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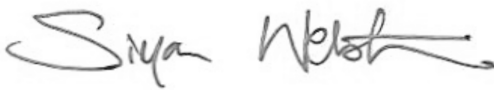
CITY WORKS, OPENSHAW, MANCHESTER

BS4142:2014+A1:2019 IMPACT ASSESSMENT

R2090-REP01F-JW

2 MAY 2024

REPORT DETAILS

Project	City Works, Openshaw, Manchester
Client	NS JV Ltd Centrix House Crow Lane East Newton Le Willows St Helens, WA12 9UY
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SUMMARY

Red Acoustics Ltd has been commissioned by NS JV Ltd to provide an assessment of the impact of sound on nearby residential properties from a proposed new commercial park that will be classed as Use Class E(g)(ii)(iii), B2 and B8 under the Town and Country Planning Act.

The proposal is for a new commercial park that will provide 4 commercial units to be constructed at land off Welcomb Street, Openshaw, Manchester.

Environmental surveys have been carried out to determine existing levels of environmental sound at the quietest (worst case) of the nearest noise sensitive dwellings to undertake an assessment with respect the guidance in BS4142:2014+A1:2019.

It has been shown that predicted worst case sound levels at the nearest noise sensitive properties associated with the proposed new commercial development are below the typical background levels measured and therefore are of low impact.

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1.0 INTRODUCTION

Red Acoustics Ltd has been commissioned by NS JV Ltd to provide an assessment of the impact of sound on nearby residential properties from a proposed new commercial park that will be classed as Use Class E(g)(ii)(iii), B2 and B8 under the Town and Country Planning Act.

The proposal is for a new commercial park that will provide 4 commercial units to be constructed at land off Welcomb Street, Openshaw, Manchester.

For further clarity the development proposal is provided as follows:

“Full application for the erection of four new industrial buildings, with the demolition of existing buildings, to create employment floor space within Use Classes E(g)(ii)(iii), B2 and B8 across the site and ancillary office space, with associated service yards, car parking including electric vehicle charging points, amended site access, refuse storage facilities, substations, boundary treatments, landscaping, and associated works and infrastructure”

2.0 SITE DESCRIPTION

The proposed development site is located on land off Welcomb Street, Openshaw, Manchester. Figure 2.1 details the location of the application site (red outline) and the location of the nearest noise sensitive properties (NSPs).

Figure 2.1: Proposed Site Location



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Figures 2.2 below shows the proposed commercial site layout under consideration.

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3.0 POLICY CONTEXT & ASSESSMENT GUIDANCE

Planning Policy

National Planning Policy Framework

The National Planning Policy Framework (NPPF¹) sets out the Government's planning policies for England and how these should be applied. Where issues of noise impact are relevant the NPPF provides guidance. In paragraph 180 it states that planning policies and decisions should contribute to and enhance the natural and local environment by:

'preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of noise pollution'.

Paragraph 191 also advises:

'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: 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 quality of life'.

The NPPF also refers to the 2010 DEFRA publication, the Noise Policy Statement for England (NSPE) which reinforces and supplements the NPPF guidance.

Noise Policy Statement for England

The Noise Policy Statement for England² (NPSE) sets out the long term vision of promoting good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development. This vision is supported by the following aims:

- Avoid Significant adverse impacts on health and quality of life.
- Mitigate and minimise adverse impacts on health and quality of life.
- Where possible, contribute to the improvement of health and quality of life.

¹ National Planning Policy Framework. Department for Levelling Up, Housing & Communities (2023)

² Noise Policy Statement for England - Department for Environment, Food & Rural Affairs (2010)

The NPSE describes the following levels at which noise impacts may be identified:

- NOEL - No Observed Effect Level. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.
- LOAEL - Lowest Observed Adverse Effect Level : This is the level above which adverse effects on health and quality of life can be detected.
- SOAEL - Significant Observed Adverse Effect Level : This is the level above which significant adverse effects on health and quality of life occur.

According to the explanatory notes in the statement, where a noise level falls between LOAEL and a level which represents SOAEL then:

'all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur'.

