Lounge/Dining Bedroom 1 Bedroom 2 Bedroom 3	None None 4/12/4 & dB450 4/12/4 & dB450
98	Monmouth	Lounge/Dining Bedroom 1 Bedroom 2 Bedroom 3	None None 4/12/4 & dB450 4/12/4 & dB450
99	Pulford	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3	4/12/4 & dB450 None None None None
111	Delemare	Family/Dining/Kitchen Lounge Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None None None None 4/12/4 & dB450 4/12/4 & dB450
122	Ascott	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	4/12/4 & dB450 None 4/12/4 & dB450 None 4/12/4 & dB450 None
123	Bretton	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	None 4/12/4 & dB450 4/12/4 & dB450 None None
124	Bretton	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	None 4/12/4 & dB450 4/12/4 & dB450 None None
125	Bretton	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	None 4/12/4 & dB450 4/12/4 & dB450 None None
126	Glyn	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	4/12/4 & dB450 None 4/12/4 & dB450 4/12/4 & dB450 None None

127	Delemare	Family/Dining/Kitchen Lounge Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None 4/12/4 & dB450 4/12/4 & dB450 4/12/4 & dB450 None None
269	Elwy	Lounge Bedroom 1 Bedroom 2	None 4/12/4 & dB450 None
270	Elwy	Lounge Bedroom 1 Bedroom 2	None None None
271	Elwy	Lounge Bedroom 1 Bedroom 2	None 4/12/4 & dB450 None
272	Tenby	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3	None None None None None
273	Pulford	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3	None None None None None
274	Ascott	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None None None None None None
275	Cardigan	Living Room Kitchen/Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	4/12/4 & dB450 None None None None None
276	Glyn	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None None None None None None
277	Kinnerton	Lounge Kitchen/Dining Bedroom 1 Bedroom 2 Bedroom 3	None None None 4/12/4 & dB450 4/12/4 & dB450
278	Kinnerton	Lounge Kitchen/Dining Bedroom 1 Bedroom 2 Bedroom 3	None None None 4/12/4 & dB450 4/12/4 & dB450
279	Ascott	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None None None None None None
280	Glyn	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2	None None None None

		Bedroom 3 Bedroom 4	None None
281	Ascott	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None None None None None None
282	Glyn	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None None None None None None
283	Kings	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None None None None None None
284	Kings	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None None None None None None
285	Glyn	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None None None None None None
286	Ascott	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None None None None None None
287	Ascott	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None None None None None None
288	Camarthan	Lounge/Dining Bedroom 1 Bedroom 2	4/12/4 & dB450 None 4/12/4 & dB450
289	Camarthan	Lounge/Dining Bedroom 1 Bedroom 2	4/12/4 & dB450 None 4/12/4 & dB450
290	Camarthan	Lounge/Dining Bedroom 1 Bedroom 2	4/12/4 & dB450 None 4/12/4 & dB450
291	Tenby	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3	None 4/12/4 & dB450 4/12/4 & dB450 4/12/4 & dB450 4/12/4 & dB450
292	Tenby	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3	None 4/12/4 & dB450 4/12/4 & dB450 4/12/4 & dB450 4/12/4 & dB800

293	Tenby	Lougne Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3	None 4/12/4 & dB450 4/12/4 & dB800 4/12/4 & dB450 10/12/6 & dB800
294	Monmouth	Lounge/Dining Bedroom 1 Bedroom 2 Bedroom 3	10/12/6 & dB800 10/12/6 & dB800 4/12/4 & dB450 4/12/4 & dB450
295	Monmouth	Lounge/Dining Bedroom 1 Bedroom 2 Bedroom 3	10/12/6 & dB800 10/12/6 & dB800 4/12/4 & dB450 4/12/4 & dB450
296	Cardigan	Living Room Kitchen/Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	4/12/4 & dB450 4/12/4 & dB450 4/12/4 & dB450 10/12/6 & dB800 4/12/4 & dB450 10/12/6 & dB800
297	Porthmadog	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	4/12/4 & dB450 10/12/6 & dB800 4/12/4 & dB450 10/12/6 & dB800 4/12/4 & dB450
298	Camarthan	Lounge/Dining Bedroom 1 Bedroom 2	4/12/4 & dB450 4/12/4 & dB450 10/12/6 & dB800
299	Camarthan	Lounge/Dining Bedroom 1 Bedroom 2	4/12/4 & dB450 4/12/4 & dB450 10/12/6 & dB800
300	Ascott	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	10/12/6 & dB800 None 10/12/6 & dB800 4/12/4 & dB450 10/12/6 & dB800 4/12/4 & dB450
301	Kinnerton	Lounge Kitchen/Dining Bedroom 1 Bedroom 2 Bedroom 3	10/12/6 & dB800 None 10/12/6 & dB800 4/12/4 & dB450 10.8/16/6 & dB800
302	Kinnerton	Lounge Kitchen/Dining Bedroom 1 Bedroom 2 Bedroom 3	10/12/6 & dB800 None 10/12/6 & dB800 4/12/4 & dB450 10.8/16/6 & dB800
303	Ascott	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	10/12/6 & dB800 None 10/12/6 & dB800 4/12/4 & dB450 10/12/6 & dB800 4/12/4 & dB450
304	Elwy	Lounge Bedroom 1 Bedroom 2	4/12/4 & dB450 10/12/6 & dB800 4/12/4 & dB450
305	Elwy	Lounge Bedroom 1 Bedroom 2	4/12/4 & dB450 10/12/6 & dB800 4/12/4 & dB450
306	Elwy	Lounge Bedroom 1 Bedroom 2	4/12/4 & dB450 10.8/16/6 & dB800 4/12/4 & dB450
307	Ascott	Lounge Kitchen/ Dining	10/12/6 & dB800 None

		Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	10/12/6 & dB800 4/12/4 & dB450 10/12/6 & dB800 4/12/4 & dB450
308	Tenby	Lougne Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3	10/12/6 & dB800 None 4/12/4 & dB450 10/12/6 & dB800 4/12/4 & dB450
309	Tenby	Lougne Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3	10/12/6 & dB800 None 4/12/4 & dB450 10.8/16/6 & dB800 4/12/4 & dB450
310	Porthmadog	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	None 10/12/6 & dB800 4/12/4 & dB450 10.8/16/6 & dB800 4/12/4 & dB450
311	Kinnerton	Lounge Kitchen/Dining Bedroom 1 Bedroom 2 Bedroom 3	10/12/6 & dB800 None 10/12/6 & dB800 4/12/4 & dB450 10.8/16/6 & dB800
312	Kinnerton	Lounge Kitchen/Dining Bedroom 1 Bedroom 2 Bedroom 3	10/12/6 & dB800 None 10/12/6 & dB800 4/12/4 & dB450 10.8/16/6 & dB800
313	Pulford	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3	10/12/6 & dB800 4/12/4 & dB450 10/12/6 & dB800 10/12/6 & dB800 10/12/6 & dB800
314	Bretton	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	None 10/12/6 & dB800 10/12/6 & dB800 4/12/4 & dB450 4/12/4 & dB450
315	Bretton	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	None 10/12/6 & dB800 10/12/6 & dB800 4/12/4 & dB450 4/12/4 & dB450
316	Porthmadog	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	None 10/12/6 & dB800 4/12/4 & dB450 10/12/6 & dB800 4/12/4 & dB450
317	Glyn	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	10/12/6 & dB800 None 4/12/4 & dB450 4/12/4 & dB450 4/12/4 & dB450 None
318	Glyn	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	4/12/4 & dB450 None None None 4/12/4 & dB450 4/12/4 & dB450
319	Ascott	Lounge Kitchen/ Dining	4/12/4 & dB450 None

		Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	4/12/4 & dB450 4/12/4 & dB450 4/12/4 & dB450 4/12/4 & dB450
320	Porthmadog	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	4/12/4 & dB450 None 4/12/4 & dB450 4/12/4 & dB450 4/12/4 & dB450
321	Cardigan	Living Room Kitchen/Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	4/12/4 & dB450 None 4/12/4 & dB450 4/12/4 & dB450 4/12/4 & dB450 4/12/4 & dB450
322	Cardigan	Living Room Kitchen/Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	4/12/4 & dB450 None 4/12/4 & dB450 4/12/4 & dB450 4/12/4 & dB450 4/12/4 & dB450
323	Ascott	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	4/12/4 & dB450 None 4/12/4 & dB450 4/12/4 & dB450 4/12/4 & dB450 4/12/4 & dB450
324	Porthmadog	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	None 4/12/4 & dB450 4/12/4 & dB450 4/12/4 & dB450 4/12/4 & dB450
325	Glyn	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	4/12/4 & dB450 None None None 4/12/4 & dB450 4/12/4 & dB450
326	Kings	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	10/12/6 & dB800 None 4/12/4 & dB450 10/12/6 & dB800 4/12/4 & dB450 4/12/4 & dB450
327	Ascott	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	10/12/6 & dB800 None 10/12/6 & dB800 4/12/4 & dB450 10/12/6 & dB800 4/12/4 & dB450
328	Porthmadog	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	None 10/12/6 & dB800 4/12/4 & dB450 10/12/6 & dB800 4/12/4 & dB450
329	Kings	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	10/12/6 & dB800 4/12/4 & dB450 10/12/6 & dB800 10/12/6 & dB800 10/12/6 & dB800 10/12/6 & dB800
330	Delemare	Family/Dining/Kitchen Lounge	None 10/12/6 & dB800

		Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	10/12/6 & dB800 10/12/6 & dB800 4/12/4 & dB450 4/12/4 & dB450
331	Kings	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	10/12/6 & dB800 None 10/12/6 & dB800 10/12/6 & dB800 4/12/4 & dB450 4/12/4 & dB450
332	Pulford	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3	10/12/6 & dB800 4/12/4 & dB450 10/12/6 & dB800 10/12/6 & dB800 4/12/4 & dB450
333	Cardigan	Living Room Kitchen/Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	4/12/4 & dB450 4/12/4 & dB450 4/12/4 & dB450 10/12/6 & dB800 4/12/4 & dB450 10/12/6 & dB800
334	Glyn	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	10/12/6 & dB800 None 4/12/4 & dB450 4/12/4 & dB450 4/12/4 & dB450 4/12/4 & dB450
335	Porthmadog	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	None 10/12/6 & dB800 None 10/12/6 & dB800 4/12/4 & dB450
336	Cardigan	Living Room Kitchen/Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	4/12/4 & dB450 None None 4/12/4 & dB450 None 4/12/4 & dB800
337	Canearfom	Living Room Study Kitchen/Breakfast Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	4/12/4 & dB450 10/12/6 & dB800 None None None None 4/12/4 & dB450 4/12/4 & dB450
338	Pulford	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3	None None None None None
339	Tenby	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3	None None None None None
340	Tenby	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3	None None None None None
341	Glyn	Lounge Kitchen/ Dining	None None

		Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None None None None
342	Delemare	Family/Dining/Kitchen Lounge Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	None None None None None None
343	Pulford	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3	None None None None None
344	Bretton	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	None 4/12/4 & dB450 4/12/4 & dB450 None None
345	Bretton	Kitchen/Dining Lounge Bedroom 1 Bedroom 2 Bedroom 3	None 4/12/4 & dB450 4/12/4 & dB450 None None
346	Glyn	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	4/12/4 & dB450 None 4/12/4 & dB450 4/12/4 & dB450 None None
347	Glyn	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	10/12/6 & dB800 None 4/12/4 & dB450 4/12/4 & dB450 4/12/4 & dB450 None
348	Ascott	Lounge Kitchen/ Dining Bedroom 1 Bedroom 2 Bedroom 3 Bedroom 4	10/12/6 & dB800 None 10/12/6 & dB800 4/12/4 & dB450 10/12/6 & dB800 4/12/4 & dB450

Appendix C

Glazing and Ventilation Specifications

Glazing Sound Reduction Data

Glazing	Octave Band								
	31.5	63	125	250	500	1000	2000	4000	8000
4/12/4	12	18	24	20	25	23	29	35	35

Glazing	Octave Band								
	31.5	63	125	250	500	1000	2000	4000	8000
10/12/6	14	20	26	27	34	40	38	46	46

Glazing	Octave Band								
	31.5	63	125	250	500	1000	2000	4000	8000
10.8/16/6	20	25	25	28	38	45	44	56	56

Ventilation Sound Reduction Data

Ventilation	Octave Band								
	31.5	63	125	250	500	1000	2000	4000	8000
Passivent TVALdB 450 (2500equiv free) Window frame vent	29.5	35.5	44.7	42.2	36.2	40.1	42.5	52.8	52.8

(Or alternative manufacturer to provide same or better specification)

Ventilation	Octave Band								
	31.5	63	125	250	500	1000	2000	4000	8000
Passivent TVALdB 800 (2012equiv free) Window frame vent	28.3	34.3	46.0	43.8	37.9	43.4	43.4	49.5	49.5

(Or alternative manufacturer to provide same or better specification)

Ventilation	Octave Band								
	31.5	63	125	250	500	1000	2000	4000	8000
Titan XS13 4400EA Vent Screw Fix	25.5	31.5	32.0	36.5	37.1	36.4	36.1	34.8	40.1

(Or alternative manufacturer to provide same or better specification)

PIV - How It Works



3) The air is then passed through the filters, and is gently fed into the dwelling via a central hallway diffuser

2) The warm air then rises to the highest point, gaining heat energy giving you the benefit of some heat recovery

1) Clean, fresh air is continuously drawn in to the loft space through the loft's natural leakage points



