



Orbit Investments (Properties) Ltd

Land at Lees Road, Academy Business Park, Knowsley

Noise Impact Assessment

15612215-02 – August 2022

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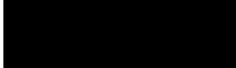
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Contact Details		
Company Name	Bureau Veritas UK Limited	Orbit Investments (Properties) Ltd
Contact Name	Richard Cope	Peter Hilldrup
Position	Technical Director	Senior Planner
Address	2 nd Floor, Atlantic House Atlas Park Simonsway Wythenshawe Manchester M22 5PR	The Emerson Group Emerson House Heyes Lane Alderley Edge SK9 7LF
Telephone	07974 576085	01625 588432
e-mail	Richard.cope@bureauveritas.com	peter.hilldrup@emerson.co.uk
Websites	www.bureauveritas.com	www.emerson.co.uk

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	Name	Job Title	Signature
Prepared By	R Cope, MIOA	Technical Director (Acoustics & Vibration)	
Approved By	Yiyang Hao MIOA	Senior Consultant (Acoustics & Vibration)	

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Registered Office: Suite 206, Fort Dunlop, Fort Parkway, Birmingham, B24 9FD

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Executive Summary

Bureau Veritas was instructed by Orbit Investments (Properties) Ltd to provide an updated noise impact assessment to reflect the proposed amended scheme to the approved application for the mixed-use development at Academy Business Park, Knowsley.

The proposed amended scheme is to be submitted as a full planning application, for two food/drink retail (Class E(a) / E(b) / Sui Generis Hot Food Takeaway) units (Units 6B(1) and 6B(2)). These units were previously consented as a single unit (same use class) with a slightly smaller floorspace (398 sq ft less).

The assessment is based on the results of baseline sound level surveys and sound propagation modelling carried out in accordance with current guidance and best practice.

Given the extant permitted use of the site, the proposed developed development would not lead to a net increase in HGV movements both on the site itself and on local roads.

The assessment has considered the potential noise impact of deliveries to the food retail units during daytime and night-time periods. Noise from staff vehicles accessing/egressing the site prior to and after trading hours will not be significant in terms of environmental noise impacts, and has therefore been excluded from further assessment; however, an assessment of noise from car park activity (customer vehicles) has been conducted.

An indicative assessment of noise from external plant items has been conducted, although specific plant details are not known at this stage. This includes the proposal of environmental noise limits. Based on these limits, there is no reason why noise from fixed plant should prove problematical for this development. If considered necessary, noise impact prediction undertaken at a later date will enable identification of noise mitigation measures (if required).

Noise from deliveries to the site are not expected to be significant during the daytime and night-time period.

In summary, the effects of noise from the amended site layout are not expected to be significant during daytime or night-time periods at the nearest residential receptors.

1 Introduction

- 1.1 Bureau Veritas was instructed by Orbit Investments (Properties) Ltd to update the noise impact assessment previously submitted and used to obtain planning approval for the mixed-use development at Academy Business Park, Knowsley.
- 1.2 This updated noise assessment has been carried out to determine the potential impact of two food/drink retail (Class E(a) / E(b) / Sui Generis Hot Food Takeaway) units (Units 6B(1) and 6B(2)). These units were previously consented as a single unit (same use class) with a slightly smaller floorspace (398 sq ft less).
- 1.3 This noise assessment has been carried out to determine the potential impact of the operation of the proposed commercial units on the nearest noise-sensitive receptors, including local residents and a primary school. The assessment is based on the results of baseline sound level surveys carried out in accordance with current guidance and best practice. Outline recommendations for noise mitigation measures have been detailed to ensure the required sound levels are achieved at neighbouring noise-sensitive receptors, where necessary.
- 1.4 The assessment has considered the potential noise impact of deliveries during daytime and night-time periods. Noise from staff vehicles accessing/egressing the site prior to and after trading hours will not be significant in terms of environmental noise, and has therefore been excluded from further assessment; however, an assessment of noise from car park use (customer and commercial vehicles) has been conducted. An indicative assessment of noise from external plant items has also been conducted, although specific plant details are not known at this stage.
- 1.5 A glossary of acoustic terminology is included in Appendix One.

