HEARING STATEMENT

STORRIE PLANNING

Town Planning Consultants

Kirklees Local Plan Hearings

Matter 37 – Batley and Spen housing allocations: Green Belt releases

Rejected Site H315 – Land at 16 Manor Park Gardens, Birkenshaw.

Date: Jan 2018

Ref: SP38

1.0 Introduction

Consideration of Rejected site H315 at 16 Manor Park Gardens, Birkenshaw

1.1 These comments are made in respect of rejected housing site H315 and H653 on behalf of Julian Wiley.

1.2 The site has been promoted throughout the Local Plan process. In rejecting the site, the only red in the traffic light assessment related to Environmental Protection matters relating to noise, air quality and land contamination (see below).

H315	Site is in Green belt	Y	Green/Brownfield	G	Settlement Position	E	Gross Area (Ha)	2.38	
Land at, 16, Manor Park Gardens, Gomersal					Employment Floorspace		Housing Capacity		53
Transport		Third party land required to achieve access from Manor Park Gardens.							
Public Health		The site is within a ward that does not have significant concerns relating to health indicators and land use planning.							
Education		No immediate need for school places but increasing trend for secondary school places.							
Historic Env		No objection raised.							
Flood/drainage		Main river flood zone 1; no objection. Surface water flood risk and surface water drainage; no objections. Sites H315 & H230 would benefit from a joint drainage plan.							
Env Protection		Objection on the grounds of noise, air quality and contamination. Even with large barriers (2.4m) the external levels are still high and a 100m bund would be required to protect development from motorway noise. The noise report does not address the issue of the bund and the information provided is not considered to address the site issues to provide a satisfactory residential environment.							
Biodiversity		A UK BAP priority habitat - appears around the north and east sides of this proposal. Lowland mixed deciduous woodland - this requires retention. The area has been netted off.							
Other constraints		Part or all of the site lies within a high risk coal referral area. Powerlines cross the site.							
Open space		N/A							
Green belt		The configuration of this site and its location relative to the existing settlement edge means that it is not well related to the settlement. Some additional land would need to be released from the green belt between the site and the motorway to create a defendable new boundary.							
Green belt edge		One of the purposes of the green belt is to prevent settlements from merging. The green belt in this location forms a narrow gap separating Gomersal from Birkenshaw, but the presence of the M62 means that there is no risk of sprawl and no risk of physical merger. The existing settlement pattern and land use features are such that there are opportunities for settlement extension without undermining the role and function of the green belt.							
Exceptional Circumstances		There are no exceptional circumstances to justify the removal of this site or any part of this site from the green belt.							
Conclusion The configuration of this site and its location relative to the existing settlement edge means that it is not well related to the settlement. Some additional land would need to be released from the green belt between the site and the motorway to create a defensible new boundary.									

1.3 In response, through the Local Plan consultation process, we have sought to overcome the Council's concerns on the environmental protection issues. A Noise Report was commissioned and concluded that noise concerns can be mitigated against (**Appendix A**). A draft layout plan was also produced to show how the site could be developed (see below).

1.4 The site is in a sustainable location with good links to schools, employment and the M62. The site is well related to existing residential development in the locality and its removal from the Green Belt would not undermine the purpose of the remaining Green Belt or result in coalescence. We believe that the site provides a better development opportunity than other proposed Green Belt release housing allocations in the Draft Local Plan that, despite their proposed designation, raise a number of unresolved issues and question marks over delivery in the plan period.

1.5 The proximity of the site to the M62, whilst raising noise issues, should not be seen as an unsurmountable constraint. As

demonstrated in the Noise Report, mitigation is possible. It should also be noted that proposed housing allocation H218 is located close to the M62 in comparison to our site.

1.6 We respectfully request that the identified site be identified as a housing allocation in the Local Plan. Failing that, consideration should be given to identifying it as safeguarded land.

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NoiseAssess

Acoustics, Noise and Vibration Consultants

Proposed residential development

Lane to the East of Manor Park Gardens
Gomersal, BD19 4BA

Noise Assessment

Our Reference: 11959.01.v2
July 2016

On behalf of: Julian Wiley

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1.0 INTRODUCTION

1.1 Scope of Report:

NoiseAssess Ltd has been commissioned by Pegasus Planning on behalf of Julian Wiley to carry out a noise survey and assessment for a proposed residential development on land to the east of Manor Park Gardens, Gomersal. The assessment relates to the potential impact of existing noise sources on the proposed dwellings and associated external amenity areas.

1.2 Site Location:

The existing site is shown on Figure 1. The M62 motorway is to the south of the site. There is a pylon at the southeastern corner of the site carrying high voltage electricity cables. A required offset from the power line prevents development right up to the motorway boundary. There are existing residential properties on Manor Park Gardens and Swincliffe Crescent to the west and northwest of the site. To the north there is an area of woodland which will be preserved beyond which there are playing fields. To the northeast there are existing residential properties on Oakway. To the east there is an open field which may also be considered for residential development in the future.

1.3 Proposals:

An initial outline site layout is shown on Figure 2 which is taken from an outline masterplan produced by Pegasus Planning. This has been prepared to illustrate one way in which the site could be developed. However, this noise assessment has been prepared to accompany an outline planning application requesting permission in principle for residential use of the site and all matters of design; layout etc. will be reserved for subsequent approval. Therefore the layout can be amended to address any constraints highlighted during the planning process.

1.4 Planning Authority:

Planning Authority:	Kirklees Metropolitan District Council
Consultee on Noise:	Environmental Health, Kirklees Metropolitan District Council
Contact(s):	Matt Roberts and Paul Bailey
Consultation:	Discussion of survey methodology and normal noise criteria used by the Local Authority for the assessment or residential planning applications.

2.0 NOISE SURVEY

2.1 The noise survey times, locations and instrumentation are detailed in Table 1 below. The noise monitoring locations are shown on Figure 1.

Table 1. Summary of noise survey times, locations and instrumentation

Survey Location	1	2	3-10
Survey Method	Unattended	Unattended	Attended
Start time	12/07/2016 13:00 hrs	12/07/2016 14:00 hrs	12/07/2016 14:15 hrs
End time	13/07/2016 13:00 hrs	13/07/2016 14:00 hrs	12/07/2016 17:57 hrs
Meter **Class / Type** **Serial number**	Rion NL-31 Class 1 00583274	Rion NL-52 Class 1 00732142	Norsonic Nor-140 Type 1 1404289
Portable calibrator **Serial number**	Norsonic 1251 32860	Norsonic 1251 32860	Norsonic 1251 32860
Frequency Analysis	Broadband only	1/3 Octave	1/3 Octave

2.2 The sound level meters were calibrated using the portable calibrator detailed in Table 1 at the start and end of the survey periods. There was no variation in the calibration level.