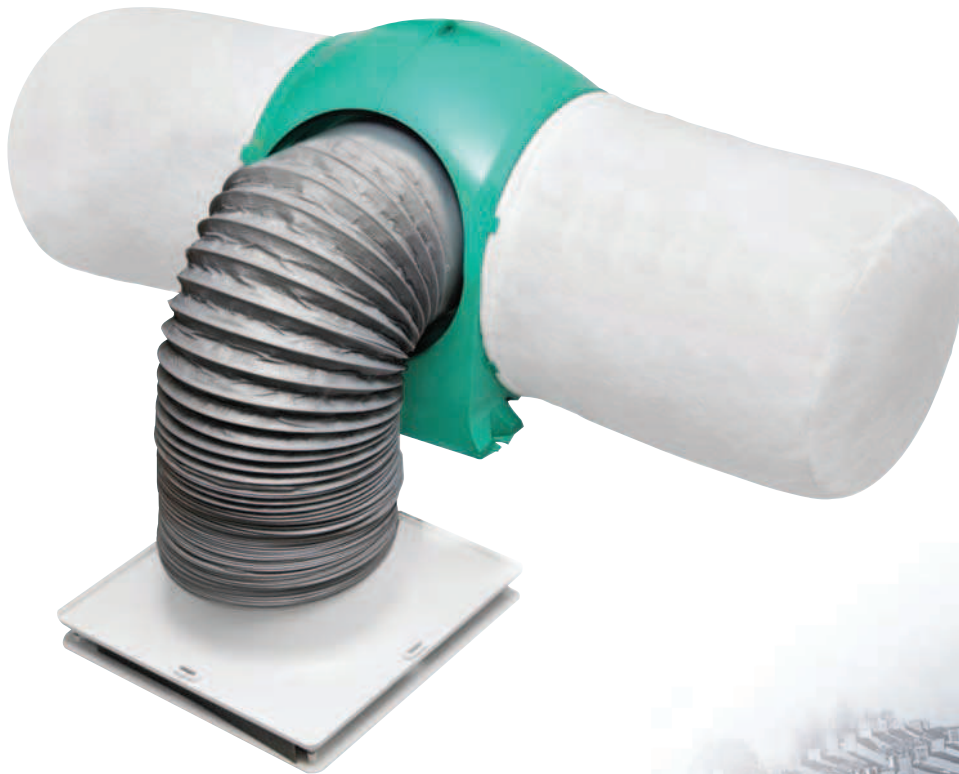
4) The air then gently pressurises the house from inside out, driving out the moisture and condensation

5) This process creates a clean, healthy environment to live in as fresh air replaces the stale air

Dilute – Displace – Replace

DRIMASTER - POSITIVE INPUT VENTILATION (PIV)

LOW COST WHOLE HOUSE VENTILATION THAT MEETS BUILDING REGULATIONS, SAVES ENERGY AND PREVENTS CONDENSATION.



BENEFITS

EXTREMELY LOW POWER CONSUMPTION

Average approximately 0.16 watts / litre / second and solar gains up to 550kW / hr / year.

EASY INSTALLATION & VERY LOW MAINTENANCE REQUIREMENT

Filter clean or replacement every 5 years.

SIGNIFICANTLY IMPROVES INDOOR AIR QUALITY

Using positive input ventilation removes indoor air pollutants such as carbon monoxide and keeps out traffic fumes, pollen and outdoor pollutants.

COMPLIES WITH THE BUILDING REGULATION VENTILATION REQUIREMENTS

Meets Part F&L England and Wales and contributes towards 'conservation of fuel and power'. (Please refer to BBA Certificate).

RADON GAS CONTROL

Helps reduce and maintain radon gas levels.

CREATES A HEALTHIER LIVING ENVIRONMENT

High efficiency G4 filters removes up to 95% dust particles.

FIT & FORGET OPERATION

Fully automatic when airflow set on installation.

FIRE DAMPER AND DIFFUSER FOR 3-STOREY ACCOMMODATION AVAILABLE

The diffuser is manufactured from aluminium and powder coated to an off white finish (RAL 9003). Product code Drimaster-3S.

SYSTEM STANDBY MODE

For summer months when loft temperature exceeds 23°C.

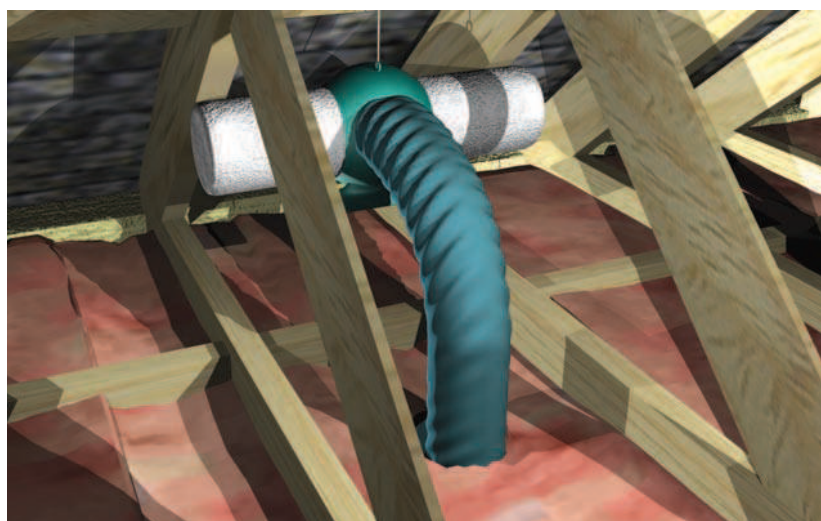
HEALTH

Clinically proven to help allergy and asthma sufferers.