Planning Practice Guidance on Noise

Planning Practice Guidance (PPG) - Noise³ is an online www.gov.uk resource (last updated 2019) to provide additional guidance on the NPPF. It discusses:

- *whether or not a significant adverse effect is occurring or likely to occur;*
- *whether or not an adverse effect is occurring or likely to occur and;*
- *whether or not a good standard of amenity can be achieved.*

In line with the Explanatory Note of the NPSE, the PPG references the LOAEL and SOAEL in relation to noise impact. It also provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome. However, inline with the NPSE, no objective noise levels are provided although the PPG states that:

'the subjective nature of noise means that there is not a simple relationship between noise levels and impact on those effected. This will depend on how various factors combine in any particular situation'

Table 3.1 below summarises the PPG noise expose hierarchy.

³ Planning Practice Guidance on Noise (<https://www.gov.uk/guidance/noise--2>). Ministry of Housing, Communities & Local Government

Table 3.1: Explanation of Noise Exposure Hierarchy - PPG

Perception	Examples of Outcomes	Increasing Effect Levels	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 Adverse Effect	Prevent

Assessment Guidance

British Standard 4142

BS 4142:2014+A1:2019⁴ presents methods for rating and assessing the potential impact of commercial and industrial sound upon noise sensitive receptors. In order to assess impact using BS 4142, the 'rating level' of the new sound source is compared with the existing contextual 'background sound level'.

- Typically, the greater this difference, the greater the magnitude of the impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to 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 the specific sound source will have an adverse impact or a significant 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.

The 'rating level' is determined by assessing the 'ambient sound level', distinguishing the 'specific sound level' from the 'residual sound level' and applying any sound specific penalties for acoustic features that would subjectively cause the sound to be perceived differently.

The 'specific sound level' of the commercial / industrial sound source is determined by either; measurement or calculation with regard to the appropriate reference time interval (for daytime or night-time periods). The standard requires separate analysis for daytime and night-time periods, evaluating the 'rating level' over an appropriate reference time interval (T_r) of: 1hr for daytime (07:00 - 23:00 hrs) and 15min for night time (23:00 - 07:00 hrs). The 'specific sound level' is defined as equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T (determined either by calculation or deducting the measured 'residual sound level' from the measured 'ambient sound level').

'Ambient sound' is defined as the totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far (The ambient sound comprises the residual sound and the specific sound when present).

⁴ BS4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound

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'Residual sound' is defined as the 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.

Where appropriate, a rating penalty can be applied to the specific noise level to account for the character of the noise, namely: tonality, impulsivity and intermittency. Such acoustic feature corrections can be added together linearly.

Tonality can be determined objectively (using adjacent third octave band analysis or the Joint Nordic method) or subjectively as described below:

- +2dB penalty: Just perceptible
- +4dB penalty: Clearly perceptible
- +6dB penalty: Highly perceptible

Impulsivity can be determined objectively (using Fast Fourier Transform analysis) or subjectively as described below:

- +3dB penalty: Just perceptible
- +6dB penalty: Clearly perceptible
- +9dB penalty: Highly perceptible

Where intermittency is present, a +3dB penalty can be applied. Where the acoustic feature characteristics are neither tonal nor impulsive, but are clearly distinguishable against the residual noise, a +3dB penalty can be applied.

4.0 ENVIRONMENTAL SOUND SURVEYS

Figure 4.1 below shows the location of the monitoring position (MP1) where measurements of the existing sound climate were taken.

Measurement position MP1 was selected for manned measurement to capture the existing sound climate at the worst case nearest noise sensitive receptors to the proposed site. Following early morning and daytime site visits to undertake these measurements, it was determined by observation that the properties on Brinsop Square were notably quieter than the properties on South Street. This was due to the proximity of the A635 Ashton Old Road to the South Street NSPs as well as other commercial uses.

Measurements were therefore taken at MP1 to provide the lowest measured background sound levels of the potential NSPs for a robust assessment of impact from the proposed uses.

Measurements were taken at a tripod height of 1.2m above ground level in free field conditions with a Class 1 Sound Level Meter logging in 15min periods. Off site manned measurements were conducted on 17th May 2022 to capture the night-time and daytime quiet periods. During the surveys, the noted weather conditions were dry, calm with wind speeds typically below <5m/s.