2.3 The site falls gradually from north to south and then falls steeply near the motorway. The steep drop is just to the north of the pylon. There is also a fall in some parts from west to east and a steep fall at the southern part of the eastern boundary. The open site to the east falls away leaving a clear view of the motorway to the south of it from the eastern boundary of the development site. However, the topography obscures the motorway for much of the site away from the eastern boundary.

2.4 It should be noted that Location 1 is closer to the motorway than the developable area due to the offset required from the power line. Therefore the results are higher than those which will occur at the proposed properties or gardens. The readings have been used to calculate the noise levels at the

proposed properties. Location 1 was chosen because it has a clear view of the motorway and the area further from the motorway was inaccessible due to it being too overgrown.

2.5 The noise survey results are summarised in Tables 2 and 3 and the full results of the noise surveys are given in Appendix A2. The dBL_{Aeq} values in Appendix A2 and Tables 2 and 3 are the log-averages of the 5-minute readings taken during the monitoring periods. The dBL_{A90} values in Appendix A2 are the arithmetic average of the 5-minute readings.

Table 2. Summary of 24 hour unattended noise survey results - free field noise levels

Period	Parameter	Location 1 noise level	Location 2 noise level
Daytime Tuesday*	$dBL_{Aeq\ 9/10hr}$*	69.3	63.8
	Highest $dBL_{Aeq\ 1hr}$	71.7	66.8
Daytime Wednesday*	$dBL_{Aeq\ 6/7hr}$*	70.2	64.5
	Highest $dBL_{Aeq\ 1hr}$	70.9	65.0
Night-time	$dBL_{Aeq\ 8hr}$	66.9	62.6
	Highest $dBL_{Aeq\ 15min}$	72.7	69.8 (67.9) +
	Range of $dBL_{Amax\ 15min}$	70.2-76.1	65.4-89.8 (76.3)+

* Tues 13:00-23:00 at Location 1 and 14:00-23:00 at Location 2. Wed 07:00-13:00 at Location 1 and 07:00-14:00 at Location 2.

+ The highest maximum noise level at this location occurred at around 06:10 hrs and is not matched by a high level at Location 1. Therefore, it was most likely to have been caused by some activity near the meter rather than by the motorway noise. It may have been caused by animal or bird activity. The next highest maximum level was 76.3 dBL_{Amax} (although this is also clearly not from the motorway as the highest value at the meter closer to the motorway was lower). If the dBL_{Aeq} value in the 15-minute period when the 89.8 dBL_{Amax} value occurred is excluded the highest $dBL_{Aeq\ 15min}$ value at Location 2 is 67.9 dBL_{Aeq}.

Table 3. Summary of daytime sample noise results - free field noise levels

Location	Time Period, hrs	Microphone height, m	dBL_{Aeq}
3	14:15-14:30	1.8	60.6
4	14:33-14:48	1.8	59.6
4A	16:08-16:18	4.2	62.8
5	15:08-15:23	1.8	63.9
6	15:36-15:51	1.8	62.3
6A	15:56-16:06	4.2	65.3
7	16:42-17:02	1.8	56.3
7A	16:22-16:37	4.2	57.4
8	17:09-17:19	1.8	58.4
9	17:22-17:38	1.8	55.1
10	17:41-17:57	1.8	50.5

2.6 The main noise source during the periods of attendance on site was road traffic on the M62 motorway and that is likely to have been the main noise source throughout the unattended noise survey periods. There was occasional noise from high level jet aircraft but the aircraft noise did not add significantly to the motorway noise levels at most locations. There was occasional noise from wildlife, birdsong and dogs barking (the land is occasionally used by dog walkers). This did not significantly affect the attended noise survey measurements but there is evidence of occasional peaks of noise at the unattended Location 2 which were not caused by road traffic.

2.7 Weather conditions during the noise survey:

The site was attended from around 11:00hrs to around 18:00hrs on the Tuesday and the weather was dry and warm with sunny periods and some cloud. In the morning it was still and in the later afternoon there was a slight breeze (1-2 m/s) of varying direction. The site was attended again in the early afternoon on the Wednesday and the weather was dry but there had been some very light showers in the late morning when travelling to site and the grass was slightly damp on arrival although the roads were mostly dry. The wind speeds were slightly higher up to 4-5 m/s westerly. Weather forecasts/reports for the unattended survey period during the evening/night and morning between the

visits indicate the area was dry with light winds (1-2m/s increasing to 4-5m/s from mid-morning Wednesday). The unattended sound level meters were fitted with environmental windshields to protect the microphones from the weather.

3.0 ASSESSMENT AND RECOMMENDATIONS

Assessment criteria

3.1 PPG24[1] which was previously referred to in relation to planning noise issues is no longer current following the publishing of the NPPF[2] and the NPPG[3]. There are no noise criteria figures quoted in the NPPF / NPPG and it has been left to local authorities to agree their own criteria. It is understood from discussion with Matt Roberts in Environmental Health that the local authority's normal noise criteria for residential developments are taken from BS8233:2014[4].

3.2 The recommended indoor ambient noise level criteria for dwellings given in BS8233:2014 are shown in Table 4 below.

Table 4. BS8233 recommendations for internal ambient noise levels

Activity	Location	07:00-23:00 hrs	23:00-07:00 hrs
Resting	Living room	35 $dBL_{Aeq,16\ hour}$	-
Dining	Dining room/area	40 $dBL_{Aeq,16\ hour}$	-
Sleeping (daytime resting)	Bedroom	35 $dBL_{Aeq,16\ hour}$	30 $dBL_{Aeq,8\ hour}$

3.3 Although no specific numerical criterion is given for individual events in BS8233:2014, most local authorities require that noise from individual events during the night-time (23:00-07:00 hrs) should not regularly exceed 45 $dBL_{Amax,f}$ in bedrooms.

3.4 Outline recommendations for the building envelope design of the proposed properties have been based on the above internal noise level criteria. Final design of the properties is a reserved matter and therefore the recommendations are provided only to give an indication of the measures that may be required based on typical property designs and assumed property locations. The final building envelope sound insulation specifications will depend on the selected layout, boundary treatment and property designs and should be checked at the detailed design stage.

