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Mulbury Homes (Goulden Street) Limited

Noise Impact Assessment

dBx Acoustics Ltd
Beehive Mill, Jersey Street
Manchester M4 6JG

18070 New Cross Goulden R01C

Client: Mulbury Homes (Goulden Street) Limited

Date: 11 November 2019

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Revision	Author	Approver	Date
-	Susan Witterick BSc(Hons) MA MBA MIOA	Issued as Draft	9 September 2018
A – updated noise model and discussion of cumulative impact added	Susan Witterick BSc(Hons) MA MBA MIOA	Susan Witterick BSc(Hons) MA MBA MIOA	17 September 2018
B – updated to reflect current proposals	Susan Witterick BSc(Hons) MA MBA MIOA	Susan Witterick BSc(Hons) MA MBA MIOA	26 February 2019
C – updated to reflect revisions to scheme	DocuSigned by: Susan Witterick 3E69257DCFC14C6... Susan Witterick BSc(Hons) MIOA	DocuSigned by: Ben Tomlin 2DD2C00AF12B454... Ben Tomlin BSc(Hons) MIOA	11 November 2019

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Introduction

This report sets out the findings of a noise impact assessment carried out by dBx Acoustics for the proposed residential development at New Cross, Manchester, for Mulbury Homes (Goulden Street) Limited.

This report relates to Goulden Street. Report in relation to Bendix Street and Oldham Road are submitted separately in support of the relevant planning application.

The intent of the report is to report on the results of a noise survey undertaken at and around the site, detail the subsequent acoustic modelling exercise, and provide outline guidance on appropriate acoustic requirements for façade and glazing build ups to control noise intrusion in line with the requirements of Manchester City Council.

Definitions of common acoustic terms are given in Appendix A for reference.

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Assessment Criteria

National Planning Policy Framework (NPPF)

The NPPF provides a set of overarching aims broadly reflecting those already covered in the Noise Policy Statement for England (NPSE) described below. They are directed towards the avoidance of significant adverse impacts and reduction of other adverse impacts on health and quality of life, set within the context of the Government's policy on sustainable development.

With regard to sustainable development, the NPPF requires that "*Where the development plan is absent, silent or relevant policies are out-of-date, permission should be granted unless any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this framework taken as a whole".*

Noise Policy Statement for England (NPSE)

NPPF affirms that National Policy Statements form part of the overall framework of national planning policy, and should be a material consideration in decisions on planning applications. The Noise Policy Statement for England came into force in 2010 and states:

This Noise Policy Statement for England (NPSE) should apply to all forms of noise including environmental noise, neighbour noise and neighbourhood noise. The NPSE does not apply to noise in the workplace (occupational noise).

Noise Policy Vision

Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.

Noise Policy Aims

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life.*

The NPPF noise aims widely reflect those in NPSE. The NPSE does however include some context within the explanatory note to assessing noise impact and uses established concepts from toxicology currently being applied to noise impacts, these include:

- ***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.
- ***SOAEL** – Significant Observed Adverse Effect Level.* This is the level above which significant adverse effects on health and quality of life occur.

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- ***LOAEL*** – *Lowest Observed Adverse Effect Level.* This is the level above which adverse effects on health and quality of life can be detected.
- However, it is clear that it is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times.

The table on the following page is extracted from the Government's Planning Practice Guidance on noise[1]. It summarises the noise exposure hierarchy, based on the likely average response.

[1] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69533/pb13750-noise-policy.pdf

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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 (LOAEL)	
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude. E.g. turning up the volume of the television; speaking more loudly; where there is no alternative ventilation, having to close windows are some of the time because of the noise. Potential for some reportedly 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 (SOAEL)	
Noticeable and disruptive	The noise causes material change in behaviour and/or attitude e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep the windows closed most of the time because of the noise. Potential for sleep disturbance result in difficulty in getting to sleep. Premature awakening and difficulty 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 the effect of noise leading to psychological stress or psychological effects e.g. regular sleep deprivation/awakening; loss of appetite; significant, medically definable harm e.g. auditoria and non-auditory	Unacceptable adverse effect	Prevent

Table 1: Noise Exposure Hierarchy

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Manchester City Council – Planning & Noise Technical Guidance (December 2015)

This document sets out Manchester City Council's requirements with regard to current guidance and policy, with the aspiration that new developments achieve the highest standards without compromising the health and wellbeing of residents. The guidance refers to the NPPF and NPSE as described above.