Figure 4.1: Environmental Noise Survey Locations

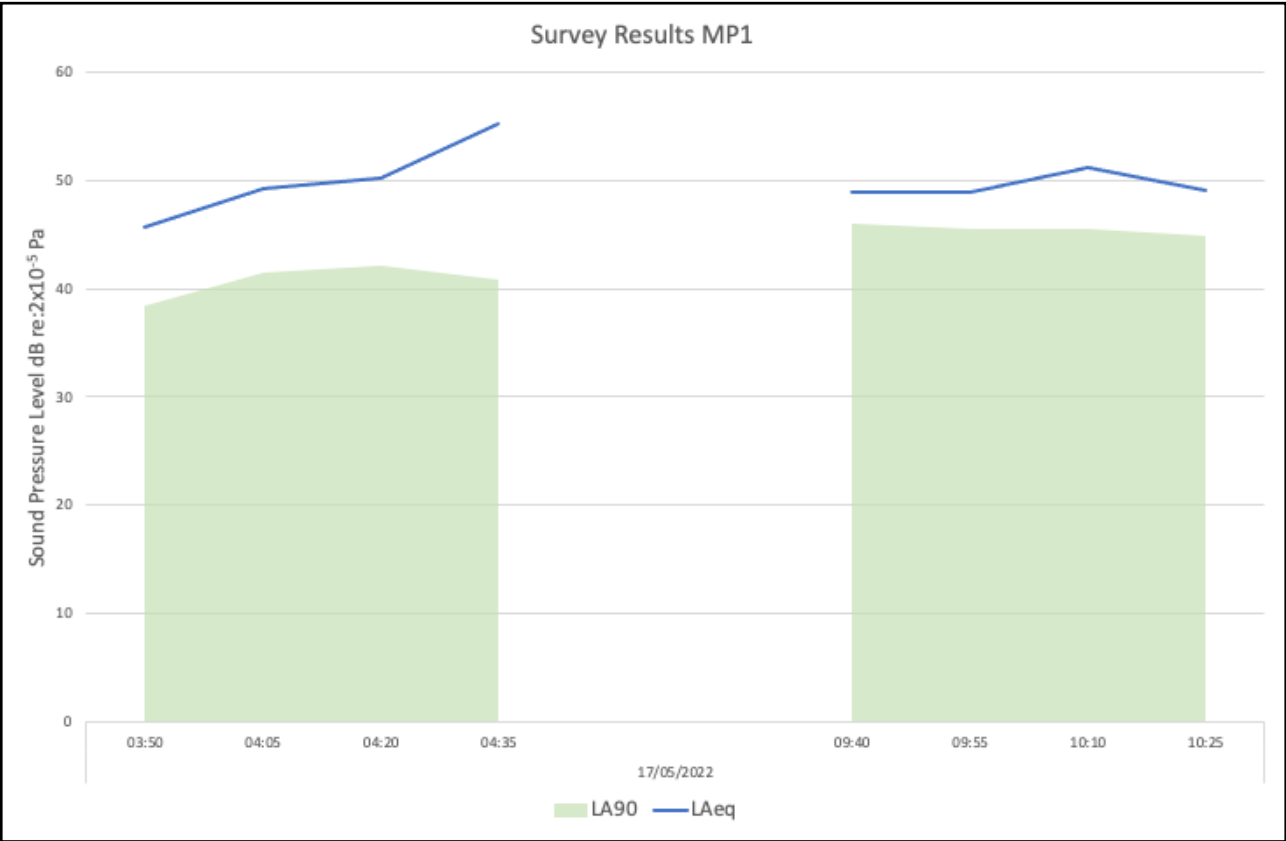


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Figure 4.2 below presents the measurement results at position MP1, showing the sound climate at the worst case nearest noise sensitive receptors during the typical night-time and daytime periods.

Figure 4.2: Environmental Sound Measurement Results - MP1



At the time of measurement during both daytime and night-time periods, the noise climate at the measurement position was driven by distant road traffic noise and birdsong.

Table 4.1 below summarises the results of the sound survey measurements at MP1.

Table 4.1: Environmental Sound Survey Summary

	Measured Sound Pressure Level, dB (re: 2x10 ⁻⁵ Pa)			
	Expected Daytime Operational Period 07:00hrs to 19:00hrs		Expected Evening/Night-time Operational Period 19:00hrs to 07:00hrs	
Measurement Location	L _{Aeq,15min}	L _{A90,15min}	L _{Aeq,15min}	L _{A90,15min}
MP1	49 - 51	45 - 46	46 - 55	38 - 42

To provide a worse case assessment the lowest daytime 15 min measurement period has been employed. The measured levels taken at MP1 represent the residual sound level and background sound level to assess against predicted specific sound level from use of both the proposed commercial buildings and site access roads.