3.5 Paragraph 7.7.3.2 of BS8233 recommends that for traditional external amenity areas such as gardens and patios, it is desirable that during the daytime the external noise level does not exceed 50 $dBL_{Aeq,T}$

with an upper guideline value of 55dB$L_{Aeq,T}$ which would be acceptable in noisier environments. The time period is not stated but is assumed to be 16 hours (07:00 hours to 23:00 hrs) as in the previous version of BS8233. Outline discussion of possible boundary treatment or perimeter fencing to garden areas has been based on these criteria. The final design of acoustic barriers should be checked at the detailed design stage once the final topography is known.

External Amenity Areas and Layout

3.6 Daytime noise levels at Location 2 were around 64 dB$L_{Aeq,16hrs}$ and this position is around the closest proposed house positon which will be most exposed to motorway noise.

3.7 Daytime noise levels at Location 1 were around 70 dB$L_{Aeq,16hrs}$ but this position is closer to and more exposed to motorway noise than the proposed gardens.

3.8 Based on the readings at Locations 1 and 2 the ends of the proposed gardens near the turning head shown on Figure 2 could be as high as 68 dBL_{Aeq} on the eastern side of the site which is less screened from the motorway.

3.9 The above noise level figures are based on existing ground levels and without additional screening. A topographical survey of the site has not yet been completed and the proposed ground levels following any earthworks are unknown. However, in general terms it is preferable for any screening acoustic barriers to be sited as close to the receptors (i.e. the proposed gardens) as possible and to be installed on ground which is at the highest level possible. As the existing ground levels generally reduce towards the south and east the construction of an acoustic barrier or bund on the boundary alone may not result in satisfactory noise levels in gardens which are further away from it. It will be difficult to construct a bund or fence on the boundary which is of sufficient height to screen the whole site. Therefore it may be preferable to consider screening with barriers local to each garden in the higher noise areas. It may also be preferable to level the gardens as much as possible so that they do not drop away leaving the local barriers at a lower level than the sitting out areas.

3.10 One example of potential attenuation by local barriers has been calculated. This is based on a 2.4m high acoustic fence on the boundary of a garden at 80m from the motorway centre line. This will probably

give around 10dB(A) of attenuation if the garden is around 4m above the motorway level and at the same level as the ground level at the fence position. To be effective the fence would need to surround the garden on all sides. This solution would result in noise levels in the closest proposed gardens of around 58 $dBL_{Aeq,16hrs}$. This is slightly above the upper limit for noise levels in gardens. Such a solution for gardens slightly further from the motorway in the northern part of the site would be likely to result in noise levels around 55 $dBL_{Aeq,16hrs}$. In addition, gardens further towards the west may be slightly more screened at the same distance from the motorway by the existing topography. There is no view of the motorway from Locations 5 and 6 which were less than 80m from the motorway centre line (closest around 70m - Location 5) whereas there is a view of the motorway from Locations 1, 2, 3, 8 and 9 across the lower site to the east.

3.11 It should also be noted that the achieving of noise levels below 55 $dBL_{Aeq,16hrs}$ in gardens is not always considered essential. It is likely that the noise levels in the gardens of existing properties nearby are above 55 $dBL_{Aeq,16hrs}$ (e.g. Manor Park Gardens, Milford Grove, Dewsbury Road etc.). BS8233:2014 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 $dBL_{Aeq,T}$, with and upper guideline value of 55 $dBL_{Aeq,T}$, 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.

Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity spaces is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In

high noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB$L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space."

3.12 Part of the above text relates to balconies and roof gardens on urban apartments which may not be the preferred form of development here. However, comments about gardens to properties adjacent to the strategic transport network are relevant.

3.13 The NPPG also gives the following advice in relation to mitigating the impact of noise on residential developments.

"the noise impact may be partially off-set if the residents of those dwellings have access to:

- a relatively quiet facade (containing windows to habitable rooms) as part of their dwelling, and/or;
- a relatively quiet external amenity space for their sole use, (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced with increasing noise exposure and could be such that significant adverse effects occur, and/or;
- a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings, and/or;
- a relatively quiet, protected, external publically accessible amenity space (e.g. a public park or a local green space designated because of its tranquility) that is nearby (e.g. within a 5 minutes walking distance)."

3.14 This again indicates that noise levels above the normal criteria in some parts of gardens may not necessarily prevent development if there are some parts of the garden or other external amenity spaces nearby which do comply.

3.15 A more effective way of screening gardens can be the use of the layout so that the dwellings themselves form barriers which can be much taller than the maximum height of fences or bunds. For instance, the

proposed turning head shown on Figure 2 could be extended to form a roadway along the southern boundary giving access to the front of properties to the north of it. If the external amenity areas of those properties were to the north of them they would be largely screened by the properties themselves, particularly if the properties were close together or attached (e.g. town houses or link houses). There would still be spillage of noise between the houses and around the ends but this could be addressed by more limited close boarded fencing/gates to close gaps between the dwellings and to the sides of the gardens. This layout would also take the gardens further away from the motorway. If the properties were made relatively tall then they would also offer some protection to other parts of the site further to the north.

3.16 The daytime sample noise levels at locations 3 and 4 (around 110-125m from the motorway centre line) were around 60 dBL_{Aeq}. It is likely that 2.4m high close boarded garden boundary fences and/or screening by dwellings will reduce noise levels to below 55 $dBL_{Aeq,16hrs}$ in this area.

3.17 At Locations 7 and 8 (150-155m from the motorway centre line) the sample noise readings were around 56 dBL_{Aeq} with screening from topography (western side) and around 58 dBL_{Aeq} when the motorway was visible (eastern side). It is likely that 2m high close boarded garden boundary fences and/or screening by dwellings will reduce noise levels to well below 55 $dBL_{Aeq,16hrs}$ in this area, possibly as low as 50 dBL_{Aeq}.

3.18 The sample noise levels at Location 9 (around 170m from the motorway and with a view of it) were 55 dBL_{Aeq} without additional screening and the sample noise levels at Location 10 (around 240m from the motorway centre line and screened by topography) were 50-51 dBL_{Aeq} without additional screening. In both cases there is likely to be a further reduction in noise levels due to screening provided by boundary fences/dwellings etc.

3.19 Where acoustic barriers are mentioned above they may be close boarded weather treated timber fences (min 18mm thick) with cover strips over the gaps between panels and gravel boards to seal the gap at the base. Alternatively masonry walls could be used. Earth bunds can also be used as barriers or bunds with the closed fences on top (to the specification given above). As discussed above, it is recommended that consideration be given to the use of local barriers to each garden area. The screening of gardens would be best achieved by barriers to the western and eastern boundaries of the

gardens as well as the southern boundaries (except where one of the boundaries is screened by the dwelling). The closest gardens are likely to require 2.4m high acoustic barriers installed on ground at the same level as the garden. They may also require some screening from dwellings by adjusting the proposed layout. Some of the gardens further from the motorway are likely to require 2m high acoustic barriers.