2 Details of Development

- 2.1 Academy Business Park is located at the western boundary of a commercial/industrial area (Knowsley Industrial Park), which lies to the east of the residential areas of Southdene and Northwood. The proposed development site is bounded to the north and east by existing commercial/industrial units, and to the south by the A5208 County Road, beyond which is Park Brow Community Primary School, approximately 110m (school building) from the proposed development site boundary.
- 2.2 A site layout showing the locations of the two food/drink units (Units 6B(1) and 6B(2)) is presented in Appendix Two. The site will be accessed from the existing roundabout junction of the A5208 County Road with Broad Lane and Arbour Lane, via the consented Academy Business Park access road.
- 2.3 The nearest residential dwellings are situated on Delfby Crescent, approximately 160m to the west of proposed development site boundary.
- 2.4 At this stage, details of proposed opening/delivery times are not known and will be determined partly on the results of this assessment.

3 Criteria for Assessment

Scope and Assessment Methodology

- 3.1 Prior to carrying out the noise assessment, the potential impacts associated with the proposed development and the general principles of the assessment methodology were considered using prior experience of similar sites throughout the UK. On such sites, it is considered that the potential noise impacts associated with the proposed development are as follows:
- Noise generated by visitors to the food and drink units including vehicle movements and door slamming.
 - Noise generated by deliveries to the food and drink units.
 - Noise associated with external plant and machinery such as chiller units and air-conditioning units operating continuously or intermittently.
- 3.2 The proposed change from the consented scheme does not materially change the car parking provision within the Academy Business Park site, and therefore the potential noise impacts from customer vehicles (movements and car door slams) will be the same, i.e., not significant during day and night-time periods.
- 3.3 The potential noise impacts at proposed sensitive receptors have been assessed with reference to the following current guidance:
- National Planning Policy Framework (NPPF) 2021 and the supplementary Planning Practice Guidance for Noise (PPGN) 2019;
 - British Standard 4142: 2014+A1: 2019, *“Methods for rating and assessing industrial and commercial sound”* (BS4142); and
 - British Standard 8233: 2014, *“Guidance on sound insulation and noise reduction for buildings”*.
- 3.4 Although not currently occupied, the current usage of part of the site includes B2 (industrial and commercial) and B8 (storage and distribution), with approximately 240,000 sq ft combined across five separate units.
- 3.5 The site includes permission for two 110,000 sq ft units with B8 usage (including 10,000 sq.ft ancillary office accommodation). The overall HGV traffic generation is therefore not expected to increase as a result of the proposed development.
- 3.6 Most vehicles (including all HGVs and staff cars for Unit 1) accessing/egressing the site would use the existing junctions with Lees Road to the east. The site entrance off the roundabout junction of County Road with Arbour Lane and Broad Lane would be maintained for access to the food retail units, and possibly the trade counters. A further access is proposed off Arbour Lane for staff/visitors to the Unit 3 only.
- 3.7 HGV movements, including turning and reversing manoeuvres would be almost entirely screened (visually and acoustically) from the nearest noise-sensitive receptors by the proposed/retained buildings.
- 3.8 Noise impacts from vehicle movements associated with the proposed development will therefore not be significant given the existing site usage, the separation distance and the screening potential by the proposed/retained buildings.

National Planning Policy Framework, 2021

- 3.9 The Revised NPPF (Jul 2021) sets out the Government's planning policies for England. It states:
- "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; and ..."*
- 3.10 It goes on to 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 [NPSE – see below];*
- 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; and..."*
- 3.11 The terms 'significant adverse impact' and other adverse impacts are defined in the explanatory notes of the 'Noise Policy Statement for England (NPSE)', which states:
- There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:*
- NOEL – No Observed Effect Level*
- This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life*
- LOAEL – Lowest Observed Adverse Effect Level*
- This is the level above which adverse effects on health and quality of life can be detected.*
- Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.*
- SOAEL – Significant Observed Adverse Effect Level*
- This is the level above which significant adverse effects on health and quality of life occur*
- 3.12 It should be noted that specific noise limits for LOAEL and SOAEL have not yet been specifically defined, and would be specific to different sectors. However, guidance from other acoustic standards may be employed to determine suitable levels within the overall principle of the NPPF.
- 3.13 The Planning Practice Guidance for Noise (PPGN) provides further detail about how the effects of noise can be categorised. Table 3.1 summarises the noise exposure hierarchy.

