

# Albion Land (2013) Ltd

**Catalyst Bicester** 

# **Noise Assessment**

# July 2019

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# **1.0 Introduction**

## **1.1** Purpose of this Report

This report presents the findings of a noise assessment for an employment floorspace and a racquets club on land to the south-east of Wendlebury Road, Bicester; the report covers two separate applications as follows:

Application 1: a hybrid application (part full and part outline). Outline planning permission for up to 23,400m<sup>2</sup> of employment floorspace (Use Classes B1a and/or B1b and/or B1c) and full planning permission for a racquets club.

Application 2: outline permission for up to 10,200m<sup>2</sup> of further employment floorspace (also in Use Classes B1a and/or B1b and/or B1c).

A description of the existing noise environment in and around the site is provided. Noise surveys have been undertaken and the results used to verify predictions of the short-term and long-term effects of noise. The noise levels from the proposed development have been predicted at local representative receptors using CADNA noise modelling software which incorporates ISO 9613 methodologies and calculations.

A list of acoustic terminology and abbreviations used in this report is provided in Appendix A and a set of location plans and noise contour plots relevant to the assessment are presented in Appendix B.

# 1.2 Legislative Context

This report is intended to provide information relevant to the local planning authority and their consultees in support of a planning application for the above proposed development. Policy guidance with respect to noise is found in NPPF, published on 24<sup>th</sup> July 2018. With regard to noise and planning, NPPF contains the following statement at paragraph 170:

*"170. Planning policies and decisions should contribute to and enhance the natural and local environment by:* 

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans

A further 2 short statements are presented at paragraph 180, which state:



"180. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- a) "mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development and avoid noise giving rise to significant adverse impacts on health and the quality of life
- *b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason."*

Furthermore, paragraphs 182 and 183 state:

"182. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

183. The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."

Planning Practice Guidance (PPG): Noise provides further guidance with regard to the assessment of noise within the context of Planning Policy. The overall aim of this guidance, tying in with the principles of the NPPF and the Explanatory Note of the Noise Policy Statement for England (NPSE), is to, *'identify whether the overall effect of noise exposure is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.'* 

A summary of the effects of noise exposure associated with both noise generating developments and noise sensitive developments is presented within the PPG and repeated as follows:



Perception	Examples of Outcomes	Increasing Effect Level	Action	
Not noticeable	No Effect	No Observed Effect	No Specific Measures Required	
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No Specific Measures Required	
	Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; closing windows for some of the time because of the noise. Potential for non-awakening sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum	
	Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. having to keep windows closed most of the time, avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid	
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Observed Adverse Effect	Prevent	

#### Table 1.1 NPPG Noise Exposure Hierarchy

The NPPF, NPSE and NPPG do not, however, present absolute noise level criteria which define SOAEL, LOAEL and NOEL which is applicable to all sources of noise in all situations. Therefore, within the context of the Proposed Development, national planning policy and appropriate guidance documents including `BS 4142: 2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound' and IEMA `Guidelines for Environmental Noise Impact Assessment'. Section 2.0 presents the noise level criteria used as a basis of this assessment.

The NPPG also states that *neither the NPSE nor the NPPF (which reflects the Noise Policy Statement) expects* noise to be considered in isolation, separately from the economic, social and other environmental dimensions of the proposed development.



# 2.0 Assessment Criteria

## 2.1 National Planning Practice Guidance - Assessment Criteria

In order to enable the assessment of the proposed development in terms of LOAEL and SOAEL, Table 2.1 presents equivalent noise levels and associated actions with the target noise level criteria identified. The noise level criteria detailed below have been derived from standards and design guidance:

BS 8233:2014 '*Guidance on sound insulation and noise reduction for buildings – Code of practice*' BS 4142:2014 + A1:2019 '*Methods for rating and assessing industrial and commercial sound*' IEMA Guidelines for Environmental Noise Impact Assessment (Oct 2014)

Effect Level	Assessment	Noise Level Criteria	Action / Justification
No Observed Adverse Effect Level (NOAEL)	Building Services Plant / Potential Industrial Activity	BS4142 Score of zero or lower	No Action Required Score of zero or lower is an indication of the sound source having a low impact
	Absolute Noise Levels from Combined Sources	Noise levels are below: <i>Bedrooms: 30 dB L<sub>Aeq,Bhours</sub></i> / 45 dB L <sub>Amax</sub> <i>Living Rooms: 35 dB L<sub>Aeq,16hours</sub></i>	Within BS8233 / WHO guideline criteria
	Assessment of Overall Change in Noise Levels	Up to 3.0 dB Change or a Reduction in Noise Levels	No Action Required – Change in noise levels unlikely to be perceptible
Lowest Observed Adverse Effect Level (LOAEL)	Building Services Plant / Potential Industrial Activity	BS4142 Score of +5 or lower	No Action Required Difference of +5db likely to be an indication of an adverse effect BS4142 Score of plus 5 or lower
	Absolute Noise Levels from Combined Sources	Noise levels are below: Bedrooms: 30 dB L <sub>Aeq, 8hours</sub> / 45 dB L <sub>Amax</sub> Living Rooms: 35 dB L <sub>Aeq, 16hours</sub>	Within BS8233 / WHO guideline criteria
	Assessment of Overall Change in Noise Levels	Up to 4.9 dB Increase in Noise Levels	No Action Required Slight Impact at Receptor of Some Sensitivity
Significant Observed Adverse Effect Level (SOAEL)	Building Services Plant / Potential Industrial Activity	BS4142 Score greater than +5	Difference of up to +10db likely to be an indication of a significant adverse effect Mitigate to achieve: BS4142 Score of + 5 or lower