Building Envelope Recommendations

3.20 Indicative initial advice on building envelope construction given below has been based on the worst case scenario of property elevations which are not screened by acoustic barriers (e.g. because they are on upper floors which overlook the barriers or because they are at the front of dwellings which look out onto local access roads with no screening fences). The proposed building envelope recommendations should be reviewed at the detailed design stage. At that stage it may be possible to reduce the proposed building envelope specifications by taking screening into account. The recommendations given below are based on the assumption that the closest building elevations to the motorway will be around the positions marked 2, 5 and 6 on Figure 1. The calculations should be checked when the proximity to the motorway and the relative heights have been finalised.

External wall construction

3.21 For the purposes of this initial outline assessment it has been assumed that the external walls of the new properties will be of cavity masonry construction (e.g. brickwork outer leaf and solid dense blockwork inner leaf) which is expected to provide sufficient sound insulation. Other external wall constructions (e.g. timber frame, rainscreen cladding, etc.) should be checked with an acoustic consultant.

Roof construction

3.22 The site is not under a low-altitude flight path and the motorway noise is generally coming from below the site level. Therefore the roof design for the dwellings may not be critical. However, at this stage it has been assumed that the external roof construction will be roofing tiles on felt and that the internal plasterboard ceilings to the upper floor rooms will be a minimum of 2 layers of 15mm dense plasterboard or 3 layers of 12.5mm standard Wallboard plasterboard with a minimum of 100mm mineral

wool insulation laid over the ceilings in the roof void/loft. If any of the properties have 'rooms in roof' it is likely that the inside face of the roof and the walls to any dormer areas will need to be a minimum of 2 layers of 15mm dense plasterboard or 3 layers of 12.5mm standard Wallboard plasterboard with a minimum of 100mm mineral wool insulation in the cavity.

3.23 Where 15mm thick dense plasterboard is referred to above this means plasterboard with a minimum weight of approximately 12.6 kgm^{-2}. Where 12.5mm thick standard Wallboard is specified this means plasterboard with a minimum weight of approximately 8.5 kgm^{-2}. Typical dense plasterboards include:

i) British Gypsum: 'Soundbloc'
ii) Knauf: 'Soundshield'
iii) Siniat: 'dBCheck'

3.24 Where mineral wool is mentioned above suitable products include Isover APR 1200 or URSA Acoustic Roll or Rockwool Flexi.

Glazing and Ventilation

Living rooms on east, south and west elevations within 125m of the M62 centre line

3.25 It is likely that these rooms will require the following specification:

- Glazing with a minimum performance of 39 dB R_w. This performance is normally achieved by double glazed units comprising one pane of 10mm glass and one pane of 6.4mm pvb laminated glass separated by a minimum cavity of 10mm.

- Specialist acoustic vents with a minimum performance of 45 dB $D_{n,ew}$, as detailed in Appendix A3.

Living rooms on north elevations within 125m of the M62 centre line

3.26 It is likely that these rooms will require the following specification:

- Glazing with a minimum performance of 31 dB R_w. This performance is normally achieved by standard thermal double glazed sealed units (e.g. two panes of 4mm glass separated by a minimum cavity of 10mm).

- Specialist acoustic vents with a minimum performance of 40 dB $D_{n,ew}$, as detailed in Appendix A3.

Bedrooms on east, south and west elevations within 125m of the M62 centre line

3.27 It is likely that these rooms will require the following specification:

- Glazing with a minimum performance of 46 dB R_w. This performance is normally achieved by standard thermal double glazed sealed units (e.g. two panes of 4mm glass separated by a minimum cavity of 10mm) plus additional 6mm secondary glazing in a separate frame with a cavity of around 150mm to the external glazing.

- Specialist acoustic vents with a minimum performance of 55 dB $D_{n,ew}$, as detailed in Appendix A3.

Bedrooms on north elevations within 125m of the M62 centre line

3.28 It is likely that these rooms will require the following specification:

- Glazing with a minimum performance of 31 dB R_w. This performance is normally achieved by standard thermal double glazed sealed units (e.g. two panes of 4mm glass separated by a minimum cavity of 10mm).

- Specialist acoustic vents with a minimum performance of 45 dB $D_{n,ew}$, as detailed in Appendix A3.

Living rooms on east, south and west elevations more than 125m of the M62 centre line

3.29 It is likely that these rooms will require the following specification:

- Glazing with a minimum performance of 39 dB R_w. This performance is normally achieved by double glazed units comprising one pane of 10mm glass and one pane of 6.4mm pvb laminated glass separated by a minimum cavity of 10mm.

- Specialist acoustic vents with a minimum performance of 40 dB $D_{n,ew}$, as detailed in Appendix A3.

Living rooms on north elevations more than 125m of the M62 centre line

3.30 It is likely that these rooms will require the following specification:

- Glazing with a minimum performance of 31 dB R_w. This performance is normally achieved by standard thermal double glazed sealed units (e.g. two panes of 4mm glass separated by a minimum cavity of 10mm).

- Standard window frame trickle vents.

Bedrooms on east, south and west elevations more than 125m of the M62 centre line

3.31 It is likely that these rooms will require the following specification:

- Glazing with a minimum performance of 39 dB R_w. This performance is normally achieved by double glazed units comprising one pane of 10mm glass and one pane of 6.4mm pvb laminated glass separated by a minimum cavity of 10mm.

- Specialist acoustic vents with a minimum performance of 45 dB $D_{n,ew}$, as detailed in Appendix A3.

Bedrooms on north elevations within 125m of the M62 centre line

3.32 It is likely that these rooms will require the following specification:

- Glazing with a minimum performance of 31 dB R_w. This performance is normally achieved by standard thermal double glazed sealed units (e.g. two panes of 4mm glass separated by a minimum cavity of 10mm).

- Standard window frame trickle vents.

General Comments

3.33 All glazing should achieve a good seal when closed. If secondary glazing is used both the external and the secondary glazing should be well sealed when closed. The example glazing specification given above is indicative and for information only. The windows installed should have manufacturer's test data confirming compliance with the dBR_w value indicated. The glass specification may need to be enhanced for other reasons (e.g. safety).

3.34 The acoustic vents specified above are to replace the normal trickle vents in the windows and the rooms where enhanced acoustic vents are specified should not have standard trickle vents in the windows. Please note that window-frame vents are not suitable for use with secondary glazing.