MCC has adopted the following internal noise limits for residential properties;

- Bedrooms (night time 23:00-07:00) 30 dB $L_{Aeq,T}$ (individual noise events should not normally exceed 45 dB $L_{Amax,F}$ more than 15 times)
- Living Rooms (daytime – 07:00-23:00) 35 dB $L_{Aeq,T}$
- Gardens and terraces (daytime) 55 dB $L_{Aeq,T}$

Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5 dB below the typical background sound level at the nearest noise sensitive location.

BS 8233: 2014 Sound Insulation and Noise Reduction for Buildings

BS 8233 gives guidance for noise levels within residential properties. It discusses appropriate criteria for reasonable rest and sleep conditions and provides noise levels which are considered to provide appropriate conditions in accordance with WHO guidelines.

Table 4 from the Standard is reproduced below:

Table 4 **Indoor ambient noise 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 $L_{Aeq,8hour}$

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

Figure 1: Internal Ambient Noise Levels for Dwellings

It should be noted that these levels represent the average noise level over the 16-hour day or 8-hour night period. This potentially means that higher noise levels may be experienced internally over a shorter period of time (e.g. Individual passing cars). These equivalent noise levels over a period of time are the best representation of the average noise level and are generally the main focus when it comes to evaluating noise exposure.

It can be seen that the MCC guidance reproduced above is in line with the recommendations presented in BS 8233.

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BS 4142:2014

BS 4142:2014 sets out a procedure for assessing noise impact whereby a Noise Rating is determined and compared with the existing local Background Sound Level. The MCC guidance refers to a noise rating level for externally mounted ancillary plant.

The Noise Rating is evaluated from the Noise Level by including several, cumulative corrections to account for factors such as distinguishable tone, impulse, intermittency or other readily distinguishable sound characteristics.

BS 4142:2014 seeks to determine a "representative" Background Sound Level, stating that "*…the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods*".

The assessment of the impact depends upon the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level. An initial estimate of the impact of the specific sound is made by subtracting the Background Sound Level from the Rating Level, while considering the following points:

a) Typically, the greater this difference, the greater the magnitude of the impact.

b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

d) 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.

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Noise Survey

Measurement Procedure

In order to establish the existing sound environment around the site, a noise survey was carried out overnight on Wednesday/Thursday 8th/9th August and Saturday/Sunday 11th/12th August, and during the daytime on Tuesday 4th September 2018. Spot measurements were made at six primary locations (shown in the figure below) in order to identify traffic noise levels from the surrounding road network. Additional daytime measurements were carried out on Tuesday 29th and Wednesday 30th October 2019 in order to confirm that the noise climate used in the assessment remains valid.

Measurements were made during the day, evening and night time periods (including rush hour periods) in order to establish the worst case for noise impact upon the site.

The spot measurement locations were selected to establish the existing noise climate around the site and also to allow accurate calibration of the noise model. The site layout made it insecure to leave a continuous noise monitor at the site. As such, attended measurements were made during the following time periods;

- Daytime 07:00-18:00
- Rush hour 17:00-19:00 (Note: by convention, this is part of the 16 hour daytime period 7am-11pm)
- Night time 23:00-07:00

The noise monitoring equipment used was a Casella CEL 633C Type 1 Sound Level Meter with serial number 3921027. On site calibration checks were performed before and after the measurements using a CEL 120/1 sound calibrator, serial number 2045151, and were found to be within the permitted tolerance of BS EN 61672-1:2013. All equipment had a valid calibration certificate at the time of the survey and the microphone was fitted with a windshield to prevent wind noise from affecting the measurements.

For all measurements the microphone was located 1.3m above ground level and 3.5m away from any other reflective surface, i.e. in free field conditions. Spot measurements were all of 15 minutes' duration.

Measurements were undertaken in accordance with BS 7445-1:2003 *Description and Measurement of Environmental Noise*. The figures below identify the site in relation to the major noise generating infrastructure in the area, as well as the noise survey locations.

The weather during the measurements was warm, still and dry. Little to no wind was present during the surveys. Occasional gusts were measured at 0.9 m/s.