Table 3.1 - National Planning Practice Guidance Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not present	No Effect	No Observed Effect	No specific measures required
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. 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			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported 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			
Present and disruptive	The noise causes a material change in the behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. 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
Present and very disruptive	Extensive and regular changes in the behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

Knowsley Local Plan Core Strategy (Adopted January 2016)

3.14 Saved Policy ENV2 'Noise and Vibration' of the Knowsley Replacement Unitary Development Policy, which continues as a saved policy in the 2016 Core Strategy, states:

- "1. Development that will either cause an unacceptable increase in noise or vibration levels or itself be subject to unacceptable noise or vibration from an existing source will not be permitted.
2. Where developments are permitted, conditions may be attached to the planning permission to ensure effective noise insulation or other required mitigation measures are carried out."

British Standard 4142: 2014+A1: 2019 Method for rating and assessing industrial and commercial sound

3.15 The potential impact of the operational activities of the commercial/retail units at sensitive residential receptors has been assessed in accordance with BS4142. The Standard provides a method for assessing whether a sound from industrial or commercial premises (e.g. fixed

mechanical and electrical (M&E) plant, loading activities etc.) is likely to cause a disturbance to persons living in the vicinity of the site.

- 3.16 BS4142 assesses potential significance of effect by comparing the 'specific sound level' of an industrial source to the typically representative background sound level (L_{A90}). Certain acoustic features can increase the potential for a sound to attract attention, and therefore increase its relative significance than that expected from a simple comparison between the specific sound level and the background sound level. In particular, BS4142 identifies noise that contains discrete impulses and/or audible tonal qualities and in these cases recommends that a correction be added to the specific sound level. The specific sound level along with any applicable correction is referred to as the 'rating level'.
- 3.17 The greater the difference between the rating level and the background sound level; the greater the likelihood of complaints. The assessment criteria given by BS4142 are as follows:
- A difference of +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
 - A difference of +5 dB could be an indication of an adverse impact, depending on the context.
 - The lower the rating level is relative to the measured background sound level, the less likely it is that there will be an adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.
 - Also to take into account the absolute level, risk that it will cause annoyance/interference with everyday activities, context of the sound, frequency and temporal variations to the sound.
- 3.18 From the information provided, it is understood that fixed plant associated with the retail units (chiller/refrigeration units) may operate 24 hours a day, 7 days a week. During the daytime and evening, BS4142 requires that sound levels are assessed over 1-hour periods. During the night-time, because sleep disturbance is the important issue and individual sound events are, therefore, more important, sound levels are assessed over 15-minute periods.
- British Standard 8233: 2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'**
- 3.19 BS 8233:2014 provides guidance for the control of noise in and around buildings. It is applicable to the design of new buildings, or refurbished buildings undergoing a change of use.
- 3.20 With regards to external sound sources affecting habitable residential spaces, Table 4 of BS 8233:2014 provides guideline values that it is desirable to not exceed during daytime and night time periods. These guideline values are based on guidelines issued by the WHO 'Guideline for Community Noise 1999', and are reproduced in Table 3.2.

Table 3.2 - Indoor Ambient Sound Levels for Dwellings

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$ 45 dB L_{AFMax}

- 3.21 The internal sound requirements are not intended to be met with open windows, although BS 8223:2014 states that the internal sound levels should take account of the proposed ventilation strategy.
- 3.22 For traditional external areas that are used for amenity space, such as gardens and patios, BS8233 states that it is desirable that the external sound level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments.

4 Baseline Sound Level Survey

- 4.1 To establish the current levels of ambient and background sound levels at the site, an attended survey was conducted in the vicinity of the school and residential dwellings on Delfby Crescent, which are the closest properties to the proposed development site. The survey was conducted on the 2nd and 3rd December 2019.
- 4.2 The survey was representative of the background noise level. Details of the monitoring location is provided below, and is shown in Figure 4.1.

Figure 4.1 - Sound Level Monitoring Location Plan



- 4.3 Sets of 30-minute measurements were made at the attended measurement location (i.e. Pos 1), during day and night time period.
- 4.4 The sound level meter was mounted vertically on a tripod 1.5 m above the ground and more than 3.5 m from any other reflecting surface.
- 4.5 Details of the equipment used for the unattended measurement location are provided in Appendix Three.
- 4.6 All measurements were carried out using a real-time sound level analyser (sound level meter) complying with BS EN 61672-1:2003. All instrumentation is controlled within the BV ISO 9001 accredited management system and has been verified to traceable standards within the last two years. The equipment was calibrated at the beginning of the assessment period, and the calibration level was checked at the end of the monitoring period using an acoustic calibrator, which had itself been calibrated against a reference set traceable to National and International Standards within the last year. There was no observed drift in calibration level before and after measurements.
- 4.7 The weather conditions were monitored throughout the survey. Conditions were generally dry and calm, with wind speeds below 3 m/s and were typically of a westerly direction. The temperature was around 5°C, with 75% relative humidity.