WARRANTY

5 year warranty for peace of mind.

TYPICAL INSTALLATION



Ceiling diffuser.



DRIMASTER

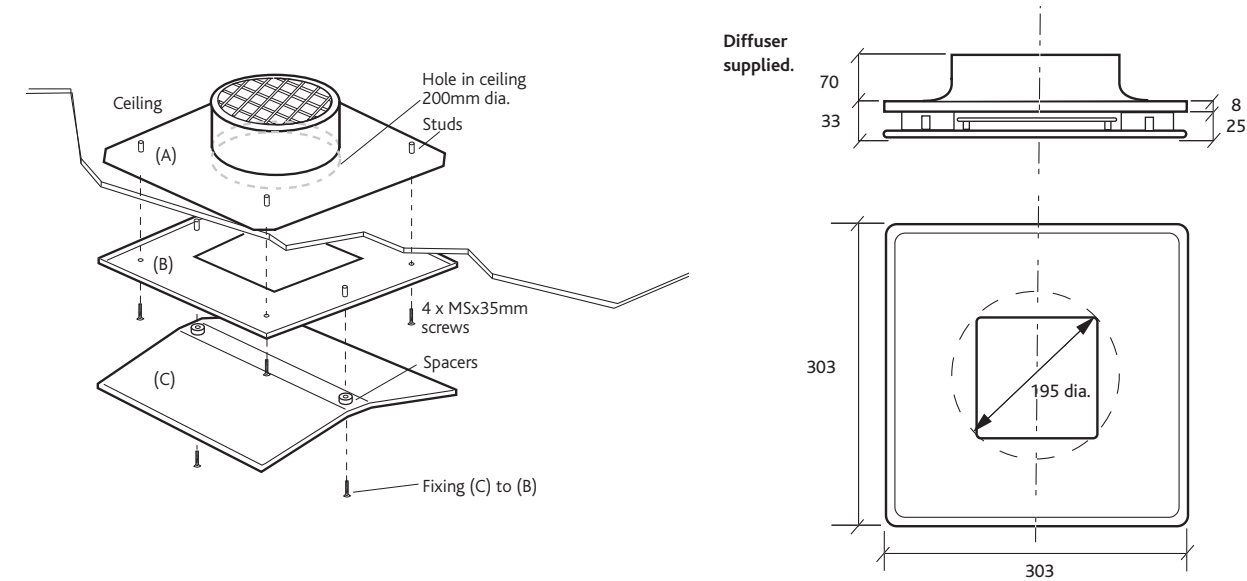
The Drimaster provides whole home ventilation using the Positive Input Ventilation principle. Essentially the concept is to introduce fresh, filtered air into the dwelling at a continuous rate, encouraging movement of air from inside to outside. To achieve this, the unit is mounted in the loft space, drawing air through the filters and inputting it, at ceiling level, into the property.

The Drimaster units are fitted with an internal temperature sensor. This sensor continuously monitors the temperature in the loft, boosting the air volume when the loft temperature is above a set level (heat recovery mode).

If the loft temperature becomes excessive the unit will switch to standby mode (no airflow). Once installed, the airflow can be set to suit the house size and, if required, the way it responds to the temperature changes within.

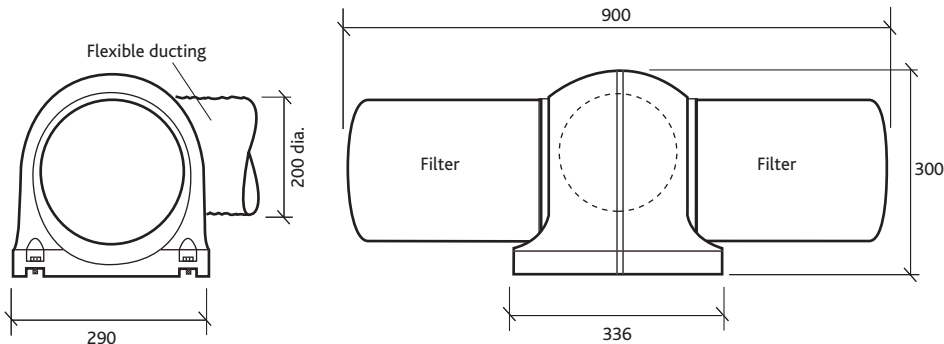
AIR DIFFUSER WITH FIRE DAMPER

For use in stairwells of three storey properties, the optional powder-coated aluminium diffuser with 'Fireblock' provides 1 hour of fire resistance in accordance with BS476 Part 20 and ISO834.



