

Noise Assessment

on behalf of

DAY PROJECT MANAGEMENT LTD

for the site at

**FAIRFIELD GENERAL HOSPITAL, ROCHDALE OLD
ROAD, BURY, BL9 7TD**

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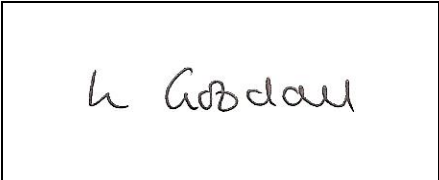
Summary

A noise impact assessment has been undertaken to predict the potential impact of a proposed extension at Fairfield General Hospital, Rochdale Old Road, Bury, BL9 7TD to the existing A&E Department, which will include a new plant building. The plant building will include both internal and external mechanical services plant.

Noise measurements were undertaken in 2023 by Miller Goodall Ltd with respect to a separate extension to the A&E department. Noise levels measured during this period were typical at locations representative of the nearest and the most sensitive receptor locations. The data from this survey has been used to predict the noise levels from the new proposed mechanical services plant, and subsequently assessed against BS 4142.

A noise model has been assembled for the proposed development site, the results from this and the assessment of those results are provided within this report. It has been found that without any additional mitigation, the noise emissions from the proposed new plant items would be expected to comply with the requirements of Bury Council i.e. below background sound levels at all noise sensitive receptors.

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1 Introduction

- 1.1 Miller Goodall Ltd has, on behalf of Day Project Management Ltd, undertaken a noise assessment in respect of the potential impact of mechanical services plant noise from a proposed new extension, including a plant building, at the Accident and Emergency Department at Fairfield General Hospital, Rochdale Old Road, Bury, BL9 7TD. The site lies within the administrative boundary of Bury Council.
- 1.2 This report provides a review of the existing noise sources in the area and assesses the potential impact of the proposed development on the local environment.

2 Site Description

- 2.1 The site is located to the north of the larger Fairfield General Hospital site and is an extension to the north-east of the existing Accident and Emergency Department. North of the A&E department, across an access road, are the Facilities and Estates offices, with the Fairfield General Hospital: Education Centre beyond that. The nearest residences to the development site are beyond this building to the north, across Rochdale Old Road.
- 2.2 Adjacent to the east boundary of the proposed plant area is, what appears to be, an auxiliary building, with the Child Development Centre and Children's Outpatient Department building approximately 25 m from the proposed site boundary.
- 2.3 All office spaces and outpatient departments are only in use during the daytime period and are therefore the nearest noise-sensitive receptors during this time. During the night-time period, the nearest off-site noise-sensitive receptors are the residences to the north side of Rochdale Old Road.

3 Proposed Development

- 3.1 It is proposed to extend the existing A&E department at Fairfield General Hospital. This will include the construction of a new plant building with
 - three Air Handling Units (AHU) and a number of smaller plant items located internally; and
 - 15 condenser units on the roof.

Only the AHU's would be considered "noise generating" plant items.

4 Policy, Guidance and Assessment Methodology

4.1 National planning policy is outlined in Appendix 1: Planning Policy. The acoustic standards and assessment techniques referred to in this assessment are outlined in Appendix 2: Acoustic Standards and Guidance.

5 Local Authority Consultation

5.1 Bury Council were consulted in 2023 with respect to a separate extension to the A&E department. At that time, it was confirmed via email on 4th April 2023 that noise limits at the site should be set such that existing representative noise levels are not exceeded. This advice has been applied to the proposal described in this report.

6 Noise Survey

6.1 Full details of the noise survey undertaken at the site in 2023 are provided in Miller Goodall Report ref: NA_102993, Section 7. The results have been summarised below in Table 1, with all sound pressure levels in dB re 20 µPa:

Table 1: Summary of noise measurements

Measurement Location	Start Time	Elapsed Time (hr:mn)	L _{Aeq,T} (dB)	Overall L _{AFmax} (dB)	L _{A10,T} (dB)	L _{A90,T} (dB)
MP1	16:01	00:10	58	74	60	52
MP2	16:12	00:10	54	65	55	51
LP1 ¹	07:00	16:00	65	108 ²	66	46
	23:00	08:00	58	91 ²	62	35

¹ Data reported was recorded over a 24-hour period commencing at 07:00 on 7 April 2023. Other data was excluded due to forecast bad weather.