#### Table 2.1 Noise Level Criteria and Actions



Effect Level	Assessment	Noise Level Criteria	Action / Justification
		Noise levels are exceeded:	Mitigate and reduce to a achieve:
	Combined Sources	45 dBL <sub>Aeq,8hours</sub> 45 dBL <sub>Amax</sub> Living Rooms: 35 dB L <sub>Aeq,16hours</sub>	Bedrooms: 30 dB L <sub>Aeq,8hours</sub> Living Rooms: 35 dB L <sub>Aeq,16hours</sub>
		3.0 to 5.0 dB Change in Noise Levels at receptor of high sensitivity	Mitigate to achieve:
	Assessment of Overall Change in Noise Levels	or	Increase in Noise Levels of less than 3.0 dB (high sensitivity)
		Up to 5.0 dB Increase in Noise Levels	Increase in Noise Levels of less than 5.0 dB (receptor of some sensitivity)
Unacceptable Observed Adverse Effect Level (UOAEL)	Building Services Plant / Potential Industrial Activity	BS4142 Score of + 10 or higher	Avoid Mitigate to achieve: BS4142 Score of 5 dB or lower
	Absolute Noise Levels from Combined Sources	Internal noise levels exceed: Bedrooms: 51 dB L <sub>Aeq,8hours</sub> , 67 dB L <sub>Amax</sub>	Mitigate and reduce to achieve: Bedrooms: 30 dB L <sub>Aeq,8hours</sub> Living Rooms: 35 dB L <sub>Aeq,16hours</sub>
	Assessment of Overall Change in Noise Levels	Greater than 5.0 dB Increase in Noise Levels	Mitigate to achieve: Increase in Noise Levels of less than 5.0 dB



# 3.0 Assessment Methodology

#### 3.1 Noise Modelling Methodology

Three-dimensional noise modelling has been undertaken based on the monitoring data to predict source noise levels at a large number of locations both horizontally and vertically. CADNA noise modelling software has been used. This model is based on the ISO 9613 noise propagation methodology and allows for detailed prediction of noise levels to be undertaken. The modelling software calculates noise levels based on the emission parameters and spatial settings that are entered. Input data, assumptions and model settings as given in the table below have been used.

Table 3.1	Modelling	Parameters Sources	and Assumptions
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Parameter	Source	Details
Horizontal distances – around site	Ordnance Survey	Ordnance Survey
Ground levels – around site	Ordnance Survey	Ordnance Survey
Ground levels – other areas	Site Observations and Ordnance Survey	OS 1:25,000 contours and OS 1:10,000 spot heights.
Building heights – around site	WYGE Observations	8 m height for two storey residential properties, and 4 m for Bungalows. 3m per storey for multi-storey buildings.
Barrier heights	WYGE Observations	All existing barriers modelled following WYG site observations with the exception of hedges and trees which are assumed to offer no noise protection.
Receptor positions	WYGE	1 m from façade, height of 1.5 m for ground floor, 4 m for first floor properties. 1.5 m height for model grid.
Façade Correction	CADNA	Façade corrections have been incorporated into the modelling
Site Plans	Hadfield Cawkwell Davidson	Racquet Club Layout: Drawing Number: A-PL-09-010 Dated: May 2019

It is acknowledged that a number of these assumptions will affect the overall noise levels presented in this report. However, it should be noted that certain assumptions made, as identified above, are worst-case.

It should be noted that due to outline nature of both applications for the proposed 'employment spaces' there is no fixed layout, however for the purposes of this assessment, noise sources have been positioned in worstcase locations towards the boundaries of the site with respect to sensitive receptors. Furthermore, no buildings have been included as part of the 'employment space' area which would, in reality, provide a certain amount of screening, and therefore the assessment is considered to represent a worst-case scenario.



#### 3.2 Model Input Data

#### **Building Services Plant Noise Data**

Point sources have been used in the model to represent the potential plant associated with both the Racquet club application and the employment space. The maximum sound pressure levels of point sources at 1 and 3 metres were estimated in the model as a conditional maximum level that the noise levels at nearby receptors were predicted to meet the BS 4142 assessment criteria. Noise emission limits have been specified to ensure that plant noise rating levels are at least 10 dB below existing daytime and night-time background noise levels.