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Figure 2: Noise Measurement Locations and Site Location

Site observations

The site is bounded by Goulden Street to the south west and Cross Keys Street to the north west. The adjacent site on Bendix Street is currently undergoing redevelopment and as such it was not possible to obtain accurate daytime noise measurements at some locations close to this area. The noise survey locations have been selected to ensure that the noise model of the developed site is as accurate as possible for the area in the absence of construction noise.

The noise climate across the site was generally dominated by road traffic on Oldham Road and Rochdale Road as well as local traffic on the surrounding road network. In particular, Angel Street and Thompson Street were noted to be heavily used by vehicles (Angel Street forms part of the Inner Ring Road).

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Measurement Results

The table below summarises the noise measurement results from the spot measurement locations.

Location	Date	Time	L_{Aeq}	L_{A90}	L_{A10}	L_{Amax}
Location 1 – Thompson Street	08/08/2018	23:35	54	45	57	69
	09/08/2018	00:26	51	45	55	61
	09/08/2018	01:18	51	43	55	64
	12/08/2018	02:44	54	49	58	66
	12/08/2018	03:38	54	49	57	65
	12/08/2018	04:42	56	47	59	72
	04/09/2018	15:38	66	56	70	80
	04/09/2018	19:43	64	52	68	80
	29/10/2019	12:12*	66	54	68	80
	29/10/2019	13:08*	68	56	70	83
	29/10/2019	14:11*	66	55	69	78
Location 2 – Cross Keys St	08/08/2018	23:51	54	44	54	79
	09/08/2018	00:42	49	42	52	63
	09/08/2018	01:34	48	42	51	65
	12/08/2018	03:00	51	46	54	65
	12/08/2018	04:01	52	47	55	62
	12/08/2018	04:58	51	46	53	65
	04/09/2018	15:55	59	51	60	75
	04/09/2018	19:26	60	49	57	86
	29/10/2019	12:46	67	57	67	83
	29/10/2019	13:46	66	55	63	86
	29/10/2019	14:47	65	56	62	83
Location 3 – Goulden Street	09/08/2018	00:08	60	46	61	81
	09/08/2018	00:59	57	47	59	79
	09/08/2018	01:52	57	45	60	76
	12/08/2018	03:19	60	51	64	74
	12/08/2018	04:25	59	49	63	74
	12/08/2018	05:16	58	47	61	73
	04/09/2018	16:12	56	53	57	65
	04/09/2018	19:05	53	48	55	66
	29/10/2019*	12:28	66	56	68	80
	29/10/2019*	13:24	65	56	65	84
	29/10/2019*	14:26	64	54	64	80
Location 4 – Angel St / Cross Keys St	08/08/2018	23:38	71	49	75	95
	09/08/2018	00:32	69	48	74	86
	09/08/2018	01:22	69	44	73	89
	12/08/2018	02:47	71	52	76	86
	12/08/2018	03:37	70	50	75	87
	12/08/2018	04:40	69	49	73	86
	04/09/2018	16:18	73	61	78	82
	04/09/2018	18:47	72	59	76	86
	30/10/2019	13:33	77	62	81	89
	30/10/2019	14:32	71	62	74	82
	30/10/2019	15:32	69	61	72	86
Location 5 – Angel St / Chadderton Street	08/08/2018	23:56	68	54	72	87
	09/08/2018	00:48	68	50	71	87
	09/08/2018	01:39	66	49	70	85
	12/08/2018	03:04	70	58	74	92
	12/08/2018	04:02	71	57	75	92
	12/08/2018	04:57	69	56	73	86
	04/09/2018	16:30	72	61	75	84
	04/09/2018	18:30	70	59	75	89
	30/10/2019	13:49	69	60	73	83
	30/10/2019	14:52	70	63	73	88

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	30/10/2019	15:52	70	62	73	91
Location 6 – Oldham Road	09/08/2018	00:13	64	53	68	77
	09/08/2018	01:05	66	51	68	91
	09/08/2018	01:55	62	51	67	76
	12/08/2018	03:20	68	59	72	88
	12/08/2018	04:18	70	60	74	80
	12/08/2018	05:12	67	56	71	80
	04/09/2018	16:48	73	65	74	93
	04/09/2018	18:14	72	64	74	89
	30/10/2019	14:07	69	60	73	84
	30/10/2019	15:08	69	62	73	83
	30/10/2019	16:07	71	61	73	93