4.8 Table 4.1 presents a summary of the sound level survey results.

Table 4.1 - Summary of Measured Sound Levels

Time Period	Sound Pressure Level, dB re: 20µPa (Fast, Free-field)		
	$L_{Aeq,T}$	$L_{AFMax,T}$	$L_{A90,T}$
Day time (03/12/19 10:00-10:30)	55 - 59 Average 56	61 - 77 Average 68	52 - 54 Modal 54
Night time (02/12/19 23:30-00:00)	44 - 48 Average 46	51 - 67 Average 59	41 - 43 Modal 42

Note: measurement period, T, was 5 minutes.

4.9 It can be seen that background noise levels range between 52 - 54 dB L_{A90} during the day and between 41 - 43 dB during the night-time survey period. As required by BS4142:2014, statistical analysis is essential to determine the most common measured background noise level (not necessarily the average). This was determined to be 54 dB for daytime and 42 dB for night-time and these values have been used to assess the impact of the commercial activities.

Comments on the Sound Climate at Site

- 4.10** Ambient noise levels around the site were generally dominated by vehicular road traffic from A5208 County Road and Broad Lane.
- 4.11** The difference between the average L_{Aeq} of day and night-time is 10 dB, which is typical of an urban environment.

5 Noise Assessment and Mitigation Measures

Introduction

- 5.1 The assessment of site suitability for commercial/retail use at this location is based upon the measured ambient sound levels ($L_{Aeq,T}$) and the measured background sound levels ($L_{A90,T}$) during the day and night periods. In order to establish a worst-case assessment, baseline sound level monitoring was undertaken at a location representative of the nearest noise-sensitive receptors.

Assessment

Noise Levels from External Plant

- 5.2 The properties with the highest potential noise exposure from the proposed food/drink retail units are those on Delfby Crescent, approximately 220m to the west of the proposed drive thru restaurant.
- 5.3 Predicted sound levels from fixed mechanical and electrical (M&E) plant is calculated from basic acoustic formulae using various factors, including the sound power level of the source (refrigeration condensers, roof mounted fans, boiler flues etc.), the directivity, distance to receiver, shielding effect of any barriers and ground surface absorption. It is usual to predict sound from fixed plant as a 1-hour daytime level and as a 15-minute night-time level, to the requirements of BS4142.
- 5.4 There will be fixed plant associated with the development, likely to include chillers and heating plant which may operate at night. It is likely that boiler plant will operate automatically if the ambient air temperature drops below 5°C in order to prevent pipe-freezing. This is only likely to occur at night when the building is unoccupied. As warm air circulation is not required at these times, fans will not operate automatically. As there is sufficient distance separation between the development and the nearest noise-sensitive receptors, the impact of this operation is likely to be negligible. Typically, condenser units used by such retail outlets for HVAC and refrigeration emit noise levels less than 70 dB L_{WA} . Therefore, assuming two units in operation at each of the two proposed drive-thru food/drink units, the predicted specific noise level at the nearest residential properties would be approximately 21dB ($76 - 20 \times \log[220]-8$).
- 5.5 Fixed plant is relatively easy to attenuate, more so at the design stage and through the plant selection process. For example, breakout noise from fans contained within units with ducted intakes and exhausts can be silenced using in-duct attenuators, and noise from boiler flue fans can be silenced by atmospheric-side boiler flue attenuators.
- 5.6 On such a scheme where residential properties are within the vicinity and based on the rating section of BS4142, the rating level from new, fixed plant associated with the development should aim to achieve below the existing representative background sound level at the nearest dwellings. By specifying an appropriate plant noise emission limit (Environmental Noise Criterion (ENC)) at night, when background sound levels are significantly lower, this should ensure that plant noise during the day would be acceptable.
- 5.7 Ambient sound in the area is typical for a suburban/commercial area, with levels, particularly during the daytime, dominated by traffic on local roads. Based on the background sound level measurements and the requirements of the Local Authority, a maximum plant noise rating level of 37 dB is considered appropriate at nearby residential receptors. This equates to being 5dB below the representative night-time background sound level.