² Based on the spectral data recorded, these max levels are due to emergency sirens

7 Modelling of Noise Associated with the Development

- 7.1 The data from measurements taken was used to populate an environmental noise model. Prediction of noise levels at sensitive receptors has been carried out using the CadnaA software package.
- 7.2 The general horizontal plan information of the area surrounding and including the proposed development site was imported from Google Earth. This was used to determine road positions, building footprint areas and relative locations and is considered accurate to within 5%. Building height information was based on site observations. Topography was included in the design of the model as the proposed site is not flat.
- 7.3 The following parameters were assigned to the model:
- Propagation of noise using algorithms within ISO 9613: 1993 *Acoustics – Attenuation of sound during propagation outdoors*.
 - Roads were modelled as line sources at a height of 0.5 m above ground level and calibrated using spectral data measured during the survey.
 - Default ground absorption $G = 0$ (equivalent to hard ground consistent with the dominant ground cover at the site).
 - Ground attenuation: spectral all sources
 - Buildings are reflecting (smooth, non-structured façade)
 - No adverse meteorological effects
 - Two orders of reflection
 - Topographical data was obtained using DEFRA LIDAR contours for the site and surrounding assessment area
- 7.4 The octave band noise source data shown in Table 2 were imported directly into the model. This data was provided by Day Project Management Ltd, as well as preliminary silencer specifications from Alloway Acoustics.

Table 2: Noise source data used within CadnaA

Measurement Descriptor	SPL or SWL	Sound Level, dB in Octave Band Centre Frequency, Hz								dB(A)
		63	125	250	500	1k	2k	4k	8k	
PUZ-ZM250YKA2R1	SPL	71.5	62.5	61	60.5	56.5	53	49	43	62
PUZ-HWM140YHA	SPL	56.5	57	53.5	50.5	48	43.5	39.5	35	53
AHU1 & AH2 Intake	SWL	71	66	70	60	55	55	47	44	64
AHU1 & AHU2 Exhaust	SWL	71	73	70	70	75	70	65	61	78
AHU3 Intake	SWL	69	68	72	64	57	53	44	34	66
AHU3 Exhaust	SWL	71	70	74	71	74	71	66	60	78

7.5 Intake and exhaust silencer specification insertion losses have been provided by Alloway Acoustics, and insertion loss data for the weather louvre is an estimated “worst case” and would be expected to be achieved by any standard weather louvre. The insertion losses as used in the noise model are provided in Table 3 below:

Table 3: Insertion Losses used within CadnaA

Element	Insertion Loss (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Intake Silencer	7	14	17	28	38	30	23	18
Exhaust Silencer	7	13	19	31	48	41	35	25
Weather Louvre	0.5	1.7	2.2	2.4	2.6	2.8	4.4	7.1

7.6 Screenshots from the noise model indicating the noise contours and the highest predicted broadband L_{Aeq} noise levels at the nearest noise sensitive receivers are shown in Appendix 3: Noise Grid Maps.

8 Assessment of Noise from the Proposed Development

8.1 Assessment of Noise levels at on-site receptors

8.1.1 The predicted plant noise level at the building immediately adjacent to the east of the plant room is 43 dBA. Assuming 15 dB attenuation through an open window, this would result in an internal level in the office spaces of approximately 28 dBA, which is significantly below guidance limits for offices, which are 45-50 dBA for open plan offices and 35-40 dBA for executive offices (BS 8233). The predicted external level of 43 dBA is also 9 dB below the existing background sound level measured at the site during the daytime. All other onsite receptors benefit from additional distance and screening losses, and are therefore subject to lower noise levels. On this basis, the impact of the new plant is predicted to be low.