*affected by construction noise

Table 2: Survey Data

The spot measurement data can be used to extrapolate the daytime 16 hour, and night time 8 hour ambient noise levels at each location. Therefore, for each of the primary survey locations, the overall sound level for calibration of the model is as follows;

Location	Daytime L_{Aeq} (07:00-23:00)	Night time L_{Aeq} (23:00-07:00)	Typical Night time L_{Afmax}
Location 1 – Thompson Street	66	54	66
Location 2 – Cross Keys St	60	52	67
Location 3 – Goulden Street	56	60	76
Location 4 – Angel St / Cross Keys St	72	70	88
Location 5 – Angel St / Chadderton Street	72	70	88
Location 6 – Oldham Road	73	68	82

Table 3: Day and Night Time Noise Levels (Existing)

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Noise Impact Assessment

Acoustic Design Process

Given the height and location of the proposed development, it is not feasible to incorporate noise control measures such as screening or building orientation. The primary noise sources in the area are due to road infrastructure which cannot be relocated. Therefore, the acoustic design must be based on the use of appropriate building constructions and ventilation strategy which consider not only noise but also thermal comfort, fire, health and safety, CDM and cost.

The following sections of this assessment aim to demonstrate the acoustic design process which has been followed to date. It should be noted that at this early stage, façade constructions, glazing specifications, and glazing areas, are yet to be determined.

The building is to be mechanically ventilated, using a MVHR system, both in order to control thermal conditions and also to control air quality and acoustic quality within the apartments. Therefore, whilst residents will have the option to open windows, the design is not reliant on open windows for ventilation.

Internal Noise Levels

Ventilation Noise Control

We understand that for thermal and air quality reasons, mechanical ventilation is proposed for this scheme.

In order to ensure that the internal ambient noise level within the apartments does not exceed MCC requirements, both noise ingress and noise from the ventilation system will therefore be designed to be no greater than 3 dB below the overall limit in the space.

The design noise limit for ventilation noise within each habitable room is therefore as follows;

- Bedrooms at night (23:00-07:00) — 27 $dBL_{Aeq,8hour}$ (approx. NR 20)
- Bedrooms during the daytime (07:00-23:00) — 32 $dBL_{Aeq,16hour}$ (approx. NR 25)
- Living rooms — 32 $dBL_{Aeq,16hour}$ (approx. NR 25)

Where ventilation louvres are provided for summer-time ‘rapid’ ventilation, it is recommended that these incorporate acoustic attenuation where located in habitable rooms.

It is not intended that the building façade should be sealed; residents should have the freedom and flexibility to open windows as they consider appropriate. The intent of the acoustic design, however, is to ensure that appropriate acoustic conditions for rest and sleep are achievable internally.

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Noise Mapping of External Noise Levels

In order to accurately assess noise propagation across the proposed site and establish the noise levels at each façade of the proposed building with height, a computer model of the site has been constructed using SoundPlan 8.0 software. This allows the variation of noise across the site to be calculated, taking into account shielding and reflections due to buildings and barriers.

The model has been developed based on the existing situation, with traffic flows input on the local road network.

The model has then been calibrated against noise levels measured at all locations during the noise survey by adjusting the traffic flows on the road and rail network, such that the ambient noise levels at all locations are within 2 dB of those measured on site, which is considered to be within measurement and modelling tolerance.

The figures in Appendix B show the calculated daytime and night-time noise levels at each façade of the proposed building. The noise-mapping calculated values have an estimated uncertainty of ±2dB.

Figure 3: Model screenshot (plan) showing site and surroundings

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Predicted External Noise Levels

The table below shows the worst-case predicted external façade noise level at each façade.

Refer to the figures in Appendix B for more detailed information.

Façade	Daytime L_{Aeq} (dB)	Night-time L_{Aeq} (dB)	Night time L_{Amax} (dB)
Cross Keys Street	65	57	67
Goulden Street	63	61	76
North east (alley between Bendix St and Cross Keys St)	63	53	62
Bendix Street (south east)	63	57	62

Table 4: External noise level by façade location. Refer to Noise Map images in Appendix for more detailed information.