#### Proposed Racquet Club Noise Level Data

#### Sports Pitch Noise Level Data

Noise associated with the proposed sports pitches at the proposed racquet club have been included in the model. To create a worst-case assessment, noise levels have been included in the model as measured from a Multi-Use Games Area (MUGA) which include noise from participating football players, spectators and use of a whistle by a referee; a Noise level of  $L_{Aeq,10mins}$  63 dB(A) were measured at 5 metres from the touchline and this data has been used to verify as an area source in the model. To ensure a worst-case assessment this noise level data has been used to represent every proposed sports pitch / playing area including outdoor swimming pool.

It is understood that both the existing and proposed racquet club will only be used during the daytime period (07:00 - 23:00) and have therefore only been included in modelling of the daytime scenario.

#### Car Park Noise Level Data

Noise levels within the proposed car parks have been based on measurements of a similar commercial premises

• Car Park LAeq Noise Level = 53.0 dB @ 1m

#### Proposed Employment Use (B1a / B1b / B1c) Noise Level Data

To present a worst-case assessment, specific noise level data has been sourced from measurements of similar-scale vehicle maintenance facilities to represent noise from any potential 'workshop areas'. Table 3.2 summaries the model input data.



Table 3.2	Workshop Noise Level Da	ta
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Noise Source	Description	Model input details
Workshop Areas	Noise level based on an internal reverberant measured LAeq,8secs of an air gun tightening bolts on a wheel with a compressor operating	Point source. 70.5 dB (A) at 3m. Based on source noise level occurring for 100% on-time.

# 3.3 Sensitive Receptors

Table 3.3 below summarises the receptor locations that have been selected to represent worst-case residential receptors with respect to direct noise from the site. Ground (daytime) and First floor (night-time receptors are represented, unless otherwise stated. The locations of the receptors are shown on SK02 in Appendix B.

#### **Table 3.3 Sensitive Receptor Locations**

Ref.	Description	Height (m) Daytime / Night-time
R01	Promised Land Farm, Wendlebury Road	1.5 / 4.0
R02	13 Bicester Park Home	1.5
R03	4a Bicester Park Home	1.5
R04	2a Bicester Park Home	1.5
R05	28a Bicester Park Home	1.5
R06	10 Hereford Close	1.5 / 4.0
R07	15 Hereford Close	1.5 / 4.0
R08	32 Haydock Road	1.5 / 4.0
R09	98 Haydock Road	1.5 / 4.0
R10	77 Flanders Close	1.5 / 4.0
R11	1 Graven Hill	1.5 / 4.0
R12	10 Graven Hill	1.5 / 4.0
R13	Consented Hotel, Wendlebury Road	4.0 / 4.0



# 4.0 Noise Survey

## 4.1 Noise Survey Methodology

A monitoring survey was undertaken to characterise baseline ambient noise levels currently experienced on the site and to establish the relative local background and traffic noise levels. Equipment used during the survey included:

Rion NL-52 Rion NL-32	Environmental Noise Analyser Environmental Noise Analyser	s/n s/n	1276552 213442
Rion NL-52	Environmental Noise Analyser	s/n	342867
Rion NC-75	Sound Calibrator	s/n	35270131

The measurement equipment was checked against the appropriate calibrator at the beginning and end of the measurements, in accordance with recommended practice, and no drift was observed. The accuracy of the calibrators can be traced to National Physical Laboratory Standards, calibration certificates for which are available on request.

A baseline monitoring survey was undertaken at six locations (as specified in the following table and shown in SK01 of Appendix B) from Friday 16<sup>th</sup> November 2018 to Thursday 22<sup>nd</sup> November 2018. Attended short term measurements were undertaken at seven locations during day, evening and night-time periods with two additional locations being measured unattended over a 141-hour period. The raw data collected from the long-term monitoring are available upon request.

Measurements were taken in general accordance with BS 7445-1:2003 *The Description and Measurement of Environmental Noise: Guide to quantities and procedures.* Weather conditions during the survey period were observed as being dry. Anemometer readings confirmed that wind speeds were less than 5 ms<sup>-1</sup> at all times during the survey, with a predominant easterly wind direction.

Ref	Description			
LT1	South west of the site, adjacent Wendlebury Road			
LT2	South west of the site, between Wendlebury Road and A41			
ST1	Langdon Lane, opposite WG Riding			
ST2	Adjacent to Bicester Park Homes			
ST3	1 Hexham Road			
ST4	North of the site, adjacent to A41			
ST5	73a Flanders Close			
ST6	North of the site, adjacent to Wendlebury Road			
ST7	Bicester Avenue Garden Centre car park			

 Table 4.1
 Noise Monitoring Locations



## 4.2 Noise Survey Results

The dominant noise source found in the area is road traffic noise from the A41 located towards the western boundary of the proposed development site. Noise was also audible from surrounding localised roads such as Wendlebury road and Anniversary Avenue with occasional contributions from passing rail traffic.