- 5.8** Consequently, a total predicted sound level criterion of 37 dB $L_{Aeq,15min}$ is recommended for the sum of all fixed plant noise associated with the development, at the nearest noise-sensitive properties.
- 5.9** At this stage a full complement of all fixed plant associated with the development is not available and will only be made available upon finalisation of the building's specification. However, it is expected that appropriate plant selection, design and attenuation should mean that no acoustic features would be present in the sound emissions, and routine inspection and servicing should ensure that this remains the case throughout the plants' operational life.
- 5.10** As soon as the fixed plant schedule and each item's hours of operation becomes known it is standard practice to undertake fixed plant noise predictions to local noise-sensitive properties to identify any necessary noise mitigation measures and the extent of those measures. As discussed previously, these measures will normally be in the form of in-duct attenuators and acoustic louvers, but in extreme cases specification of particularly quiet plant may be necessary (for example, the use of slow speed 12-pole condenser fans instead of faster, noisier 8-pole fans) or the relocation of noisy plant to shielded areas of the site or within purpose-built buildings or enclosures.
- 5.11** There is no reason why noise from fixed plant should prove problematical for this development. If considered necessary, noise impact prediction undertaken at a later date will enable identification of any necessary noise mitigation measures.

Deliveries to Drive Thru / Food Kiosk

- 5.12** Based on Bureau Veritas' experience of similar developments, the main sound sources related to the small food/drink retail outlet deliveries are considered to be the opening and closing of doors (driver's and tailgate), beeping of reversing alarms, steel cages/pallets travelling from lorry to store, engine noise, cab-mounted chiller power unit noise (if temperature controlled) and the raising and lowering of the tail lift. Delivery times may vary but are typically between 15 and 30 minutes for fast food restaurant units. Bureau Veritas' library noise data for a typical delivery are detailed in Tables 5.1 and 5.2.

Table 5.1: Activity Sound Levels

Activity	Measurement distance (m)	Sound Pressure Level, dB L_{Aeq}	Sound Power Level, dB L_{WA}	Total duration (min)	Time corrected SWL, dB L_{WA}
Truck tail lift raising	4	64	84	1	72
Dolly moving on ground between truck and store	4	66	86	2**	n/a
Truck arrival / departure	6	70	94	1	n/a

Note: *Highest measured noise level for the activity is shown in the table as worst cases.

** Approx. 15 seconds to push dolly between truck and store (approx 10m).

Table 5.2: Activity Sound Spectra

Activity	Sound Pressure Level SPL (dBA)	Octave Band Sound Power Level SWL (dB)							
		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Truck tail lift raising	64@4m	31	43	45	61	55	58	53	45
Dolly moving on ground between truck and store	66@4m	31	40	46	53	57	63	62	55
Truck arrival / departure	70@6m	39	57	61	63	64	63	59	50

- 5.13 The resulting sound level contours, using CadnaA modelling software, for deliveries are shown in Figure 5.4 (at a height of 4.0 m).

Figure 5.4: Prediction of Sound Levels due to Deliveries to Site



5.14 Table 5.3 provides a BS4142 assessment for deliveries to site.

Table 5.3: BS4142 Assessment of the Noise from Deliveries to the Proposed Development at Sensitive Receptors

Assessment Calculation Parameters	Assessment Values, dB	Commentary
Specific sound level at receptor, dB $L_{Aeq,T}$	17	Predicted by CadnaA, based on historical measurements of similar sound sources, based on worst-case assumption of LGV delivery. Noise from deliveries by smaller vehicles (vans) would be significantly lower.
Acoustic feature correction, dB	0	No acoustic character or impulsivity will be audible at nearest residential receptors
Rating Level, dB $L_{Ar,Tr}$	17	
Background sound level at nearest receptor, dB $L_{A90,T}$	54 42	Daytime Night-time
Excess of rating level over background sound level, dB	-37 -25	Daytime Night-time
Assessment outcome		The assessment indicates that there would be no impact during the daytime and night-time periods.
Context		The context is that a new commercial source is being introduced into an area where existing commercial sources already exist and where the acoustic climate is dominated by road traffic and includes HGVs and buses. Noise from deliveries to the retail units would be short-term and typically limited to just one per day, maximum.
Uncertainty of the assessment		Uncertainty unlikely to significantly affect outcome.