8.2 BS 4142:2014+A1:2019 Assessment of Night Time Noise at Dwellings on Rochdale Old Road

- 8.2.1 A BS 4142 noise impact assessment has also been undertaken in order to assess the potential noise impact at the most affected residential location and is detailed in this section of the report.
- 8.2.2 The following BS 4142 assessment has considered the night- time impact (23:00 – 07:00) as a worst-case. The 8-hour background sound level measured during the night time period at LT1 has been used as the basis for the assessment.
- 8.2.3 This is considered to be a worst-case approach as the influence from weather was negligible during this period of the survey, so background noise levels were at the lowest. Furthermore, this period was over the Easter weekend, when traffic levels are likely to be lower due to the bank holidays, again resulting in lower noise levels.
- 8.2.4 Based on the above assumptions, the BS 4142 assessment of noise impact at the most affected location from the proposed development site is shown in Table 4 overleaf:

Table 4: BS 4142:2014 Noise Impact Assessment: Night – Time

Results		Relevant Clauses of BS 4142:2014	Commentary
Measured Ambient Noise Level	$L_{Aeq,8hours} = 58 \text{ dB}$	7.3.1	Measured over 8-hour period at the site
Background Sound Level	$L_{A90,8hours} = 35 \text{ dB}$	8.1.2 8.3	Determined from measurements made during the 8-hour night-time period
Assessment made during the night-time, so the reference interval is 15 minutes		7.2	
Predicted Sound Level	$L_{Aeq,15mins} = 22 \text{ dB}$		Using CadnaA modelling
Acoustic feature correction	+ 0 dB	9.2	No acoustic character expected
Rating Level	$(22 + 0) \text{ dB} = 22 \text{ dB}$		
Excess of Rating Level over Background Sound Level	$(22 - 35) \text{ dB} = -13 \text{ dB}$		i.e. Cumulative plant noise lower than background noise
Assessment indicates likelihood of negligible impact		11	Initial estimate only
Context		11 8.5	New mechanical services plant introduced at an existing hospital with significant mechanical services plant already present.
Uncertainty of the assessment		10	There is some uncertainty in noise levels at the receptor position, however, the predicted level is significantly below the background level and the risk remains 'low'.

8.2.5 It can be seen from the above table that the initial estimate of the noise impact of the proposed extension to Fairfield General Hospital's A&E department, based on the BS 4142 methodology, indicates plant noise levels significantly below the existing representative background sound levels. This is compliant with the requirements of Bury Council, and therefore no acoustic mitigation is required.

9 Summary and Conclusions

- 9.1 A noise assessment has been undertaken to predict the impact of extending the existing A&E department at Fairfield General Hospital. Noise from proposed mechanical services plant has been assessed against noise data previously measured at the site by Miller Goodall Ltd. in 2023.
- 9.2 It has been found that without any additional mitigation, the noise emissions from the proposed new plant items would be expected to comply with the requirements of Bury Council i.e. below background sound levels at all noise sensitive receptors.

APPENDICES

Appendix 1: Planning Policy

Noise Policy Statement for England

The Noise Policy Statement for England (NPSE¹), published in March 2010, sets out the long-term vision of Government noise policy. The Noise Policy aims, as presented in this document, are:

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

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

The NPSE makes reference to the concepts of NOEL (No Observed Effect Level) and LOAEL (Lowest Observed Adverse Effect Level) as used in toxicology but applied to noise impacts. It also introduces the concept of SOAEL (Significant Observed Adverse Effect Level) which is described as the level above which significant adverse effects on health and the quality of life occur.

The first aim of the NPSE is to avoid significant adverse effects, taking into account the guiding principles of sustainable development (as referenced in Section 1.8 of the Statement). The second aim seeks to provide guidance on the situation that exists when the potential noise impact falls between the LOAEL and the SOAEL, in which case:

"...all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development".

Importantly, the NPSE goes on to state:

"This does not mean that such adverse effects cannot occur".

The Statement does not provide a noise-based measure to define SOAEL, acknowledging that the SOAEL is likely to vary depending on the noise source, the receptor and the time in question. NPSE advises that:

"Not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available"

¹ Noise Policy Statement for England, Defra, March 2010

It is therefore likely that other guidance will need to be referenced when applying objective standards for the assessment of noise, particularly in reference to the SOAEL, whilst also taking into account the specific circumstances of a proposed development.