DIMENSIONS (MM) & WEIGHT DRIMASTER UNIT

Weight: 5.7kg



WIRING

The unit is supplied with a pre-wired power supply. This power supply unit has a metal bracket incorporating fixing holes, which should be used to fit the power supply to a suitable surface e.g. a wooden joist. The fan unit is also supplied with a fused spur. The 3 core mains cable from the power supply should be connected to a fixed wiring installation, via the isolator, via the spur, in accordance with current IEE wiring regulations.

Electrical details:-

- Voltage: 240V 1ph 50Hz
- Consumption: 1.6W(min) 15.3W(max)
- Fuse size: 1 Amp

CONSULTANTS SPECIFICATION

FAN DESCRIPTION

Low energy positive input ventilation unit - for use in homes with a loft.

The unit shall be robustly constructed from flame retardant VO rated ABS polymer and the casing shall be of spherical pattern with a flat mounting base.

Flame retardant filters of G4 grade, surface area approx 0.47m² (with 5 year typical maintenance period) shall be fitted, which may be removed from the unit without the use of tools. The filters shall be arranged such as to prevent their obstruction in the loft space.

The unit shall incorporate a forward curved centrifugal impeller and high efficiency brushless DC motor fitted with sealed for life, self lubricating bearings and locked rotor protection. The unit's average power consumption shall be 0.16 watts per l/s of airflow.

The unit shall be supplied with a length of flexible ducting, and all necessary connectors and fixings.

The unit shall weigh less than 6kg and we recommend that the unit is suspended from the roof structure.

The unit shall be supplied with a purpose designed flame retardant polymer diffuser for efficient, directable air input. The diffuser design shall be optimised for use in areas where smoke detectors are fitted. The unit shall include 5 programmable temperature control strategies, 6 volume control settings and an optional high duty boost setting providing an airflow rate of 70l/s for optimum performance and occupant comfort.

The units "Fixed Temperature Heat Recovery" strategy shall be achieved via a sensor located in the unit and shall improve energy performance accordingly. An internal monitor shall record the unit's operational time.

The unit shall be offered with a 5 year warranty.

For information on reducing radon egress, it is suggested that the details given in Positive pressurisation: a guide to radon remedial measures in existing dwellings may be considered.

Installation and Maintenance

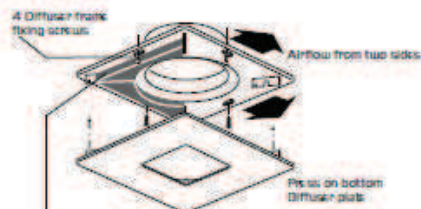
DRIMASTER/DRIMASTER 35 Anti-Condensation & Whole House Ventilation

Note: SMOKE ALARMS

It is also important to ensure that the diffuser is NOT placed within 1 metre of a smoke alarm.

If the diffuser cannot be repositioned, two sides of the diffuser must be closed off using the foam strips supplied to encourage the air through the remaining open sides that face at least 1.5 metres of unobstructed area away from the smoke alarm sensor.

Figure 3. Fitting the 2 foam strips.



2 Foam strips (supplied) fit on any of the diffuser sides to guide airflow away from a smoke detector and/or obstructions as required.

3.0 Fitting the Diffuser

3.1 Plastic Type

Cut a circular hole 225mm diameter in the ceiling between two convenient joists. Position the diffuser frame and secure it to the underside of the ceiling with the 1 1/2" x 8 csk. hd. screws and plugs provided.

Attach the diffuser plate to the frame using the four built in press on clips provided.

Foam strips should also be used as required when this method of installing the diffuser is used.

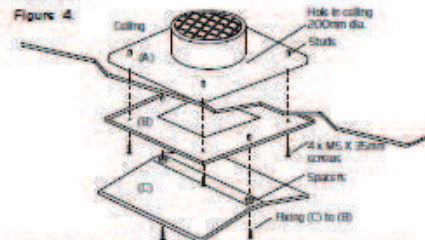
3.2 Painted aluminum type c/w Intumescent fireblock

Cut a 200mm hole in ceiling and align the top portion of unit (A) above the ceiling over the hole.

Position the central ceiling plate (B) on the ceiling in the room ensuring the central hole is aligned with the hole in the ceiling. Use the 4 M5 X 35mm screws to fix (B) to (A) through the 4 studs positioned on the upper side of (B).

Screw bottom part of the unit (C) to the ceiling plate (B) through the plastic spacers and into the 2 studs positioned on the upper side of (A).

Figure 4.



Note: Due to the higher air resistance of the fireblock, the speed of the unit should be increased by one increment for the particular property (see 9.0 speed setting).