5.0 DETERMINATION OF OPERATIONAL SOUND LEVELS

The final occupants of the proposed commercial units are not known at this stage. For assessment purposes we have assessed a worst case commercial park usage. Class E(g)(ii)(iii), B2, B8 operational usage can vary from low impact office and storage type spaces to typically higher noise operational levels, though the use classes do not typically include high noise uses. For the purposes of a worst case assessment, typical noise levels for a vehicle repair workshop have been assumed as it would not be anticipated that higher noise levels would be associated with the proposed use.

In order to assess impact from typical internal operating sound levels within the proposed commercial units, an assumed typical internal noise level has been taken from measured library data held on file by Red Acoustics for a vehicle repair and servicing workshop. Measured typical levels for a vehicle repair workshop are presented in Figure 5.1 and Table 5.1 below. These were measured at Complete Vehicle Maintenance in Preston during a busy daytime period during vehicle repair operations. The loudest 1 hour period has been used as the typical internal level for the proposed units.

Figure 5.1: Measured Internal Operating Level (Complete Vehicle Maintenance Preston)

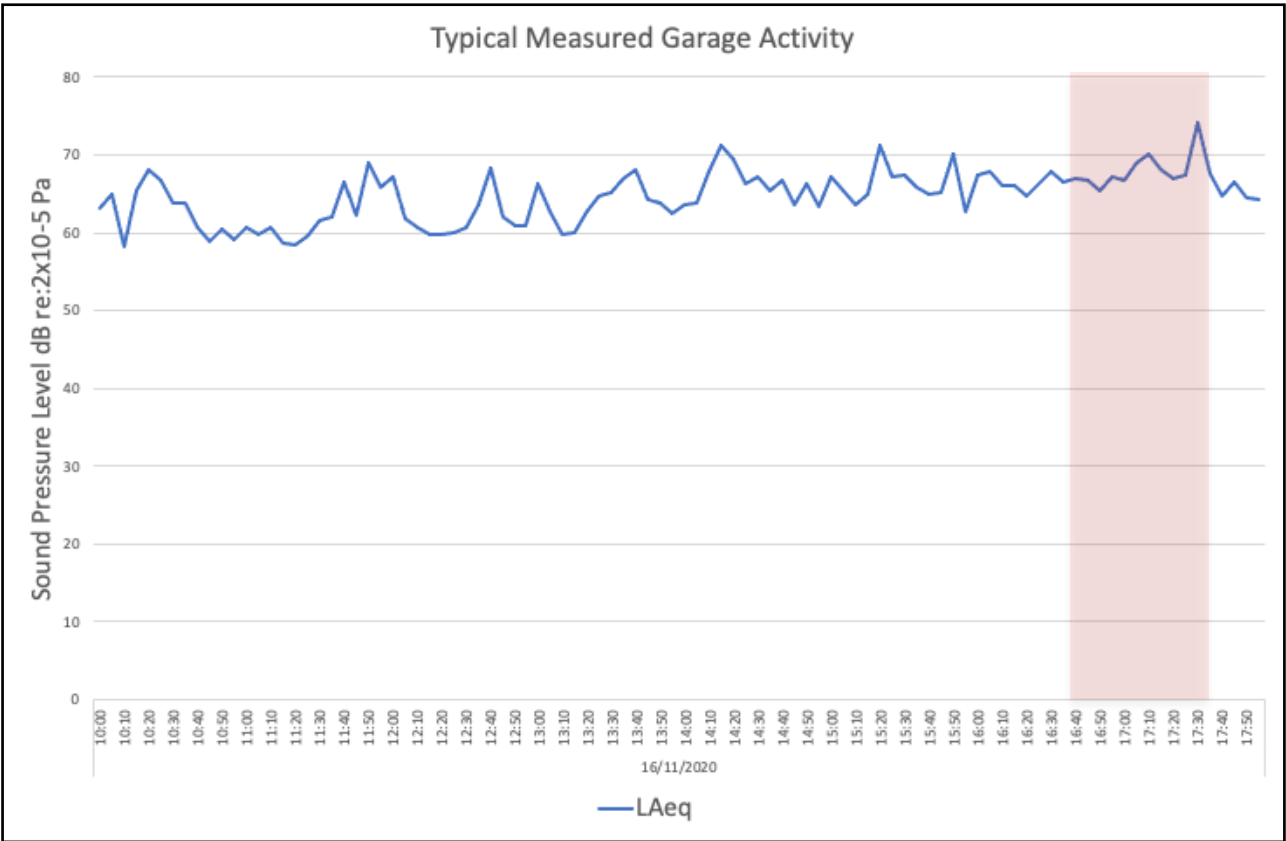


Table 5.1: Measured Internal Operating Level (1 Hour Period Highlighted in Figure 5.1 Above)

Item	L _{Aeq,1hr}	Octave Band Centre Frequency (dB)								
		31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1.0 kHz	2.0 kHz	4.0 kHz	8.0 kHz
Loudest 1 Hour Period	68.7	63.2	62.1	65.3	65.1	64.2	63.2	62.0	59.9	54.5

The measured levels have been taken for input into a CadnaA 3D noise propagation model as an internal noise level within all the proposed units. Noise breakout is then predicted to the nearby noise sensitive uses. This level assumed to be the case for the entire one hour assessment period in all of the proposed units simultaneously for a typical worst case assessment. This is discussed further in section 6.0 below.

In order to establish typical vehicle movements, these have been split into HGV and car movements which are based on previously measured pass-by data, as described in Section 6 below. Previously measured vehicle pass-by events for HGV and cars were taken by Red Acoustics at Universal Products (Lytham), Kirkham. All vehicles were travelling at approximately 15kph and were measured in free field conditions at 3m from the vehicle pass-by location.

6.0 NOISE PROPAGATION MODELLING