The following table shows the target internal noise levels as required by Manchester City Council and BS 8233:2014;

Location	Daytime L_{AEQ} (07:00 – 23:00)	Night-time L_{AEQ} (23:00 – 07:00)	Night-time L_{Amax} (23:00 – 07:00)
Living Room	35dB	-	-
Bedroom	35dB	30dB	45dB <15 times a night

Table 5: Target Internal Noise Levels

As noted above, in order to account for the combined effect of both noise break-in and noise from the ventilation system, the façade should be designed in order to limit noise break in to 3 dB below the target levels set by MCC.

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Façade Sound Reduction

Based on the external noise levels and the target internal levels presented above, the indicative sound insulation performance requirement for each façade is shown in the table below.

In order to establish indicative performance specifications for the glazed portion of the building façade, a number of assumptions have been made at this stage;

- Indicative performance is based on the worst case for each room type on each façade, i.e., largest ratio of glazing area to smallest room volumes
- Reverberation time within the furnished apartments is assumed to be 0.5s

The performance specifications given below are indicative only and must be reviewed against the target internal levels as the preferred façade construction and elevations are developed.

Façade	Glazing Sound insulation Performance, dB	Example Glazing Build-up	Ventilator Sound insulation Performance, $dBD_{n,e,w}$
Goulden Street	$44dBR_w$ and $37dBR_w+C_{tr}$	10mm/16mm thermal cavity/8.4mm	44
All other facades	$37dBR_w$ and $33dBR_w+C_{tr}$	8mm/12mm thermal cavity/6.4mm	38

Table 6: Recommended glazing sound insulation performance to achieve target internal noise levels.

Solid facade elements can be expected to achieve a minimum sound insulation performance of at least $50dBR_w$.

Maximum Noise Levels

Under MCC requirements, a maximum internal noise level of 45 dB $L_{Amax,F}$ should not be exceeded more than 15 times per night. Based on the noise survey data, the typical maximum noise levels are 76 $dBL_{Amax,F}$ on Goulden Street and 62-67 $dBL_{Amax,F}$ on the other facades. The recommended façade sound insulation performance presented above is intended to limit these maximum noise levels such that an internal level of 45 dB $L_{Amax,F}$ is not typically exceeded.

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External Amenity

There is a private courtyard proposed on the corner of Goulden Street and Bendix Street. Assuming that this is enclosed by a solid perimeter fence, external noise levels within this area will be below 50 dB L_{Aeq} during the daytime.

Assessment of Other Relevant Issues

It is clear that the Local Authority's aim is to ensure that noise levels are acceptable and appropriate. Use of MCC requirements, and the standards set out in BS 8233:2014 and BS 4142:2014, is considered appropriate to meet this aim as well as supporting the Government's long-term noise strategy as set out in the NPSE.

The assessment presented here demonstrates that it will be possible to achieve appropriate internal noise levels for residential amenity within the proposed building with careful consideration of façade and ventilation specification. Given the character of the area, there are no significant acoustic design changes which could provide any greater benefit than those demonstrated here.

The development is one of a number of schemes proposed as part of the regeneration of the Ancoats district. It is anticipated that occupants will be able to exercise choice when deciding to move into the development, and compliance with BS 8233 is intended to ensure that the different sensitivities of potential occupant groups are taken into account.

The proposals for noise control as set out in this assessment have been reviewed for unintended adverse consequences. Whilst it is acknowledged that it would be desirable to provide natural ventilation by means of open windows throughout the development, this is not practical on this site for reasons including but not limited to noise. Occupants will have freedom to open windows as desired in order to allow connection with the external environment as required.

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Recommendations to the decision maker

Planning condition may be granted subject to the inclusion of suitable noise conditions

We anticipate standard noise conditions with regard to the achievement of appropriate internal noise levels for residential amenity as well as for noise emissions from building services plant associated with the development.

Plant Noise Emission Limits

Manchester City Council requires that externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5 dB L_{Aeq} below the typical background L_{A90} level at the nearest noise sensitive location.

The nearest noise sensitive locations to the site have been identified as the Turning Point residential treatment facility to the north west of the site, and the apartments currently under construction on Bendix Street.