3.35 The recommended minimum acoustic ventilation performance figures given above are applicable where 1 vent is sufficient to provide adequate airflow within the room. If more than one vent is necessary then the required performance for each individual vent must be increased by 10xlog(n) where n is the number of vents in the room. Please see Appendix A3 for more information.

3.36 The recommendations in this report are given for acoustic reasons only and advice on other matters should be obtained from other specialists. It is the Client's responsibility to check with the manufacturer that all products chosen are suitable for the proposed use. The safety implications of the installation of any products used should be checked by the contractor before use and appropriate systems of work put in place. Heavier products are often preferable from the acoustic point of view. However, where it is

considered that appropriate safe systems of work cannot be implemented for such products then alternatives should be agreed in advance of construction.

3.37 The recommendations provided in this report are based on the noise levels measured during the survey. The survey measurements are considered to be representative of the area although there may be some variation in noise levels due to local events, seasons etc.

3.38 This noise assessment has been prepared to accompany an outline planning application requesting permission in principle for residential use of the site and some matters which influence the noise intrusion calculations will be reserved for subsequent approval (e.g. room sizes, glazing area per room etc.) Therefore the building envelope design should be checked by an acoustic consultant at the detailed design stage.

4.0 CONCLUSIONS

4.1 A noise survey and assessment has been carried out for a proposed residential development on land to the east of Manor Park Gardens, Gomersal.

4.2 The most significant noise source at the site was road traffic on the M62 motorway to the south.

4.3 It is likely that local acoustic barriers will be required to gardens in most parts of the site (e.g. 18mm thick close boarded weather treated timber fences with cover strips over the gaps between panels and gravel boards to seal the gap at the base). Screening is likely to be required to the western, southern and eastern boundaries of the gardens which can be provided by acoustic fences or by the new dwellings. The closest gardens are likely to require 2.4m high acoustic barriers installed on ground at the same level as the garden. They may also require some screening from dwellings by adjusting the proposed layout. Some of the gardens further from the motorway are likely to require 2m high acoustic barriers.

4.4 Indicative building envelope recommendations have been made to illustrate the kind of measures likely to be required to meet the internal noise levels criteria. The measures include enhanced acoustic glazing and ventilation.

4.5 The recommendations given in this report are indicative only because the report has been prepared to accompany an outline planning application and all matters of design; layout etc. will be reserved for subsequent approval. The sound insulation design should be checked once the layout and detailed design of the properties is fixed.

4.6 The assessment demonstrates that the development can be designed to meet the Local Authority's required noise criteria and therefore, noise should not be a reason to refuse outline planning permission for the residential development of the site.

5.0 REFERENCES

1. PPG24: Planning Policy Guidance 24, Department of the Environment, 1994.

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

3. Department for Communities and Local Government, Planning Practice Guidance on noise (2014). Obtained from: http://planningguidance.planningportal.gov.uk/blog/guidance/noise/noise-guidance/ accessed 17/10/2015.

4. BS8233: British Standard 8233, Guidance on sound insulation and noise reduction for buildings, BSI 2014.

FIGURE 1: SITE AND NOISE MONITORING LOCATIONS

FIGURE 2: PROPOSED SITE LAYOUT

APPENDIX A1: ACOUSTIC TERMINOLOGY

Ambient noise	The sound pressure level at a given location (i.e. sound from all sources) usually measured using the L_{Aeq} parameter.
A-weighting	A weighting applied to the frequencies which make up a sound pressure level to mimic the response of the human ear which is less responsive to low frequency sounds as it is to high frequency sounds. The resultant level after application of the weighting is called the 'A-weighted sound pressure level' and is denoted by dB(A) or by using a subscript A (e.g. dBL_{Aeq}).
Background noise	The noise measured in the absence of the noise under investigation usually using the statistical parameter L_{90} which represents the quietest parts of the measurement period.
Broadband sound	Sound which contains all the frequencies.
Decibel (dB)	A logarithmic measurement scale used for sound pressure levels. This scale is used because the simple use of sound pressures would be unwieldy as the range of pressures to which the human ear responds is very large. The normal threshold of hearing at 1kHz is 0dB. A level of $120dBL_{Aeq}$ is very loud (L signifies level and the A and eq are explained under A-weighting and L_{eq}). Some night club dance floors can have sound levels of around 110 dBL_{Aeq}. In the workplace the wearing of hearing protection is compulsory for staff who experience a noise level of over $85dBL_{Aeq}$ averaged over an 8-hour day and is normally used when the levels are over $80dBL_{Aeq}$ averaged over the 8-hour day. Noise intrusion levels into bedrooms (e.g. from traffic noise) are often controlled to below $30dBL_{Aeq}$ in the design of new properties (standards sometimes vary between authorities). Noise levels of below $20dBL_{Aeq}$ are very quiet and would normally only be achieved in a well designed recording studio. Although noise calculations are normally carried out using figures to 1 decimal place the results are often presented to the nearest dB as changes of a fraction of a dB are not normally perceptible even in controlled conditions.
Facade noise level	Noise level including a contribution from the reflection from a building facade, usually measured at 1m from the facade.
Free field	Noise levels with no contribution from reflections from nearby structures.
Hertz	The units used for frequency denoted by Hz, i.e. the number of cycles of pressure fluctuation per second. K used in front of Hz represents 1000 (1kHz = 1000Hz). High frequency sounds (e.g. 8kHz) are high pitched and low frequency sounds (e.g. 63Hz) are the bass notes.

L_{eq}	A parameter used to denote the 'equivalent continuous sound pressure level'. This is the sound pressure level of a continuous sound that would contain the same energy as the varying sound being measured or investigated. L_{Aeq} is the parameter used to denote the 'A-weighted equivalent continuous sound pressure level' (see A-weighting).
L_{10}	A statistical parameter often used for the measurement of road traffic noise. It is the level exceeded for 10% of the time period being considered. If A-weighted a subscript A is included and the time period can also be included in subscript, e.g. $L_{A10,\ 1hour}$.
L_{90}	A statistical parameter often used for the measurement of background noise levels. It is the level exceeded for 90% of the time period being considered. If A-weighted a subscript A is included and the time period can also be included in subscript, e.g. $L_{A90,\ 5min}$.
L_{max}	The maximum noise level which occurred during the monitoring period. $L_{Amax,f}$ denotes the maximum A-weighted sound pressure level using the fast time constant of 125ms.
Loudness	Although a 3dB increase is equivalent to a doubling of the sound power level of a sound source this increase is the minimum perceptible under normal conditions. It takes a 10dB change in noise level for it to sound roughly twice (or half) as loud subjectively.