To predict noise levels from the proposed commercial unit and access across the local environment, CadnaA 3D noise propagation modelling software has been used, which implements the calculation procedure specified within ISO9613-2.

To undertake the impact assessment in accordance with BS4142 a 3D noise propagation model has been constructed using CadnaA. For this assessment the typical Internal operating source sound level presented in Section 5.0 above was used to establish a noise breakout level from the relevant areas of the proposed buildings, based on drawn information provided by the Client and the predicted sound reduction indices for the building facade elements.

For the purpose of the assessment and calculation, the building envelope is assumed to be a portal framed design which includes a standard single skin insulated cladding material for the wall and roof areas. The assumed sound reduction performance of a standard single skin insulated cladding material be $\leq 24\text{dB } R_w$ which is based on manufacturer data. Roller shutter doors were also accounted for using performance data held on file by Red Acoustics.

The vehicle movements are based on individual line sources for both HGV and car movements with the emission set as a moving point source set to 15kph. Vehicle movements are set as follows:

- Movements of HGVs set to 4 per hour per loading door (2 HGVs per door, per hour). Car movements are set to 2 per hour per space, for every space within the development - distributed to account for an arrival and departure of cars to all spaces and HGVs to each bay within a one hour period. This is assumed to be more than worse case for deliveries and staff/customer movements per hour.
- Sound power for delivery vehicles and cars are set at 94dBA and 86dBA respectively based on previously measured vehicle pass-by events for HGV and cars at Universal Products (Lytham) Kirkham. All vehicles were travelling at approximately 15kph and were measured in free field conditions at 3m from the vehicle pass-by location.

The modelling software utilises topography data from the Defra Data Service Platform. The existing buildings, and the surroundings are modelled using Google Earth imagery and the proposed buildings are based drawn details provided by the client. Buildings and were set to fully reflective surfaces in the model and the ground was set to 50% reflective to account for mixed ground. It was assumed that the proposed building location ground levels will be commensurate with the existing site levels.