5.15 The results in Table 5.3 indicate that the predicted sound levels likely to be generated by deliveries associated with the proposed development will be well below the typical existing background sound levels during daytime and night-time periods.

5.16 Noise from deliveries to the site is not expected to be significant during daytime and night-time periods.

6 Conclusions

- 6.1 Bureau Veritas was instructed by Orbit Investments (Properties) Ltd to update the noise impact assessment previously submitted and used to obtain planning approval for the mixed-use development at Academy Business Park, Knowsley.
- 6.2 This updated noise assessment has been carried out to determine the potential noise impact of the operation of the proposed food/drink units on local residents based on the results of a baseline sound level survey and sound propagation modelling carried out in accordance with current guidance and best practice.
- 6.3 To establish the current levels of ambient and background sound at the site, data was used from the short-term attended survey that was conducted in the vicinity of residential dwellings on Delfby Crescent, which are the closest properties to the development site.
- 6.4 The assessment has considered the potential noise impact of deliveries during daytime and night-time periods. Noise from staff vehicles accessing/egressing the site prior to and after trading hours will not be significant in terms of environmental noise impacts, and has therefore been excluded from further assessment.
- 6.5 An indicative assessment of noise from external plant items has also been conducted, although specific plant details are not known at this stage. Based on the derived noise limits, there is no reason why noise from fixed plant should prove problematical for this development. If considered necessary, noise impact prediction undertaken at a later date will enable identification of noise mitigation measures, if required.
- 6.6 Noise from deliveries to the site are not expected to be significant during the daytime and night-time period.
- 6.7 In summary, the effects of noise from the site are not expected to be significant during daytime or night-time periods at nearby receptors and as such noise should not be considered as a constraint to development.

Appendix One – Glossary of Acoustic Terminology

"A" Weighting (dB(A))	The human ear does not respond uniformly to different frequencies. "A" weighting is commonly used to simulate the frequency response of the ear. It is used in the assessment of the risk of damage to hearing due to noise.
Decibel (dB)	The range of audible sound pressures is approximately 2×10^{-5} Pa to 200 Pa. Using decibel notation presents this range in a more manageable form, 0 dB to 140 dB.
Ambient sound level, $L_{Aeq,T}$	equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T. NOTE The ambient sound level is a measure of the residual sound and the specific sound when present.
Background sound level, $L_{90,T}$	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.
Maximum sound level, $L_{Amax,T}$	The maximum RMS A-weighted sound pressure level occurring within a specified time period.
Noise	Unwanted sound.
Ambient sound	Totally encompassing sound in a given situation at any given time composed of noise from many sources, near and far.
Residual sound	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
Rating level	Specific sound level plus any adjustment for the characteristic features of the sound.

Appendix Two – Site Layout Plan

Appendix Three – Schedule of Monitoring Equipment

Sound Monitoring Equipment – Unattended Monitoring	
Rion NL-52 Class 1 Sound Level Meter	Serial Number 342835
Rion NH-25 Preamplifier	Serial Number 43729
Rion UC-59 ½" Microphone	Serial Number 07493
Rion NC-74 Acoustic Calibrator	Serial Number 34167511

Appendix Four – Sound Level Data

Table A4.1: Sound Level Measurement Data - 2nd December 2019

Start time	Sound Pressure Level, dB				
	L _{Aeq,5min}	L _{AFmax,5min}	L _{Amin,5min}	L _{A90,5min}	L _{A10,5min}
23:30	45.2	63.6	39.9	42.2	47.6
23:35	47.8	66.6	39.2	40.9	49.8
23:40	44.3	50.7	39.0	41.5	46.9
23:45	46.0	58.7	40.1	41.9	48.6
23:50	48.4	60.5	40.0	43.1	52.1
23:55	44.7	51.8	40.2	41.9	47.1

Table A4.2: Sound Level Measurement Data - 3rd December 2019

Start time	Sound Pressure Level, dB				
	L _{Aeq,5min}	L _{AFmax,5min}	L _{Amin,5min}	L _{A90,5min}	L _{A10,5min}
10:00	56.2	72.1	52.9	54.2	57.7
10:05	55.7	60.8	52.9	54.4	56.8
10:10	55.9	65.8	52.7	53.8	58.2
10:15	56.4	70.7	51.9	53.3	58.4
10:20	58.5	76.9	52.2	54.1	58.4
10:25	54.9	63.7	50.7	52.4	56.9