Ambient and background noise levels are usually described using the  $L_{Aeq}$  index (a form of energy average) and the  $L_{A90}$  index (i.e. the level exceeded for 90% of the measurement period) respectively. Road traffic noise is generally described using the  $L_{A10}$  index (i.e. the level exceeded for 10% of the measurement period). For the long-term (LT) locations, the presented  $L_{Aeq,T}$  and  $L_{A10,T}$  are average noise levels whilst the  $L_{A90}$  is the modal noise level of each 5-minute measurement over the stated survey period.

Survey Location	Date & Time	Temperature (°C)	Wind Speed (m/s)	Wind Direction	Cloud Cover (Oktas)	Dominant Noise Source
Daytime ST1	21/11/2018 12:30	7.0	3 - 4	E	0	Distant Road Traffic Noise
Daytime ST2	21/11/2018 13:03	7.0	4 - 5	E	0	Localised Road traffic noise Wendlebury Road and distant road traffic noise from the A41
Daytime ST3	21/11/2018 14:45	6.0	3 - 4	Е	4	Road traffic noise A41
Daytime ST4	21/11/2018 15:07	5.0	3 - 4	E	4	Road traffic noise A41
Daytime ST5	21/11/2018 11:57	7.0	1 - 2	E	0	Road traffic noise A41
Daytime ST6	21/11/2018 14:18	7.0	3 - 4	E	2	Road traffic noise A41
Daytime ST7	21/11/2018 13:56	7.0	2 - 3	E	0	Road traffic noise on garden centre exit road
Evening ST1	21/11/2018 21:18	1.0	0 - 1	E	0	Distant road traffic noise
Evening ST2	21/11/2018 19:09	2.0	0 - 1	E	0	Road traffic noise A41
Evening ST3	21/11/2018 14:45	2.0	0 - 1	E	0	Road traffic noise A41
Evening ST4	21/11/2018 15:07	2.0	0 - 1	E	0	Road traffic noise A41
Evening ST5	21/11/2018 11:57	2.0	0 - 1	E	0	Road traffic noise A41
Evening ST6	21/11/2018 14:18	2.0	0 - 1	Е	0	Road traffic noise A41
Night-time ST1	22/11/2018 01:10	0.0	0 - 1	Е	0	Distant road traffic noise
Night-time ST2	22/11/2018 00:31	0.0	0 - 1	E	0	Road traffic noise A41
Night-time ST3	21/11/2018 23:46	0.0	0 - 1	E	0	Road traffic noise A41
Night-time ST4	22/11/2018 00:04	0.0	0 - 1	E	0	Road traffic noise A41
Night-time	21/11/2018	1.0	0 - 1	E	0	Road traffic noise A41

Table 4.2	Meteorol	ogical	Conditions	durina	the Survey	v
	FICEOIOI	ogicai	conditions	uuring		



Survey Location	Date & Time	Temperature (°C)	Wind Speed (m/s)	Wind Direction	Cloud Cover (Oktas)	Dominant Noise Source
ST5	23:00					
Night-time ST6	21/11/2018 23:22	0.0	0 - 1	Е	0	Road traffic noise A41

The results of the statistical measurements and frequency measurements conducted during the survey are summarised in the following table. All values are sound pressure levels in dB (re:  $2 \times 10^{-5}$  Pa). For the long-term (LT) locations, the presented L<sub>Aeq,T</sub> and L<sub>A10,T</sub> are average noise levels whilst the L<sub>A90</sub> is the modal noise level of each 5-minute measurement over the stated survey period.

Table 4.3	Results of Baseline Noise Monitoring Survey (Average Levels)
	Results of baseline Noise Monitoring Survey (Average Levels)