4.0 Fitting the filters to the unit

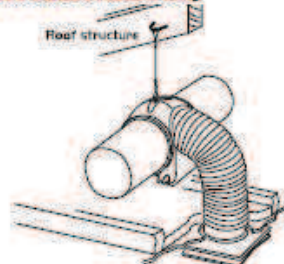
The filter has a push fit rim to attach itself to the main body of the unit.

Offer the filters up to the unit and apply a small amount of pressure to the filter rim (by hand). The filter will clip into place. The unit can then be attached to the roof via the chain (or fixed to the floor joists using the optional anti vibration mounting kit).

5.0 Fitting the Drimaster Unit

The standard method of installation is suspended from a convenient roof beam via the cord/chain supplied. (Note: unit weight = 3.2 kg).

Figure 5. Standard method of fixing.



The method of locating the wire to the roof timber is the responsibility of the installer.

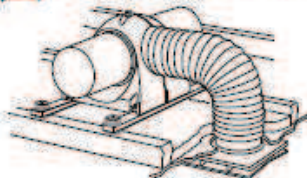
The flexible ducting fitted to the fan unit is connected to the outlet diffuser spigot by securing the end over the spigot using the tie band supplied. Ensure all duct joints are air tight.

6.0 Optional AV mounting

The AV kit contains all the parts necessary to complete a joist mounted installation. If this option is required the kit can be purchased direct from Nuair using the following code number 771993.

Lower the unit with the battens attached onto the joists (see Figure 6). Mark and drill the 12mm dia. clearance holes required in the ends of the battens (not supplied). Figure 7 shows a sectional view of the fixing.

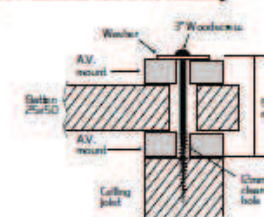
Figure 6. Optional method of fixing (AV mounting kit onto roof joists).



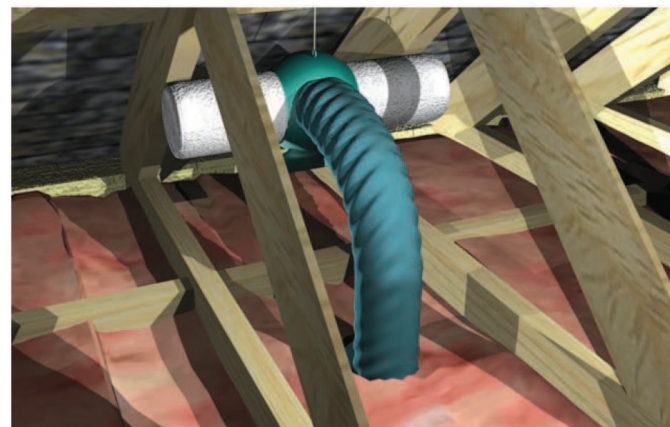
Place anti-vibration mounts above and below each batten fixing point and, using the 4 large screws and special washers, fix the unit to the joists.

Do not overtighten the fixings. The distance from the top washer to the joist when installed must not be less than 50mm.

Figure 7. Sectional view of AV mounting.

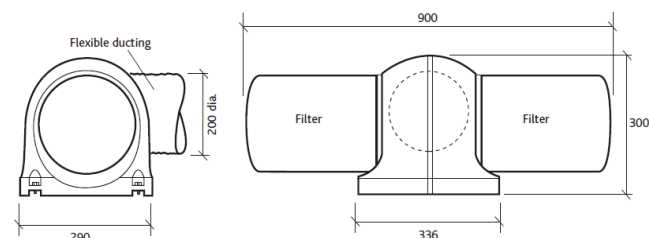


TYPICAL INSTALLATION



DIMENSIONS (MM) & WEIGHT

Weight: 5.7kg



2.0 Siting the Diffuser position

The diffuser has a unique air throw pattern and it is essential that it is located correctly in the central hallway in single storey properties or in the ceiling of the top floor landing on 2 or more storey dwellings. As can be seen in Figure 2 the diffuser discharges air evenly from all four sides along the underside of the ceiling.

Figure 2. Diffuser (viewed from below).



Airflow from four sides

Note: The positioning of the diffuser should be in strict accordance with the table shown below to ensure correct operation:-

Speed Setting	Minimum distance of diffuser from wall
1	100mm
2	155mm
3	400mm
4	625mm
5	850mm
6	1000mm

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Mid Glamorgan
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Mail enquiries@nuair.co.uk



DO NOT SCALE

THIS DRAWING IS FOR ILLUSTRATION PURPOSES ONLY. IN PREPARING THIS INFORMATION NUAIR HAS REFERRED TO RECOGNISED GUIDELINES SET OUT IN THE BUILDING REGULATIONS AND OTHER RELEVANT ADVISORY DOCUMENTS AND ACKNOWLEDGES THAT THIS DOES NOT IN ANYWAY GUARANTEE COMPLIANCE WITH LEGISLATION.