APPENDIX A2: NOISE SURVEY RESULTS

Daytime survey results

Table A2.1: Location 1
Tuesday 12 Jul 2016

Date	Start (h:m:s)	Period (h:m:s)	Free field noise levels (dB)			
			L_{Aeq}	$L_{Amax(f)}$	L_{A10}	L_{A90}
12/07/2016	13:00:01	01:00:00	70.8	77.1	72.1	68.7
12/07/2016	14:00:01	01:00:00	71.2	75.7	72.6	69.3
12/07/2016	15:00:01	01:00:00	71.7	75.3	72.9	70.0
12/07/2016	16:00:01	01:00:00	70.5	76.3	71.8	68.5
12/07/2016	17:00:01	01:00:00	70.1	78.8	71.5	68.0
12/07/2016	18:00:01	01:00:00	68.3	83.5	70.1	65.2
12/07/2016	19:00:01	01:00:00	69.0	74.7	70.7	66.2
12/07/2016	20:00:01	01:00:00	67.2	75.8	69.4	63.4
12/07/2016	21:00:01	01:00:00	63.1	80.6	64.9	57.9
12/07/2016	22:00:01	01:00:00	63.9	70.7	66.3	58.9
AVERAGE			69.3	-	70.2	65.6
HIGHEST			71.7	83.5	72.9	70.0
LOWEST			63.1	70.7	64.9	57.9

Table A2.1: Location 1
Wednesday 13 Jul 2016

Date	Start (h:m:s)	Period (h:m:s)	Free field noise levels (dB)			
			L_{Aeq}	$L_{Amax(f)}$	L_{A10}	L_{A90}
13/07/2016	07:00:01	01:00:00	69.3	76.1	70.3	67.0
13/07/2016	08:00:01	01:00:00	69.8	75.0	70.9	67.9
13/07/2016	09:00:01	01:00:00	69.8	78.0	71.1	67.7
13/07/2016	10:00:01	01:00:00	70.3	74.7	71.7	68.5
13/07/2016	11:00:01	01:00:00	70.6	75.9	72.1	68.7
13/07/2016	12:00:01	01:00:00	70.9	75.1	72.1	69.1
AVERAGE			70.2	-	71.4	68.2
HIGHEST			70.9	78.0	72.1	69.1
LOWEST			69.3	74.7	70.3	67.0

Table A2.3: Location 2
Tuesday 12 Jul 2016

Date	Start (h:m:s)	Period (h:m:s)	Free field noise levels (dB)			
			L_{Aeq}	$L_{Amax(f)}$	L_{A10}	L_{A90}
12/07/2016	14:00:01	01:00:00	66.0	74.9	67.5	63.8
12/07/2016	15:00:01	01:00:00	66.8	72.3	68.1	65.0
12/07/2016	16:00:01	01:00:00	65.0	69.7	66.4	62.8
12/07/2016	17:00:01	01:00:00	64.4	75.3	66.0	62.2
12/07/2016	18:00:01	01:00:00	62.7	86.8	64.4	59.5
12/07/2016	19:00:01	01:00:00	63.3	75.1	64.9	60.5
12/07/2016	20:00:01	01:00:00	62.3	92.7	63.9	58.1
12/07/2016	21:00:01	01:00:00	57.9	71.9	59.9	53.1
12/07/2016	22:00:01	01:00:00	58.8	66.2	61.3	53.9
AVERAGE			63.8	-	64.7	59.9
HIGHEST			66.8	92.7	68.1	65.0
LOWEST			57.9	66.2	59.9	53.1

Table A2.4: Location 2
Wednesday 13 Jul 2016

Date	Start (h:m:s)	Period (h:m:s)	Free field noise levels (dB)			
			L_{Aeq}	$L_{Amax(f)}$	L_{A10}	L_{A90}
13/07/2016	07:00:01	01:00:00	64.4	72.0	65.5	62.0
13/07/2016	08:00:01	01:00:00	64.4	73.4	65.8	62.2
13/07/2016	09:00:01	01:00:00	64.5	86.1	65.7	61.9
13/07/2016	10:00:01	01:00:00	63.9	69.2	65.5	61.8
13/07/2016	11:00:01	01:00:00	64.5	74.2	66.1	62.5
13/07/2016	12:00:01	01:00:00	65.0	70.3	66.4	62.9
13/07/2016	13:00:01	01:00:00	64.6	70.9	66.1	62.6
AVERAGE			64.5	-	65.9	62.3
HIGHEST			65.0	86.1	66.4	62.9
LOWEST			63.9	69.2	65.5	61.8

Table A2.5: Location 3, Height 1.8m
12/07/2016

Start (h:m:s)	Period (h:m:s)	Free field noise levels (dB)				Comments
		L_{Aeq}	$L_{Amax(f)}$	L_{A10}	L_{A90}	
14:15:59	00:05:00	60.7	63.8	61.9	59.1	Road traffic (M62), occasional high level aircraft
14:21:03	00:05:00	60.6	65.5	61.9	58.9	
14:26:06	00:05:00	60.5	64.5	61.9	58.8	
Average		60.6	-	61.9	58.9	

Table A2.6: Location 4, Height 1.8m
12/07/2016

Start (h:m:s)	Period (h:m:s)	Free field noise levels (dB)				Comments
		L_{Aeq}	$L_{Amax(f)}$	L_{A10}	L_{A90}	
14:33:00	00:05:00	59.6	62.3	60.7	58.2	Road traffic (M62), occasional high level aircraft
14:38:03	00:05:00	59.8	71.7	60.8	58.3	
14:43:43	00:05:00	59.4	62.7	60.6	58.1	
Average		59.6	-	60.7	58.2	

Table A2.7: Location 4A, Height 4.2m
12/07/2016

Start (h:m:s)	Period (h:m:s)	Free field noise levels (dB)				Comments
		L_{Aeq}	$L_{Amax(f)}$	L_{A10}	L_{A90}	
16:08:53	00:05:00	62.8	66.1	64.1	61.3	Road traffic (M62), occasional high level aircraft
16:13:57	00:05:00	62.7	65.3	63.7	61.4	
Average		62.8	-	63.9	61.4	

Table A2.8: Location 5, Height 1.8m
12/07/2016

Start (h:m:s)	Period (h:m:s)	Free field noise levels (dB)				Comments
		L_{Aeq}	$L_{Amax(f)}$	L_{A10}	L_{A90}	
15:08:36	00:05:00	63.7	66.3	64.7	62.5	Road traffic (M62), occasional high level aircraft
15:13:39	00:05:00	63.9	66.1	64.6	62.9	
15:18:42	00:05:00	64.1	66.7	64.9	62.9	
Average		63.9	-	64.7	62.8	