Figure 6.1: Predicted Specific Sound Level (dB $L_{Aeq,1\text{hour}}$) - NSPs Adjacent to South Street

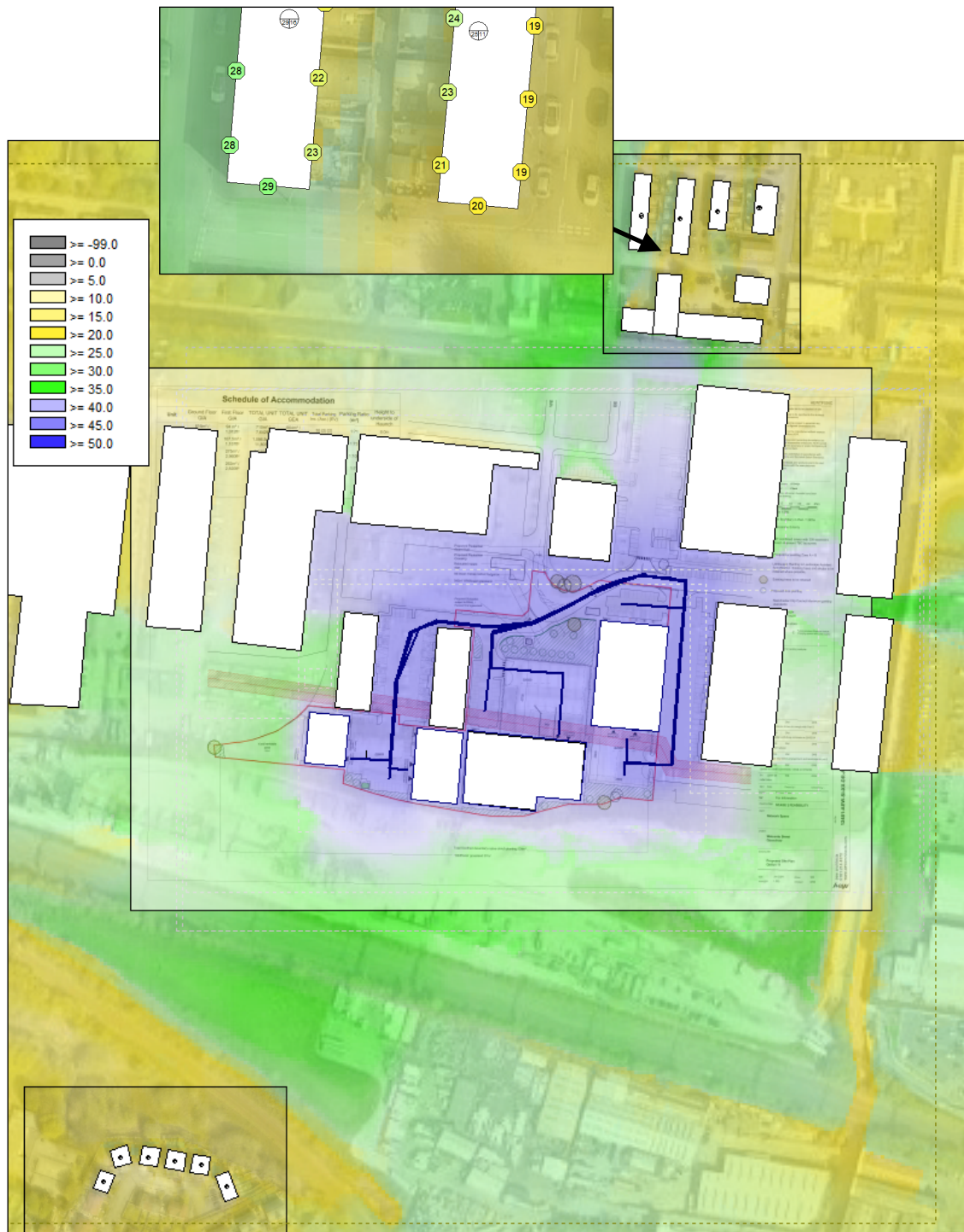
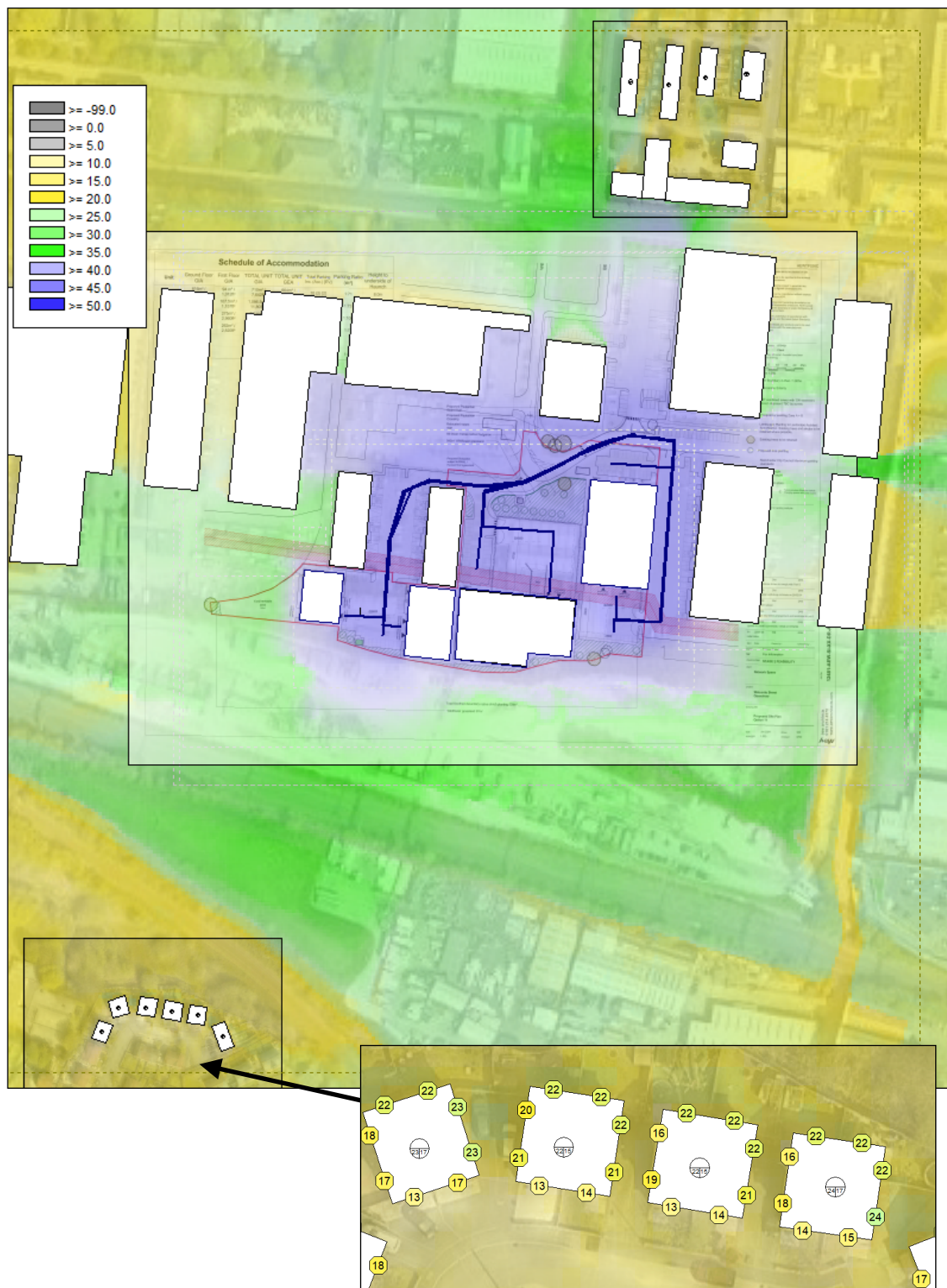