Based on the requirements of MCC and the typical background L_{A90} measured during the noise survey, the rating noise level for building services plant should not exceed the following levels;

Location	BS 4142 Rating Level	
	Day (07:00-23:00)	Night (23:00-07:00)
Bendix Street	45 dB $L_{Ar,Tr}$	40 dB $L_{Ar,Tr}$
Turning Point	45 dB $L_{Ar,Tr}$	40 dB $L_{Ar,Tr}$

Table 7: BS 4142 Rating Levels

Cumulative Impact

Although this report is concerned with the development at Goulden Street, the site forms one of three Mulbury developments in New Cross which are being developed concurrently. It is therefore appropriate to consider the cumulative impact of these developments on the surrounding noise sensitive receptors, which include residential premises at the Turning Point on Thompson Street and both commercial and residential properties in the surrounding area.

The cumulative noise impact of these developments is not expected to be significant. Adherence to MCC requirements for a rating level for services noise emissions of 5 dB below the existing background level means that overall background noise levels will not increase at any of the receptors as a result of the developments. Traffic generation as a result of the full development is expected to be lower than from the current use of the Bendix Street site as a car park and will therefore have a small positive noise effect, although given traffic levels on the surrounding road network this will not be perceptible.

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Conclusion

This report details the noise survey and subsequent noise impact assessment for proposed residential development at Goulden Street in New Cross, Manchester. In order to provide a thorough noise impact assessment for the site, the published requirements of Manchester City Council with regard to noise have been considered in conjunction with a comprehensive noise survey in the area of the site.

The report goes on to detail the acoustic modelling exercise which has been carried out. This includes road noise, and an assessment of façade noise levels at all floors of the building.

Acoustic performance specifications for ventilation and glazing strategy are provided in outline, and it is demonstrated that internal noise levels appropriate for residential amenity in accordance with MCC and BS 8233 are achievable.

The noise survey and modelling exercise is also used to set noise emission limits from building services plant in accordance with the requirements of MCC and BS 4142.

An assessment is provided setting out how the acoustic design has mitigated noise levels as far as possible. The ultimate recommendation to the planning Decision Maker is that permission should be granted, subject to standard conditions relating to internal ambient noise levels and plant noise emission levels.