Table A2.9: Location 6, Height 1.8m
12/07/2016

Start (h:m:s)	Period (h:m:s)	Free field noise levels (dB)				Comments
		L_{Aeq}	$L_{Amax(f)}$	L_{A10}	L_{A90}	
15:36:02	00:05:00	63.0	66.2	63.9	61.9	Road traffic (M62), occasional high level aircraft
15:41:05	00:05:00	62.2	65.6	63.8	60.4	
15:46:08	00:05:00	61.6	63.8	62.4	60.6	
Average		62.3	-	63.4	61.0	

Table A2.10: Location 6A, Height 4.2m
12/07/2016

Start (h:m:s)	Period (h:m:s)	Free field noise levels (dB)				Comments
		L_{Aeq}	$L_{Amax(f)}$	L_{A10}	L_{A90}	
15:56:15	00:05:00	65.3	67.8	66.2	64.3	Road traffic (M62), occasional high level aircraft
16:01:18	00:05:00	65.3	68.0	66.3	64.2	
Average		65.3	-	66.3	64.3	

Table A2.11: Location 7, Height 1.8m
12/07/2016

Start (h:m:s)	Period (h:m:s)	Free field noise levels (dB)				Comments
		L_{Aeq}	$L_{Amax(f)}$	L_{A10}	L_{A90}	
16:42:06	00:05:00	57.7	61.3	59.5	55.6	Road traffic (M62), occasional high level aircraft
16:47:09	00:05:00	56.6	64.3	58.3	54.7	
16:52:12	00:05:00	55.7	59.7	56.8	54.3	
16:57:15	00:05:00	54.8	59.7	55.9	53.4	
Average		56.3	-	57.6	54.5	

Table A2.12: Location 7A, Height 4.2m
12/07/2016

Start (h:m:s)	Period (h:m:s)	Free field noise levels (dB)				Comments
		L_{Aeq}	$L_{Amax(f)}$	L_{A10}	L_{A90}	
16:22:24	00:05:00	56.5	59.4	57.9	55.1	Road traffic (M62), occasional high level aircraft
16:27:28	00:05:00	57.6	60.9	58.7	56.4	
16:32:43	00:05:00	58.0	61.1	59.1	56.8	
Average		57.4	-	58.6	56.1	

Table A2.13: Location 8, Height 1.8m
12/07/2016

Start (h:m:s)	Period (h:m:s)	Free field noise levels (dB)				Comments
		L_{Aeq}	$L_{Amax(f)}$	L_{A10}	L_{A90}	
17:09:34	00:05:00	59.3	65.4	60.8	57.5	Road traffic (M62), occasional high level aircraft
17:14:37	00:05:00	57.3	65.1	58.7	55.6	
Average		58.4	-	59.8	56.6	

Table A2.14: Location 9, Height 1.8m
12/07/2016

Start (h:m:s)	Period (h:m:s)	Free field noise levels (dB)				Comments
		L_{Aeq}	$L_{Amax(f)}$	L_{A10}	L_{A90}	
17:22:31	00:05:00	55.1	64.4	56.0	54.0	Road traffic (M62), occasional high level aircraft
17:27:37	00:05:00	55.8	65.9	57.1	53.7	
17:33:39	00:05:00	54.4	59.7	55.5	52.9	
Average		55.1	-	56.2	53.5	

Table A2.15: Location 10, Height 1.8m
12/07/2016

Start (h:m:s)	Period (h:m:s)	Free field noise levels (dB)				Comments
		L_{Aeq}	$L_{Amax(f)}$	L_{A10}	L_{A90}	
17:41:54	00:05:00	51.2	63.6	52.7	49.3	Road traffic (M62), occasional high level aircraft
17:47:00	00:05:00	49.4	55.1	50.0	48.5	
17:52:03	00:05:00	50.8	53.7	51.9	48.9	
Average		50.5	-	51.5	48.9	

Night-time survey results

Table A2.16: Location 1
Tuesday 12 Jul 2016 to Wednesday 13 Jul 2016

Date	Start (h:m:s)	Period (h:m:s)	Free field noise levels (dB)			
			L_{Aeq}	$L_{Amax(f)}$	L_{A10}	L_{A90}
12/07/2016	23:00:01	00:15:00	64.3	73.6	66.9	58.1
12/07/2016	23:15:01	00:15:00	64.9	71.3	67.5	59.7
12/07/2016	23:30:01	00:15:00	64.3	71.9	67.2	57.8
12/07/2016	23:45:01	00:15:00	64.1	71.0	67.0	56.9
13/07/2016	00:00:01	00:15:00	63.6	71.5	66.6	54.6
13/07/2016	00:15:01	00:15:00	63.3	72.1	66.6	52.5
13/07/2016	00:30:01	00:15:00	63.6	70.3	66.9	52.5
13/07/2016	00:45:01	00:15:00	63.8	72.0	67.3	52.9
13/07/2016	01:00:01	00:15:00	62.6	72.1	66.3	51.2
13/07/2016	01:15:01	00:15:00	63.1	70.2	66.7	51.9
13/07/2016	01:30:01	00:15:00	62.9	72.6	66.4	51.2
13/07/2016	01:45:01	00:15:00	62.7	71.6	66.2	52.2
13/07/2016	02:00:01	00:15:00	62.6	70.7	66.4	48.7
13/07/2016	02:15:01	00:15:00	63.8	72.5	67.1	53.3
13/07/2016	02:30:01	00:15:00	63.1	70.8	66.6	50.8
13/07/2016	02:45:01	00:15:00	63.1	70.3	66.5	50.7
13/07/2016	03:00:01	00:15:00	62.7	70.5	66.1	52.9
13/07/2016	03:15:01	00:15:00	63.7	74.3	66.9	53.8
13/07/2016	03:30:01	00:15:00	63.8	73.0	67.1	52.8
13/07/2016	03:45:01	00:15:00	63.6	71.1	67.0	55.0
13/07/2016	04:00:01	00:15:00	63.8	71.2	67.1	54.3
13/07/2016	04:15:01	00:15:00	65.1	71.6	68.0	57.3
13/07/2016	04:30:01	00:15:00	65.6	71.3	68.2	59.2
13/07/2016	04:45:01	00:15:00	65.2	72.0	67.5	59.6
13/07/2016	05:00:01	00:15:00	67.7	73.5	70.0	62.4
13/07/2016	05:15:01	00:15:00	69.0	74.4	70.9	65.5
13/07/2016	05:30:01	00:15:00	70.4	74.9	72.2	67.6
13/07/2016	05:45:01	00:15:00	71.1	75.8	72.7	68.8
13/07/2016	06:00:01	00:15:00	71.8	75.5	73.3	69.6
13/07/2016	06:15:01	00:15:00	72.7	76.0	73.9	71.1
13/07/2016	06:30:01	00:15:00	71.6	76.1	72.7	69.7
13/07/2016	06:45:01	00:15:00	70.8	75.1	72.3	68.6
AVERAGE			66.9	-	68.3	57.6
HIGHEST			72.7	76.1	73.9	71.1
LOWEST			62.6	70.2	66.1	48.7