Period	Duration (T)	Monitoring Date and Times	Location	L <sub>Aeq,T</sub> (dB)	L <sub>Amax,T</sub> (dB)	L <sub>Amin,T</sub> (dB)	L <sub>А10,Т</sub> (dB)	L <sub>А90,Т</sub> (dB)
Weekday Daytime 07:00 - 23:00	61 Hours	16/11/2018 – 22/11/2018 11:44 – 08:44		64.5	93.8	28.4	47.9	48.0
Weekday Night-time 23:00 - 07:00	32 Hours	16/11/2018 – 22/11/2018 23:00 - 07:00	171	53.3	90.7	25.6	41.2	37.0
Weekend Daytime 07:00 - 23:00	32 Hours	17/11/2018 – 18/11/2018 07:00 - 23:00		62.4	93.7	36.0	47.2	46.0
Weekend Night-time 23:00 - 07:00	16 hours	17/11/2018 – 18/11/2018 23:00 - 07:00		51.4	85.7	22.4	37.4	36.0
Weekday Daytime 07:00 - 23:00	61 Hours	16/11/2018 – 22/11/2018 12:17 – 08:32		60.1	82.0	32.7	61.8	56.0
Weekday Night-time 23:00 - 07:00	32 Hours	16/11/2018 – 22/11/2018 23:00 - 07:00	172	55.0	75.0	28.3	56.2	38.0
Weekend Daytime 07:00 - 23:00	32 Hours	17/11/2018 – 18/11/2018 07:00 - 23:00	LIZ	59.3	80.8	36.9	61.0	57.0
Weekend Night-time 23:00 – 07:00	16 hours	17/11/2018 – 18/11/2018 23:00 - 07:00		51.0	81.2	25.4	54.0	36.0
	15 Mins	21/11/2018 12:30	ST1	52.2	69.1	42.5	55.0	46.3
	15 Mins	21/11/2018 13:03	ST2	52.0	73.5	45.3	54.0	48.6
	15 Mins	21/11/2018 14:45	ST3	57.1	76.5	51.6	58.0	53.5
07:00 - 19:00	15 Mins	21/11/2018 15:07	ST4	72.9	86.3	53.0	76.6	60.1
	15 Mins	21/11/2018 11:57	ST5	62.3	75.8	54.1	64.5	58.8
	15 Mins	21/11/2018 14:18	ST6	66.3	82.4	48.1	70.9	52.5
	15 Mins	21/11/2018 13:56	ST7	57.7	79.3	47.4	58.0	50.0
	15 Mins	21/11/2018 21:18	ST1	54.5	91.9	41.2	45.8	43.0
	15 Mins	21/11/2018 19:09	ST2	52.1	66.6	45.2	54.3	48.6
Evening 19:00 - 23:00	15 Mins	21/11/2018 14:45	ST3	51.2	60.9	46.4	53.2	48.7
	15 Mins	21/11/2018 15:07	ST4	71.5	90.0	49.3	76.0	55.6
	15 Mins	21/11/2018 11:57	ST5	57.9	65.9	42.3	61.3	49.1



Period	Duration (T)	Monitoring Date and Times	Location	L <sub>Aeq,T</sub> (dB)	L <sub>Amax,T</sub> (dB)	L <sub>Amin,T</sub> (dB)	L <sub>А10,Т</sub> (dB)	L <sub>А90,Т</sub> (dB)
	15 Mins	21/11/2018 14:18	ST6	59.7	78.0	48.3	60.8	52.3
	15 Mins	22/11/2018 01:10	ST1	39.5	53.7	35.7	41.1	37.5
	15 Mins	22/11/2018 00:31	ST2	44.4	54.4	36.2	47.5	40.0
Night-time 23:00 - 07:00	15 Mins	21/11/2018 23:46	ST3	46.0	60.4	39.0	48.3	42.2
	15 Mins	22/11/2018 00:04	ST4	66.6	85.8	40.8	69.8	43.7
	15 Mins	21/11/2018 23:00	ST5	54.9	66.0	40.7	59.1	44.6
	15 Mins	21/11/2018 23:22	ST6	57.5	82.6	41.0	55.1	45.5

All values are sound pressure levels in dB re: 2x 10<sup>-5</sup> Pa



# 5.0 Assessment of Effects

#### 5.1 BS4142:2014 Assessment (Building Services Plant)

This assessment has been undertaken to establish the maximum external noise levels from the proposed development. The assessment compares the predicted worst-case breakout noise levels from potential plant with the typical measured average background noise LA90 at the closest existing residential receptors.

A series of predictions were made by defining different sound power levels at point sources. When the sound pressure levels are set as shown in Tables 5.1 (which are considered to be achievable), the noise levels at all the existing receptors are predicted to be at least 10 dB below existing background levels during the daytime and night-time as shown in Tables 5.2. All predicted rating noise levels fall within the No Observed Adverse Effect Level; specific noise levels at proposed receptors are predicted to be below the measured background noise levels.

In accordance with section 9.2 of BS4142:2014 an overall +3 dB character correction has been applied to account for any intermittent characteristics of noise from the plant units which may be perceptible at the closest sensitive receptors.

As the proposed employment space is outline in nature, the exact locations of BSP units are not known., therefore, plant noise sources have been positioned in worst-case locations with respect to surrounding sensitive receptors. For the Racquet Club, point sources have been located to represent plant associated with the Spa area / Swimming pool and dome area.

The assessment presented below has been undertaken with plant for each unit operating at full capacity, simultaneously.