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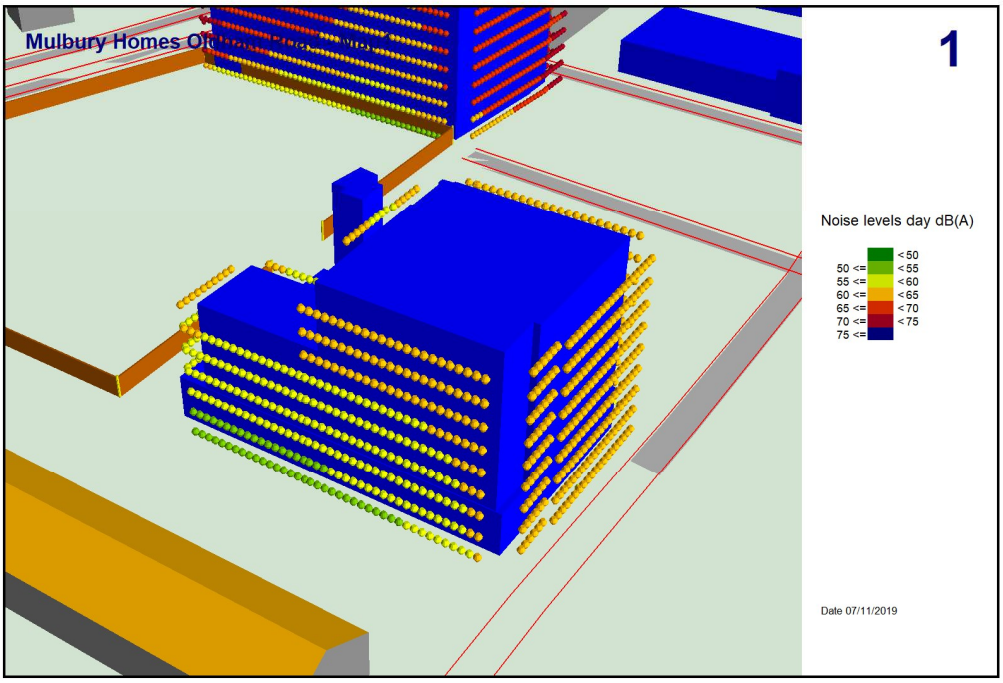
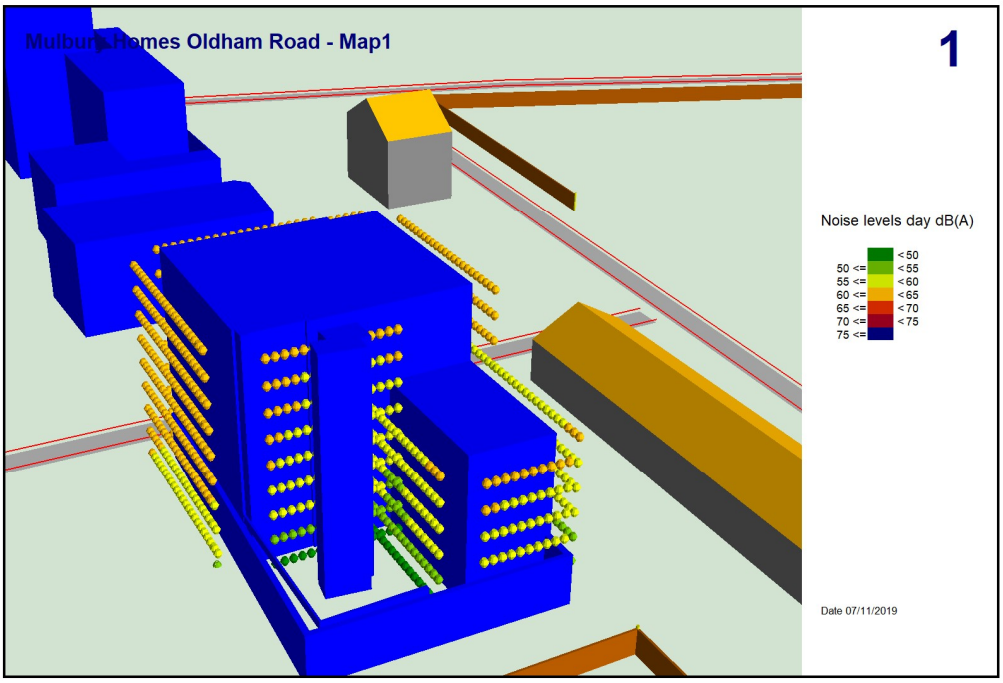
Post Development Noise Model