Figure 6.2: Predicted Specific Sound Level (dB $L_{Aeq,1hour}$) - NSPs Adjacent to Brinsop Square

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It can be seen in Figures 6.1 and 6.2 above that the specific sound levels from the combined sound sources impacting the nearest noise sensitive properties are 29dB and 22dB $L_{Aeq,1hour}$ respectively.

The worst case specific sound level predictions have then been used in the BS4142 assessments presented in Section 7 below.

7.0 BS4142 IMPACT ASSESSMENT

To undertake the impact assessment in accordance with BS4142 a 3D noise propagation model has been employed to accurately predict the combined specific sound level for typical commercial operation and vehicle movements.

Based on typical internal reverberant operational sound pressure levels and the predicted sound reduction from a lightweight single skin cladding on steel frame construction as well as vehicle movements, impact on to the nearby noise sensitive property has been predicted using CadnaA.

Tables 7.2 & 7.3 below present the BS4142 assessments based on impact at the most affected noise sensitive properties.

Table 7.2: BS4142 Assessment Period - NSP Adjacent to South Street (Worst Case Prediction) - Daytime Period

	Period (07:00 - 19:00)
Specific Noise Level (Predicted)	29dB
Corrections	Internal sound level assumed to be the case for the entire 1 hour assessment period in all units simultaneously. Vehicle movements assessed as discussed in Section 6.0 above with vehicle movements per hour built into the noise propagation model. No further corrections necessary.
Rating Level dB	29dB
Typical Background $L_{A90,t}$	45dB
Difference	-16dB
Conclusion	Low Impact

It can be seen that the noise impact is predicted to be low, as the rating level is 16dB below the typical daytime background sound level. It should also be noted that background sound levels are expected to be higher in this location.

Table 7.3: BS4142 Assessment Period - NSP Adjacent to South Street (Worst Case Prediction) - Evening/Night-time Period

	Period (19:00 - 07:00)
Specific Noise Level (Predicted)	29dB
Corrections	Internal sound level assumed to be the case for the entire 1 hour assessment period in all units simultaneously. Vehicle movements assessed as discussed in Section 6.0 above with vehicle movements per hour built into the noise propagation model. No further corrections necessary.
Rating Level dB	29dB
Typical Background $L_{A90,t}$	38dB
Difference	-9dB
Conclusion	Low Impact

It can be seen that the noise impact is predicted to be low, as the rating level is 9dB below the typical evening/night-time background sound level. It should also be noted that background sound levels are expected to be higher in this location.

8.0 PLANT NOISE TARGET LIMITS

As the final occupiers of the proposed units are not known at this stage and may vary, the nature of any plant items that may be installed in future is unknown. At this stage therefore, based on the measured survey data, plant noise target limits are proposed to enable future design targets. Table 8.1 below presents the proposed plant noise target limits at the nearest noise sensitive dwellings when assessed in accordance with BS4142:2014+A1:2019.

In line with expected requirements from the Local Planning Authority, the targets represent a level 5dBA below the existing measured typical background sound level.

Table 8.1: Proposed Commercial Sound (Plant) Target Limits

Measurement Location	Measured Sound Pressure Level, dB (re: 2x10 ⁻⁵ Pa)			
	Daytime Period 07:00hrs to 19:00hrs		Evening/Night-time Period 19:00hrs to 07:00hrs	
	Typical Existing L _{A90,15min}	Proposed Target L _{Aeq,15min}	Typical Existing L _{A90,15min}	Proposed Target L _{Aeq,15min}
MP3 (Representing worst case Background Sound Level)	45	40	38	33

9.0 CONCLUSIONS

An assessment of sound impact from operation of a proposed new commercial park at land off Welcomb Street, Openshaw has been undertaken in line with the guidance in BS4142:2014+A1:2019.

Impact from internal operational activities and vehicle movements is predicted to be low. No additional mitigation measures are proposed at this stage.

APPENDIX A: NOISE SURVEY DETAILS

Location

Brinsop Square, Openshaw.

Survey Dates

17th May 2022 (attended)

Weather

Conditions during the surveys were dry with wind speeds $<5\text{ms}^{-1}$

Personnel

Paul Clark Pg. Dip. IOA MIOA.

Johnathan Whittle BSc (Hons), Pg. Dip. IOA AMIOA MCIEH.

Instrumentation

Table A1 details the equipment used during the surveys.

Table A1: Survey Instrumentation

Equipment Description	Type Number	Manufacturer	Serial Number	Date of Last Calibration	Calibration Certificate Number
Sound Level Meter	Type 118 IEC 60651 Type 1	Norsonic	30519	21-Aug-20	35534
Microphone Pre-Amplifier	Type 1206	Norsonic	30540	21-Aug-20	35534
Microphone Capsule	Type 1225	Norsonic	57555	21-Aug-20	35533
Sound Calibrator	Type 1251 IEC 60942-1997 Class 1	Norsonic	31040	12-Aug-21	38705

Methodology

Before and after the measurements the sound level meters were check calibrated to an accuracy of $\pm 0.3\text{dB}$ using their associated Class 1 Calibrators. No drift in the instruments' sensitivities were noted across any of the survey periods.

Calibration Certificates

Copies of all calibration certificates are kept on file by Red Acoustics Ltd and can be supplied if requested.