Table A2.17: Location 2
Tuesday 12 Jul 2016 to Wednesday 13 Jul 2016

Date	Start (h:m:s)	Period (h:m:s)	Free field noise levels (dB)			
			L_{Aeq}	$L_{Amax(f)}$	L_{A10}	L_{A90}
12/07/2016	23:00:01	00:15:00	59.1	67.1	62.0	53.1
12/07/2016	23:15:01	00:15:00	59.8	66.5	62.6	54.4
12/07/2016	23:30:01	00:15:00	59.1	66.6	62.1	52.8
12/07/2016	23:45:01	00:15:00	59.3	67.7	62.4	52.2
13/07/2016	00:00:01	00:15:00	58.9	65.6	62.2	50.6
13/07/2016	00:15:01	00:15:00	58.8	66.2	62.0	49.5
13/07/2016	00:30:01	00:15:00	58.9	68.4	62.3	48.6
13/07/2016	00:45:01	00:15:00	59.2	68.2	62.7	49.9
13/07/2016	01:00:01	00:15:00	58.2	67.7	61.9	48.1
13/07/2016	01:15:01	00:15:00	58.5	65.4	62.2	49.0
13/07/2016	01:30:01	00:15:00	58.1	66.2	61.6	48.7
13/07/2016	01:45:01	00:15:00	58.0	66.0	61.5	49.6
13/07/2016	02:00:01	00:15:00	58.1	66.9	62.1	46.6
13/07/2016	02:15:01	00:15:00	59.5	67.2	63.1	49.9
13/07/2016	02:30:01	00:15:00	58.7	67.3	62.5	48.4
13/07/2016	02:45:01	00:15:00	58.6	67.3	62.2	47.8
13/07/2016	03:00:01	00:15:00	58.3	67.7	61.8	49.8
13/07/2016	03:15:01	00:15:00	59.4	68.6	63.0	51.3
13/07/2016	03:30:01	00:15:00	59.5	69.3	63.1	50.0
13/07/2016	03:45:01	00:15:00	59.3	68.3	63.0	51.3
13/07/2016	04:00:01	00:15:00	59.4	67.4	62.7	50.8
13/07/2016	04:15:01	00:15:00	60.6	67.2	63.7	53.1
13/07/2016	04:30:01	00:15:00	61.2	74.3	64.1	54.4
13/07/2016	04:45:01	00:15:00	60.7	73.0	63.2	54.7
13/07/2016	05:00:01	00:15:00	63.0	70.0	65.3	57.3
13/07/2016	05:15:01	00:15:00	64.6	76.3	66.7	60.5
13/07/2016	05:30:01	00:15:00	65.9	70.5	67.8	62.7
13/07/2016	05:45:01	00:15:00	66.4	71.0	68.3	63.7
13/07/2016	06:00:01	00:15:00	69.8	89.8	69.8	64.9
13/07/2016	06:15:01	00:15:00	67.9	71.8	69.3	66.1
13/07/2016	06:30:01	00:15:00	67.0	71.4	68.2	65.0
13/07/2016	06:45:01	00:15:00	66.3	70.8	67.8	63.8
AVERAGE			62.6	-	63.9	53.7
HIGHEST			69.8	89.8	69.8	66.1
LOWEST			58.0	65.4	61.5	46.6

APPENDIX A3: VENTILATION SYSTEMS

The noise break-in calculations have been based on manufacturers' published test data for the ventilation units in the tables below:

Manufacturers' published sound insulation performance: Window frame vents

dB $D_{n,e,w}$	Ventilation unit
40	Titon SF3300 vent & 75mm spacer inside with SF Canopy & 50mm spacer-11mm outside / open
40	Passivent ALdB450 acoustic window vent inside with Fresh 65 outside
41	Titon SFSA acoustic V75 C50 / open
42	Passivent ALdB800 acoustic window vent inside with Fresh 65 outside
42	Renson Acoustic window ventilator Invisivent Evo AK Ultra / Open
42	Greenwood EAR42W Acoustic Window Ventilator
48	Renson Acoustic window ventilator Invisivent Evo AK EXTREME / Open

Manufacturers' published sound insulation performance: Through the wall vents

dB $D_{n,e,w}$	Ventilation unit
40	Rytons TAL9HMCWL - OPEN - ventilator assembly; x1 MFAB, TAL9x9 AirLiner1, HM123F Internal, ABC9 Cowl
42	Titon 9×6 Cowled Acoustic AirLiner® Set with Flush Louvre Ventilator
42	Rytons TALHMCWL - OPEN - ventilator assembly; x1 MFAB96, TAL8000 AirLiner, HM85F Internal, ABC6 Cowl
46	Greenwood AAB Acoustic Airbrick - Acoustic background ventilator
55	Greenwood MA3051 Acoustic wall ventilator
55	Titon Sonair F+ acoustic (attenuated) fitered air supply unit

Other ventilation units from other manufacturers are available. However, it should be noted that not all units advertised as having the $D_{ne,w}$ value(s) outlined as necessary in this report will provide the required attenuation at all frequencies. Ventilation units other than those listed above will need to be checked by an acoustic consultant. Selection should be based on $D_{ne,w}$ values achieved with vents in the OPEN position.

The specified ventilation sound insulation performance applies to the combined sound insulation of all vents in the room. If only one vent is required, it can be selected with the specified performance given. If more than one vent is required then the required performance for each individual vent must be increased by 10xlog(n) where n is the number of vents in the room. For instance, if there are 2 vents to a room for which a 42 dB $D_{ne,w}$ vent is specified, the required sound insulation performance for each individual vent must be increased to 45 dB $D_{ne,w}$.

Links to the above suppliers' websites are given below:

- http://www.greenwood.co.uk/range/15/acoustic-vents.html
- http://www.passivent.com/acoustic_vents.html
- http://www.titon.co.uk/pages/knowledge-support/acoustic-ventilation.php
- http://www.rensonuk.net/united-kingdom-acoustic-vent-sonovent.html
- http://rts.vents.co.uk/blog/index.php/approvals-testing/about-the-bre/#.VWzExM9VhBc