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☐ APPROVAL	☐ SUBMITTED ONLY
☐ COMMENTS	☐ REVISIONS AVAILABLE

No.	Revision Description	Date

Client: Bellway Homes

Checked by: CLAY (DRAFT) Date:

Checker:

Client: Bellway House Types

14/16882

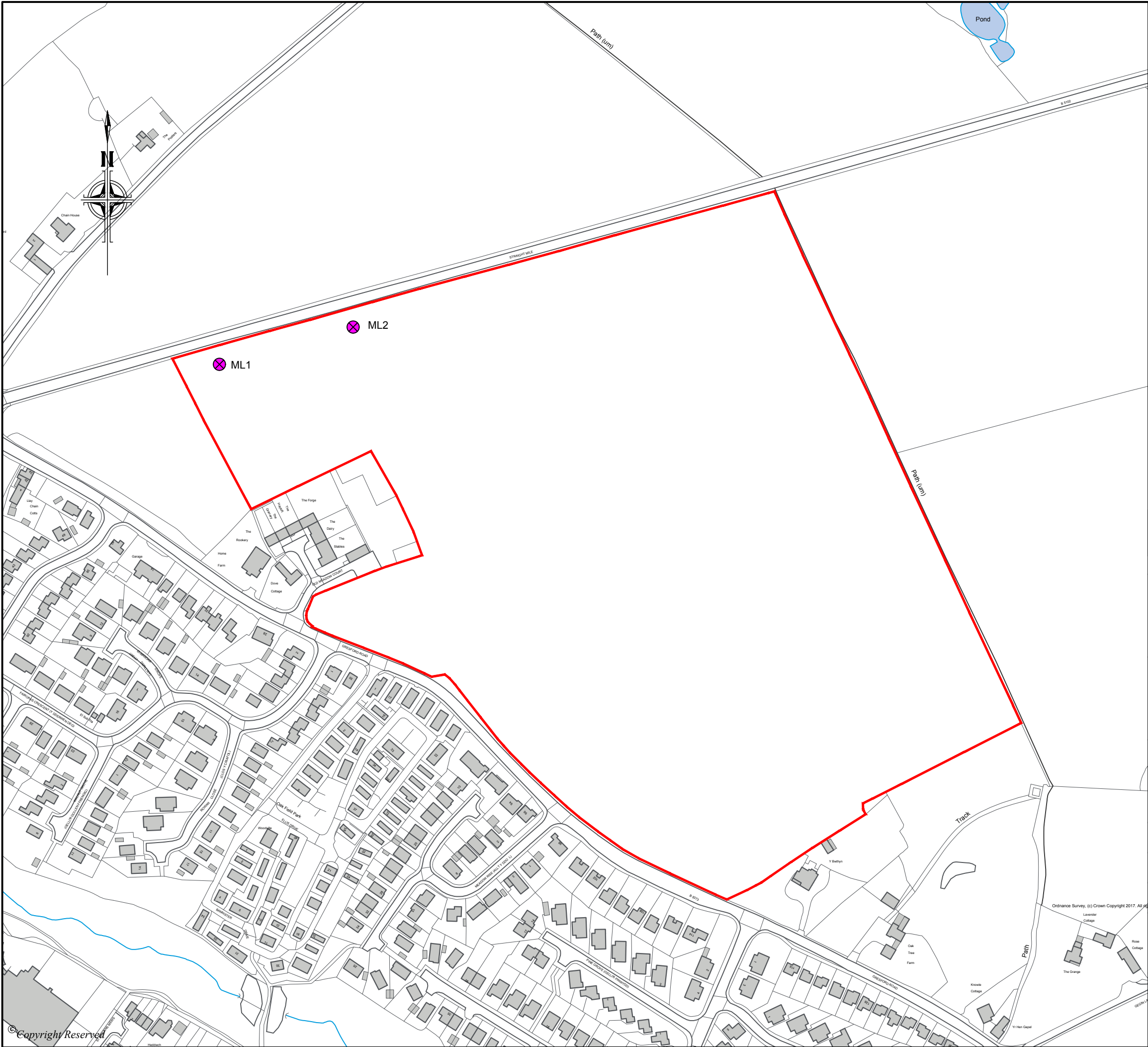
Rev: 14/16882 - Spec

Date: 08/10/2014

Time: AM

Page: A

Drawing



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REFERENCE

- SITE BOUNDARY
- NOISE MONITORING LOCATION

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D
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CLIENT
Bellway Home Limited (North West)
and Anwyl Homes

PROJECT
Land off Gresford Road
Llay, Wrexham

DRAWING TITLE
Noise Monitoring Locations

DRG No.	LE14078001	REV	A
DRG SIZE	A3	SCALE	1:2500
DRAWN BY	SG	CHECKED BY	TD
		APPROVED BY	CMD

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