National Planning Policy Framework

The National Planning Policy Framework (NPPF²) initially published in March 2012, was updated most recently in December 2023. One of the documents that the NPPF replaces is Planning Policy Guidance Note 24 (PPG 24) "Planning and Noise"³.

The revised NPPF advises that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives). One of these is an environmental objective which is described in par. 8 (c):

"to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."

At par. 180 we are advised that:

"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..."

Par. 191 goes on to state:

"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

² National Planning Policy Framework, Ministry of Housing, Communities and Local Government, December 2023

³ Planning Policy Guidance 24: Planning and Noise, DCLG, September 1994

on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; ...”

Par. 193 seeks to ensure that any development does not prejudice the legally permitted operations and activities of other, existing non-residential uses, stating:

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

Planning Practice Guidance – Noise

As of March 2014, a Planning Practice Guidance⁴ for noise was issued which provides additional guidance and elaboration on the NPPF, the guidance was updated in July 2019. It advises that when plan-making and decision-taking, the Local Planning Authority should consider the acoustic environment in relation to:

- 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 goes on to reference the LOAEL and SOAEL in relation to noise impact. It also provides examples of outcomes that could be expected for a given perception level

⁴ Planning Practice Guidance – Noise, <https://www.gov.uk/guidance/noise--2> 22nd July 2019.

of noise, plus actions that may be required to bring about a desired outcome. However, in line with the NPSE, no objective noise levels are provided for LOAEL or SOAEL although the PPG acknowledges that:

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

Examples of these factors include:

- The source and absolute noise level of the source along with the time of day that it occurs;
- Where the noise is non-continuous, the number of noise events and pattern of occurrence;
- The frequency content and acoustic characteristics of the noise;
- The effect of noise on wildlife;
- The acoustic environment of external amenity areas provided as an intrinsic part of the overall design;
- The impact of noise from certain commercial developments such as night clubs and pubs where activities are often at their peak during the evening and night.

The PPG also provides general advice on the typical options available for mitigating noise. It goes on to suggest that Local Plans may include noise standards applicable to proposed developments within the Local Authority's administrative boundary, although it states that:

“Care should be taken, however, to avoid these being implemented as fixed thresholds as specific circumstances may justify some variation being allowed”.

The PPG was amended in December 2014 to clarify guidance on the potential effect of noise from existing businesses on proposed new residential accommodation. Even if existing noise levels are intermittent (for example, from a live music venue), noise will need to be carefully considered and appropriate mitigation measures employed to control noise at the proposed accommodation.

Appendix 2: Acoustic Standards and Guidance

BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

This standard carries the full weight of an adopted British Standard, provides recommended guideline acoustic design criteria for new dwellings and is supported by guidance contained within WHO GCN⁵. The guideline noise design criteria of BS 8233 apply to external noise “without a specific character” (previously and sometimes termed or referred to as “anonymous noise”) such as that associated with road and rail traffic.

Internal Amenity

The Standard states that for external noise without a specific character, such as road traffic, it is desirable that the internal ambient noise level does not exceed the guideline values shown in Table 5, below.

The note to paragraph 7.7.1 states that where noise has a specific character (i.e. it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content) “lower noise limits might be appropriate”.

Table 5: BS 8233: 2014 guideline indoor ambient noise levels for dwellings

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

Note 7 to Table 4 of BS 8233 states:

“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.”

⁵ World Health Organisation Guidelines for Community Noise, 1999

Guidance on reasonable acoustic design criteria for individual noise events are also provided, and the Standard advises that:

“regular individual noise events...can cause sleep disturbance. A guideline value may be set in terms of SEL^6 or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values”.

For Internal spaces, the Standard states that;

“..to avoid sleep disturbance, sound pressure levels at the outside facades of living spaces should not exceed 45 dB L_{Aeq} (taken as a façade level, and equating to a free-field external level of 42 dB L_{Aeq}) and 60 dB L_{AFmax} so that people may sleep with bedroom windows open.”