Table 5.1	Proposed Emission Limits for BSP as Modelled
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<b>BSP</b> Location	Noise Emission Limit - Sound Pressure Level (Per Unit)			
	Daytime	Night-time		
Building Services Plant x 19 units	75.5 dB(A) at 1m OR 65.9 dB(A) at 3m	66.3 dB(A) at 1m OR 56.7 dB(A) at 3m		

#### Table 5.2 BS4142 Assessment for Proposed Plant

Reference	Measured Background L <sub>A90</sub>		Rating leve	l from plant	BS 414	2 Score
	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time
R01	46	36	29	20	-17	-16
R02	56	36	31	22	-25	-14



Reference	Measured Background L <sub>A90</sub>		Rating level from plant		BS 4142 Score	
	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time
R03	56	36	29	20	-27	-16
R04	56	36	30	21	-26	-15
R05	56	36	31	21	-25	-15
R06	54	42	33	25	-21	-17
R07	54	42	33	25	-21	-17
R08	54	42	33	26	-21	-16
R09	54	42	30	24	-24	-18
R10	59	45	19	19	-40	-26
R11	46	36	35	27	-11	-10
R12	46	36	34	25	-12	-11
R13	52	45	43	33	-10	-12

# 5.2 BS4142:2014 Assessment (Potential Workshop Noise)

This assessment has been undertaken in order to establish the effect of noise from potential light industrial use associated within the outline employment space. The assessment compares the predicted average noise rating levels from workshop noise with the measured pre-installation daytime and night-time background noise L<sub>A90</sub> at the nearest noise sensitive properties.

In accordance with section 9.2 of BS4142:2014 an overall +3 dB character correction has been applied to account for any impulsive characteristics of noise from the units which may be just perceptible at the closest sensitive receptors and to account for uncertainty.

As the 'employment space' is outline in nature, the exact location of any units or the use of the units is unknown. However, to create a worst-case assessment 9-point sources have been included with the model. In reality the number of light industrial uses is expected to be much lower however the assessment presented below has been undertaken with the units operating at full capacity, simultaneously.

Reference	Measured nce Background L <sub>A90</sub>		Rating level from Potential Workshops		BS 4142 Score	
	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time
R01	46	36	32	32	-14	-5
R02	56	36	34	34	-22	-2
R03	56	36	31	31	-25	-5
R04	56	36	32	32	-24	-4
R05	56	36	32	32	-24	-4
R06	54	42	35	35	-19	-7
R07	54	42	36	36	-18	-6

Table 5.3	BS4142 Assessment for Potential Workshops



Reference	Measured Background L <sub>A90</sub>		Rating level from Potential Workshops		BS 4142 Score	
	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time
R08	54	42	35	35	-19	-7
R09	54	42	33	34	-21	-8
R10	59	45	20	30	-39	-16
R11	46	36	36	37	-10	1
R12	46	36	35	36	-11	0
R13	52	45	43	43	-9	-2

The assessment above shows that worst-case noise rating levels are predicted to be below background noise levels during the daytime and no more than 1 dB above background noise levels during the night-time periods at all nearby sensitive receptor locations, which is an indication of a low impact (on the basis of worst-case assumptions regarding the use of the site and on-time of the noise sources). Therefore, worst-case noise levels from the employment space falls within or the Lowest Observed Adverse Effect Level.

## 5.3 Noise Intrusion Assessment (All Sources)

Tables 5.3 and 5.4 below show the external noise levels at nearby sensitive receptors from combined sources of potential noise associated with the proposed development, including; Building Services Plant and Workshop noise associated with the employment space and building services plant, car parking and sports pitch noise associated with the racquet club.

Internal L<sub>Aeq</sub> noise levels have been assessed both with windows open, where a reduction from a partially open window of 15 dB has been used, and with windows closed where an assumption of single glazing with a sound reduction of 30 dB has been used.

All sources have been assumed to be operating at 100% capacity and simultaneously during the daytime. During the night-time scenario, as the racquet club is unlikely to operating, noise sources from this area have not been included.

Location	External L <sub>Aeq</sub> Noise Level at 1 metre from façade	Internal L <sub>Aeq</sub> with windows open	Internal L <sub>Aeq</sub> with windows closed	Criteria (Internal L <sub>Aeq</sub> dB Daytime)
R01	30.9	15.9	0.9	35
R02	33.4	18.4	3.4	35
R03	30.9	15.9	0.9	35
R04	31.7	16.7	1.7	35
R05	32.4	17.4	2.4	35
R06	38.4	23.4	8.4	35
R07	39.4	24.4	9.4	35
R08	39.3	24.3	9.3	35

Table 3.4 Holse Ind asion Levels Laeq, mour (Day chine)	Table 5.4	Noise Intrusion Levels LAeq, 1hour	(Daytime)
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Location	External L <sub>Aeq</sub> Noise Level at 1 metre from façade	Internal L <sub>Aeq</sub> with windows open	Internal L <sub>Aeq</sub> with windows closed	Criteria (Internal L <sub>Aeq</sub> dB Daytime)
R09	38.4	23.4	8.4	35
R10	21.3	6.3	0.0	35
R11	37.8	22.8	7.8	35
R12	36.4	21.4	6.4	35
R13	48.7	33.7	18.7	35

All values are sound pressure levels in dB re:  $2x \ 10^{-5}$  Pa.