Daytime Façade Maps





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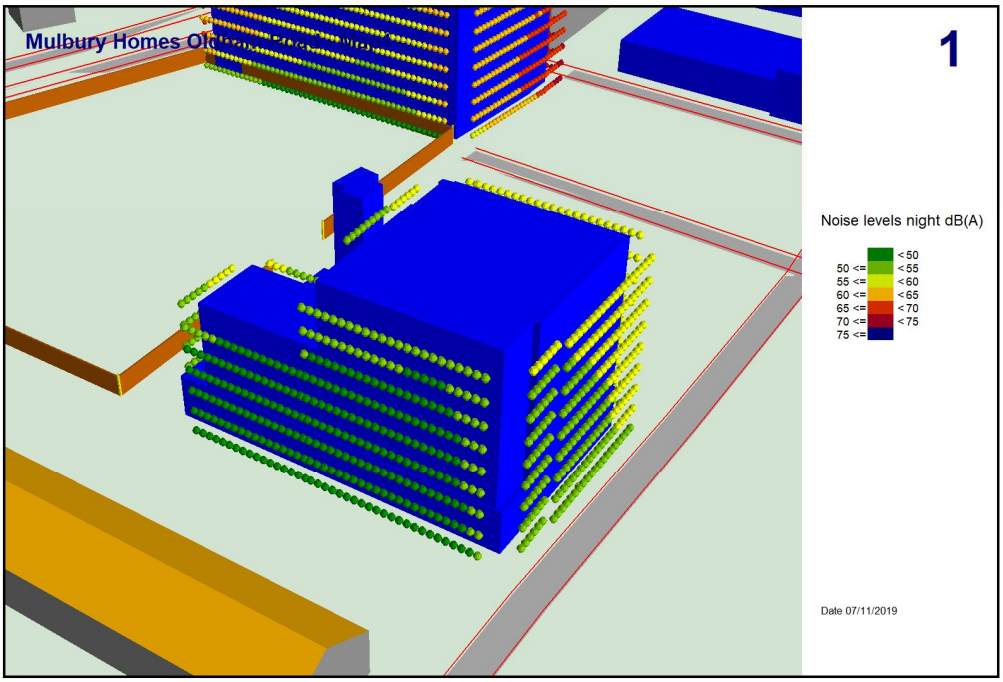
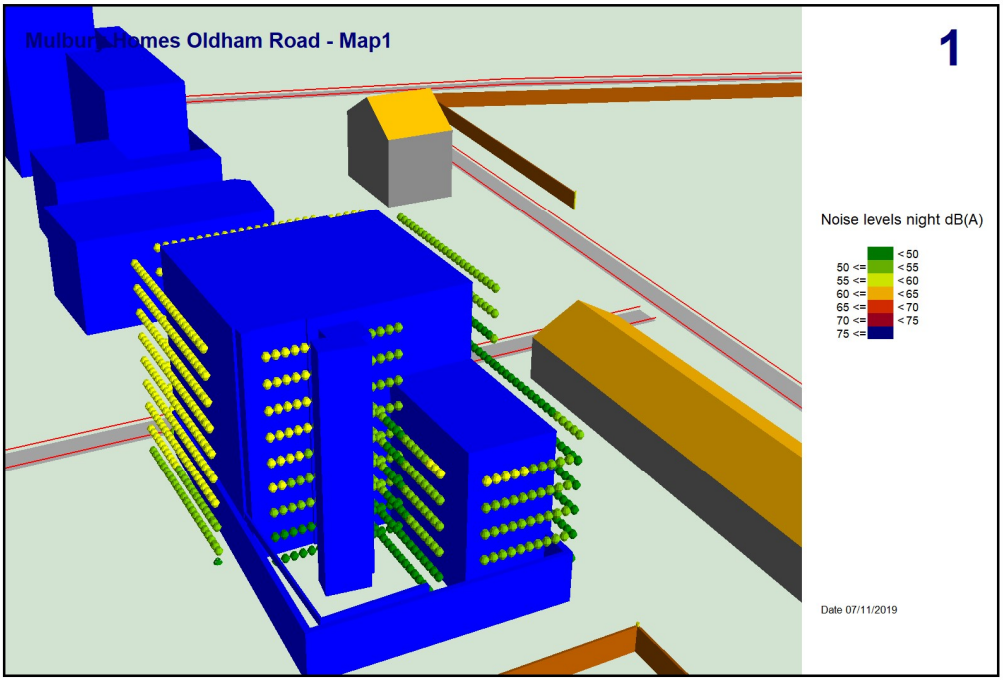
Night Time Façade Maps





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Glossary of Acoustic Terminology

Decibel, dB	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. For sound pressure level (L_p) the reference quantity is $2x10^{-5}$ N/m^2. The sound pressure level existing when microphone measured pressure is $2x10^{-5}$ N/m^2 is 0 dB, the threshold of hearing.
L	Instantaneous value of Sound Pressure Level (L_p) or Sound Power Level (L_w).
Frequency	Number of cycles per second, measured in hertz (Hz), related to sound pitch.
A weighting	Arithmetic corrections applied to values of L_p according to frequency. When logarithmically summed for all frequencies, the resulting single "A weighted value" becomes comparable with other such values from which a comparative loudness judgement can be made, then, without knowledge of frequency content of the source.
$L_{eq,T}$	Equivalent continuous level of sound pressure which, if it actually existed for the integration time period T of the measurement, would possess the same energy as the constantly varying values of L_p actually measured.
$L_{Aeq,T}$	Equivalent continuous level of A weighted sound pressure which, if it actually existed for the integration time period, T, of the measurement would possess the same energy as the constantly varying values of L_p actually measured.
$L_{n,T}$	L_p which was exceeded for n% of time, T.
$L_{An,T}$	Level in dBA which was exceeded for n% of time, T.
$L_{max,T}$	The instantaneous maximum sound pressure level which occurred during time, T.
$L_{Amax,T}$	The instantaneous maximum A weighted sound pressure level which occurred during time, T.