External Amenity

BS 8233:2014 adopts guideline external noise values provided in WHO for external amenity areas such as gardens, patios and private outdoor amenity spaces. BS 8233:2014 adopts guideline external noise level limits provided in WHO for external amenity areas such as gardens and patios. The standard states that it is “desirable” that the external noise does not exceed 50 dB $L_{Aeq,16hr}$ with an upper guideline value of 55 dB $L_{Aeq,16hr}$ whilst recognising in paragraph 7.7.3.2 that development in higher noise areas, such as urban areas or those close to the transport network, may require a compromise between elevated noise levels (i.e., above 55 dB $L_{Aeq,16hr}$) and other factors that determine if development in such areas is warranted. In such circumstances, the development should be designed to achieve the lowest practicable noise levels in external amenity areas, but should not be prohibited.

The standard also states:

“Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be

⁶ Sound exposure level or L_{AE}

possible at the outer edge of these areas, but should be achievable in some areas of the space."

World Health Organisation (WHO) Guidelines for Community Noise 1999

The WHO Guidelines 1999 recommends that to avoid sleep disturbance, indoor night-time guideline noise values of 30 dB L_{Aeq} for continuous noise and 45 dB $L_{AF,max}$ for individual noise events should be applicable. It is to be noted that the WHO Night Noise Guidelines for Europe 2009⁷ makes reference to research that indicates sleep disturbance from noise events at indoor levels as low as 42 dB $L_{AF,max}$. The number of individual noise events should also be taken into account and the WHO guidelines suggest that indoor noise levels from such events should not exceed approximately 45 dB $L_{AF,max}$ more than 10 – 15 times per night.

The WHO document recommends that steady, continuous noise levels should not exceed 55 dB L_{Aeq} on balconies, terraces and outdoor living areas. It goes on to state that to protect the majority of individuals from moderate annoyance, external noise levels should not exceed 50 dB L_{Aeq} .

BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'

BS 4142:2014+A1:2019⁸ provides guidance on the assessment of the likelihood of complaints relating to noise from industrial sources. It replaced the 1997 edition of the Standard in October 2014 and was amended in June 2019. The amended version corrected a number of printing errors and further clarified that the standard is used to assess external noise levels, and not internal noise levels (although this can form part of the discussion regarding context). The key aspects of the Standard are summarised below.

The standard presents a method of assessing potential noise impact by comparing the noise level due to industrial sources (the Rating Level) with that of the existing background noise level at the nearest noise sensitive receiver in the absence of the source (the Background Sound Level).

The Specific Noise Level – the noise level produced by the source in question at the assessment location – is determined and a correction applied for certain undesirable acoustic features such as tonality, impulsivity or intermittency. The corrected Specific Noise Level is referred to as the Rating Level.

⁷ WHO Night Noise Guidelines for Europe 2009

⁸ BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound

In order to assess the noise impact, the Background Sound Level is arithmetically subtracted from the Rating Level. The standard states the following:

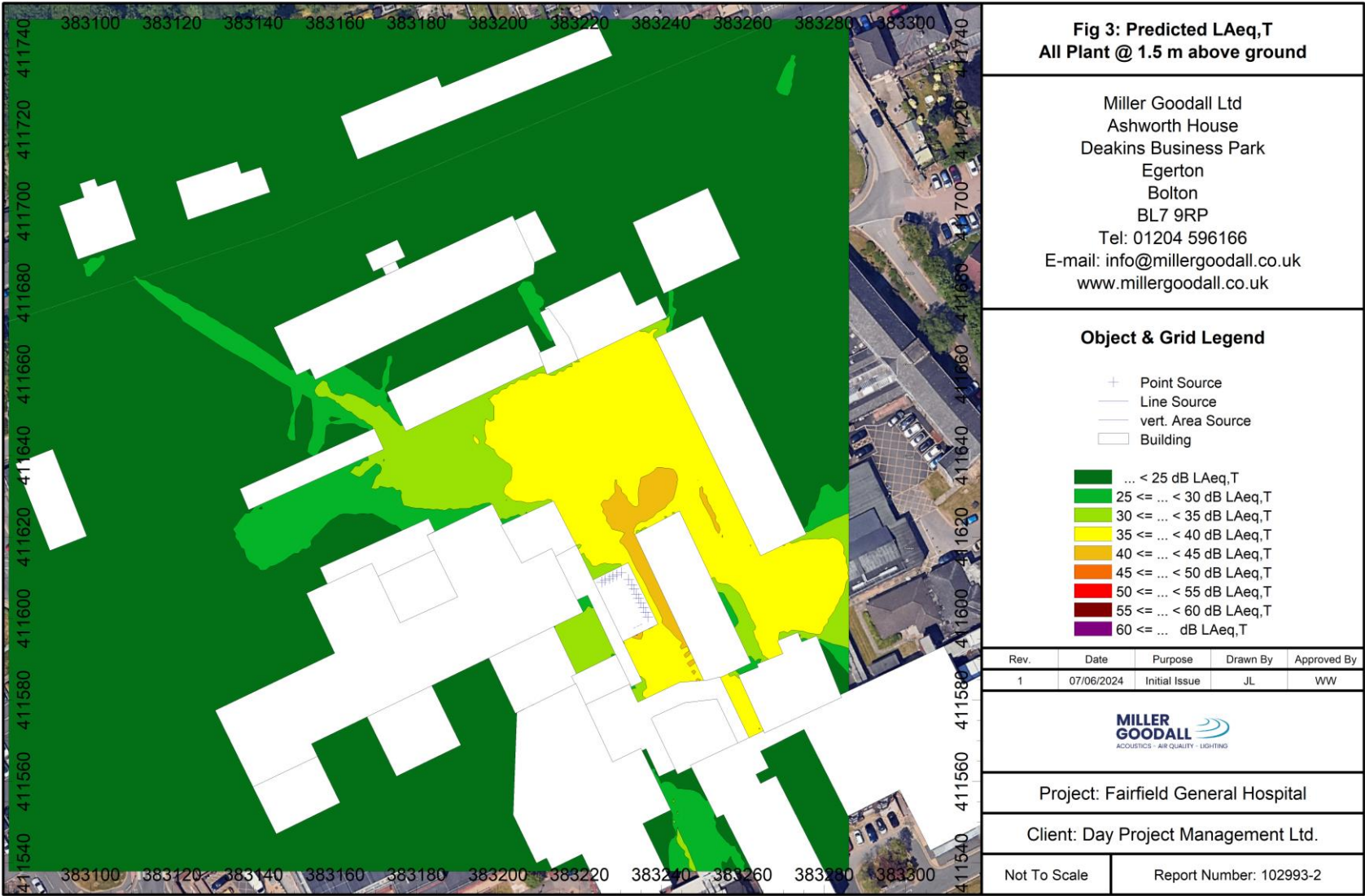
- *Typically, the greater this difference, the greater the magnitude of the impact,*
- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context,*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending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

In addition to the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level, the 2014+A1:2019 edition places emphasis upon an appreciation of the context, as follows:

An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context.

The 2014 edition of BS 4142 also introduced a requirement to consider and report the uncertainty in the data and associated calculations and to take reasonably practicable steps to reduce the level of uncertainty.

Appendix 3: Noise Grid Maps



Glossary of Terms

Decibel (dB) The unit used to quantify sound pressure levels; it is derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 μPa , the threshold of normal hearing is in the region of 0 dB, and 140 dB is the threshold of pain. A change of 1 dB is usually only perceptible under controlled conditions.

dB L_A Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB L_A broadly agree with an individual's assessment of loudness. A change of 3 dB L_A is the minimum perceptible under normal conditions, and a change of 10 dB L_A corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB L_A ; normal conversation about 60 dB L_A at 1 meter; heavy road traffic about 80 dB L_A at 10 meters; the level near a pneumatic drill about 100 dB L_A .

$L_{A90,T}$ The A weighted noise level exceeded for 90% of the specified measurement period (T). In BS 4142: 2014+A1:2019 it is used to define background noise level.

$L_{Aeq,T}$ The equivalent continuous sound level. The sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). $L_{Aeq,T}$ is used to describe many types of noise and can be measured directly with an integrating sound level meter.