#### Table 5.5 Noise Intrusion Levels LAeq, 15mins (Night-time)

Location	External L <sub>Aeq</sub> Noise Level at 1 metre from façade	Internal L <sub>Aeq</sub> with windows open	Internal L <sub>Aeq</sub> with windows closed	Criteria (Internal L <sub>Aeq</sub> dB Night-time)
R01	28.8	13.8	0.0	30
R02	31.6	16.6	1.6	30
R03	28.3	13.3	0.0	30
R04	29.1	14.1	0.0	30
R05	29.8	14.8	0.0	30
R06	32.0	17.0	2.0	30
R07	33.5	18.5	3.5	30
R08	32.8	17.8	2.8	30
R09	31.8	16.8	1.8	30
R10	26.8	11.8	0.0	30
R11	34.3	19.3	4.3	30
R12	33.0	18.0	3.0	30
R13	40.3	25.3	10.3	30

All values are sound pressure levels in dB re:  $2x \ 10^{-5}$  Pa.

The assessment presented in the tables above demonstrates that internal  $L_{Aeq}$  noise levels from the proposed development are predicted to be within the BS 8233/WHO noise intrusion criteria at all existing receptors with windows open or closed. Noise levels at all receptors fall within the No Observed Adverse Effect Level.

#### 5.4 Overall Change in Noise Level Assessment (All Sources)

This assessment has been undertaken to compare worst-case noise levels from the 'existing ambient noise levels' (L<sub>Aeq</sub>) to the 'proposed scheme' noise at identified existing and proposed residential receptors. The differences between the 'existing' and the 'proposed' development scenarios. Including; Building Services Plant and Workshop noise associated with the employment space; and building services plant, car parking and sports pitch noise associated with the racquet club.

All sources have been assessed to be operating at 100% capacity, simultaneously during the daytime. During the night-time scenario, as the racquet club is unlikely to operating, noise sources from this area have not been included.



Ref.	Existing L <sub>Aeq</sub> (monitored)	Proposed L <sub>Aeq</sub> (modelled)	Combined L <sub>Aeq</sub>	Contribution from Proposed Scheme
R01	62.4	30.9	62.4	0.0
R02	59.3	33.4	59.3	0.0
R03	59.3	30.9	59.3	0.0
R04	59.3	31.7	59.3	0.0
R05	59.3	32.4	59.3	0.0
R06	57.1	38.4	57.2	0.1
R07	57.1	39.4	57.2	0.1
R08	57.1	39.3	57.2	0.1
R09	57.1	38.4	57.2	0.1
R10	62.3	21.3	62.3	0.0
R11	62.4	37.8	62.4	0.0
R12	62.4	36.4	62.4	0.0
R13	66.3	48.7	66.4	0.1

# Table 5.6Difference between Existing Conditions and Contribution from ProposedDevelopment: Daytime LAeg

All values are sound pressure levels in dB re: 2x 10<sup>-5</sup> Pa.

#### Table 5.7 Difference between Existing Conditions and Contribution from Proposed

#### Development: Night-time LAeq

Ref.	Existing L <sub>Aeq</sub> (monitored)	Proposed L <sub>Aeq</sub> (modelled)	Combined L <sub>Aeq</sub>	Contribution from Proposed Scheme
R01	51.4	28.8	51.4	0.0
R02	51.0	31.6	51.0	0.0
R03	51.0	28.3	51.0	0.0
R04	51.0	29.1	51.0	0.0
R05	51.0	29.8	51.0	0.0
R06	46.0	32.0	46.2	0.2
R07	46.0	33.5	46.2	0.2
R08	46.0	32.8	46.2	0.2
R09	46.0	31.8	46.2	0.2
R10	54.9	26.8	54.9	0.0
R11	51.4	34.3	51.5	0.1
R12	51.4	33.0	51.5	0.1
R13	57.5	40.3	57.6	0.1

All values are sound pressure levels in dB re: 2x 10<sup>-5</sup> Pa.

The results presented in the tables above show the change in noise levels between the existing monitored  $L_{Aeq}$  noise levels and the contribution from the proposed scenario. The differences between the 'existing' and 'proposed' scenario are no greater than 0.2 dB(A) at all receptors which is considered to be negligible (noise level changes of ± 3 dB are generally imperceptible to the human ear). Therefore, in terms of the change in noise level associated with the development, noise effects fall within the No Observed Adverse Effect Level.



# 6.0 Conclusions of Noise Assessment

A noise assessment has been undertaken for an employment floorspace and a racquet club on land to the south-east of Wendlebury Road, Bicester. The NPPF provides test points against which the proposed development has been assessed. Considering these points, the following conclusions can be drawn:

#### NPPF paragraphs 170 (e) and 180 (a)

In considering paragraphs 170 and 180, a background noise comparison assessment (in accordance with BS4142:2014), which considers the worst-case noise levels, has shown that worst-case noise rating levels from the potential light-industrial use associated with the outline employment space are predicted to be no more than 1dB above the existing background noise levels during the daytime or night-time hours.

Maximum noise level limits have been set for potential building services plant which ensures that rated noise levels are at least 10 dB below the existing background noise levels during both the daytime and night-time.

A noise intrusion assessment, from all combined noise sources associated with the employment space and proposed racquet club has shown that the BS 8233 criteria will be achieved at all of the closest sensitive receptors during the daytime and night-time with windows open or closed.

Furthermore, a change in noise level assessment which compares the existing ambient noise levels with the addition of the proposed combined noise levels has shown that noise levels are predicted to change by no more than 0.2 dB which is considered to be negligible.

Accordingly, the proposed operations are not expected to have a significant 'adverse impact' on health or quality of life at nearby dwellings and satisfies the relevant policy considerations set out in the NPPF.

#### NPPF Paragraphs 180 (b), 182 & 183

Given the favourable results of assessments as described above, no nearby business are expected to have unreasonable restrictions put on them as a result of the proposals. In addition, it is considered that the proposals will not have an effect on the tranquillity of the area and local access to areas of greater tranquillity.

#### Planning Practice Guidance: Noise

The assessment has demonstrated that noise levels from proposed operations at existing receptors are predicted to be within below the Lowest Observed Adverse Effect Level at all times.



# Appendices



# Appendix A – Acoustic Terminology and Abbreviations

An explanation of the specific acoustic terminology referred to within this report is provided below.

- dB Sound levels from any source can be measured in frequency bands in order to provide detailed information about the spectral content of the noise, i.e. whether it is high-pitched, low-pitched, or with no distinct tonal character. These measurements are usually undertaken in octave or third octave frequency bands. If these values are summed logarithmically, a single dB figure is obtained. This is usually not very helpful as it simply describes the total amount of acoustic energy measured and does not take any account of the ear's ability to hear certain frequencies more readily than others.
- dB(A) Instead, the dBA figure is used, as this is found to relate better to the loudness of the sound heard. The dBA figure is obtained by subtracting an appropriate correction, which represents the variation in the ear's ability to hear different frequencies, from the individual octave or third octave band values, before summing them logarithmically. As a result the single dBA value provides a good representation of how loud a sound is.
- $L_{Aeq} Since almost all sounds vary or fluctuate with time it is helpful, instead of having an instantaneous value to describe the noise event, to have an average of the total acoustic energy experienced over its duration. The L_{Aeq, 07:00 23:00} for example, describes the equivalent continuous noise level over the 12 hour period between 7 am and 11 pm. During this time period the L_{pA} at any particular time is likely to have been either greater or lower that the L_{Aeq, 07:00 23:00}.$
- L<sub>Amin</sub> The L<sub>Amin</sub> is the quietest instantaneous noise level. This is usually the quietest 125 milliseconds measured during any given period of time.
- L<sub>Amax</sub> The L<sub>Amax</sub> is the loudest instantaneous noise level. This is usually the loudest 125 milliseconds measured during any given period of time.
- $L_n$  Another method of describing, with a single value, a noise level which varies over a given time period is, instead of considering the average amount of acoustic energy, to consider the length of time for which a particular noise level is exceeded. If a level of x dBA is exceeded for say. 6 minutes within one hour, then that level can be described as being exceeded for 10% of the total measurement period. This is denoted as the LA10, 1 hr = x dB.

The  $L_{A10}$  index is often used in the description of road traffic noise, whilst the  $L_{A90}$ , the noise level exceeded for 90% of the measurement period, is the usual descriptor for underlying background noise.  $L_{A1}$  and  $L_{Amax}$  are common descriptors of construction noise.

*R<sub>w</sub>* The *weighted sound reduction index* determined using the above *measurement* procedure, but weighted in accordance with the procedures set down in BS EN ISO 717-1. Partitioning and building board manufacturers commonly use this index to describe the inherent sound insulation performance of their products.



An explanation of abbreviations used within this report is provided below.

- CADNA Computer Aided Noise Abatement
- DMRB Design Manual for Roads and Bridges
- HGV Heavy Goods Vehicle
- UDP Unitary Development Plan
- UKAS United Kingdom Accreditation Service
- WYGE WYG Environment



# **Appendix B – Sketches**

- SK01 Noise Monitoring Locations
- SK02 Sensitive Receptor Locations
- SK03 Cumulative Indicative Daytime LAeq Noise Contour Plot







Client: Albion Land (2013) Limited

Project: Catalyst Bicester

Project Number: A111250

Drawing Title / Scenario: Cumulative Indicative Daytime LAeq Noise Contour Plot

Drawing Number: SK03

Key:

23,400m2 Employment Space:

Developable Land:

Racquet Club: ----

10,200m2 Employment Space:

0.0 - 45.0 dB
45.0 - 55.0 dB
55.0 - 65.0 dB
> 65.0 dB

Scale : Not to scale

Please note: Noise contour plots are for illustrative purposes only

WYGE Leicester 25.07.19

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# Appendix C – Report Conditions

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