Assessment of noise from replacement refrigeration condensers

McDonald's
1169 Oldham Road
Failsworth
Manchester M40 2FU

On behalf of

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1 Summary

The McDonald's restaurant at 1169 Oldham Road, Failsworth in Manchester, is to have its chiller and freezer rooms refurbished and this will require the existing Foster's condensers, which are mounted on the plant well on the roof, being replaced, with modern and quieter Danfoss units.

The drinks machine at the counter in the restaurant is also to be updated. The new drinks machine will have a small roof mounted condenser unit.

The replacement *Danfoss* freezer and chiller condensers will be 13 dBA quieter than the old *Fosters* units they will replace. When the contribution for the additional drinks cooler is considered the overall noise reduction at the nearest sensitive receiver (NSR) will be 8 dB.

This report sets out the details of the existing equipment, its replacement and provides numerical predictions of current and future sound levels.

In absolute terms the replacement plant will create no more than 26 dB LAeq at the NSR and this is more than 5 dB below the minimum night time background noise and therefore better than Manchester City Council noise planning requirements.

2 Proposed replacement plant

2.1 Chiller & Freezer condensers existing

The existing *Fosters* condenser servicing the chiller and freezer rooms requires replacement. The photograph below shows the existing condensers;

When new these Fosters condensers noise levels could be expected to be 76 dB L_{Aeq} at 1m with both running.

2.2 Proposed replacement chiller & freezer condensers

It is proposed that the old Fosters units will be replaced with modern and quieter Danfoss Units, a model OP-LPHM096[1] (Freezer) and a model OP-LPHM026[2] (chiller) rated at 61 and 59 dB at 1m respectively, shown below;

The combined noise level at 1m from both of these units running will be 63 dB L_{Aeq}, some 13 dBA quieter than the Fosters units they will replace.

2.3 Drinks machine (ABS) cooler

The cooler for the Manitowoc drinks machine[3] has a measured operational noise level of 66 dB $L_{Aeq,T}$ at 1m.

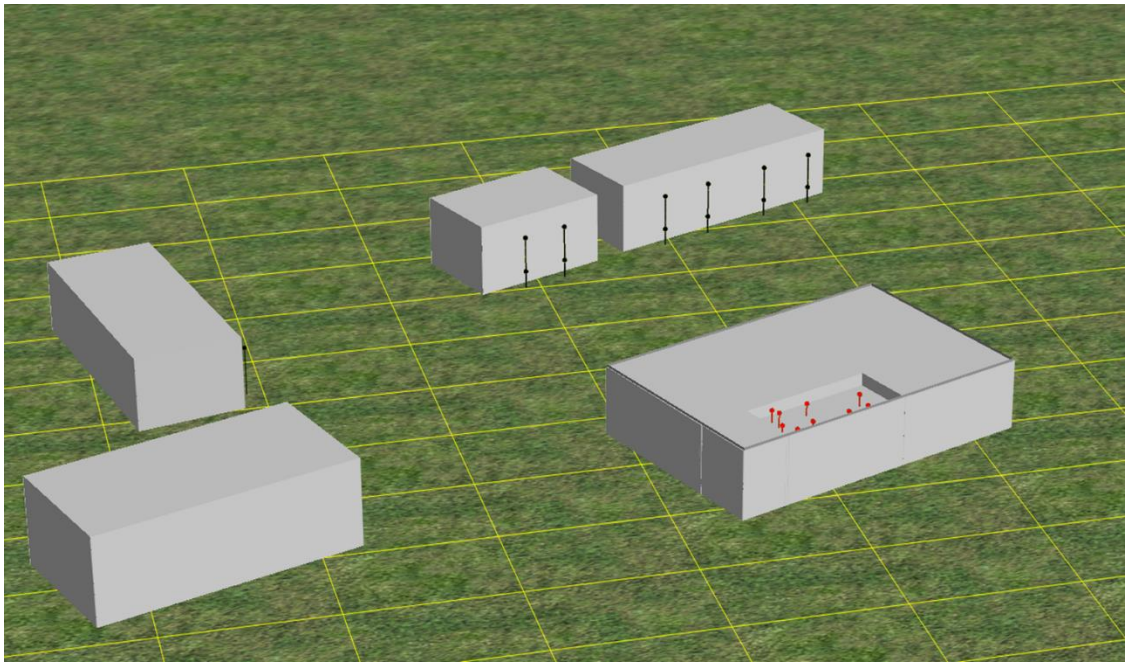
3 Radiated noise levels

The level of noise radiated to the neighbours from the plant in the roof well has been calculated using 3-D noise modelling software (iNoise[4]), implementing the calculation procedures set out in ISO 9613[5].

[1]https://store.danfoss.com/gb/en_GB/Climate-Solutions-for-cooling/Condensing-Units/Optyma%E2%84%A2-Plus/Optyma%E2%84%A2-Plus%2C-OP-LPQM096NTP00E/p/114X3357
[2]https://store.danfoss.com/en/Climate-Solutions-for-cooling/Condensing-Units/Optyma%E2%84%A2-Slim-Pack/Optyma%E2%84%A2-Slim-Pack%2C-OP-MSBM026AJW05E/p/114X7093
[3] https://www.manitowocice.com/asset/?id=dktsnh&regions=us&prefLang=en
[4] https://inoise.com/
[5] ISO 9613-2:1996
Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation

The location of the plant and the closest neighbours are shown below;

And in 3D;



The predicted noise from the existing Fosters chiller and freezer condensers is 34 dB L_{Aeq} at the NSR (3 Irving Street). The combined noise level from the two replacement Danfoss condensers and the ABS drinks cooler will be only 26 dB $L_{Aeq,T}$ a reduction of 8 dB.

4 Planning Policy

4.1 National Planning Policy

National Planning Policy Framework (NPPF[6]) provides noise policy aims within Section 15 "Conserving and enhancing the natural environment" and paragraph 174 states;

> *174. Planning policies and decisions should contribute to and enhance the natural and local environment by:*
>
> > *a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);*
> > *b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;*
> > *c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate;*
> > *d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;*
> > *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*
> > *f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.*

Paragraph 185 also refers to noise and states;

> *185. 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 life65;*
> > *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*

[6] Revised 20th July 2021

c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

The Framework states that the planning system should contribute to and enhance the natural and local environment by preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of noise pollution. It does not, however, provide any specific formal guidelines.

Further guidance was published by Department for Communities & Local Government in March 2014 relating to Noise and is known as Planning Practice Guidance, this states.

Local planning authorities' plan-making and decision taking should take account of the acoustic environment and in doing so consider:

- *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 Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation. As noise is a complex technical issue, it may be appropriate to seek experienced specialist assistance when applying this policy.

Significant Observed Adverse Effect Level (SOAEL) occurs above the perception of "noticeable and intrusive" and examples of this are given in the table below, which has been taken directly from Paragraph 006 of PPG;

Perception	Examples of Outcomes	Increasing Effect Level	Action
		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; 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	
Noticeable and disruptive	The noise causes a 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 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	Significant Observed Adverse Effect	Avoid

NPSE states;

"Promote good health and good quality of life"

2.15 This statement expresses the long term desired policy outcome, but in the use of "promote" and "good" recognizes that it is not possible to have a single objective noise-based measure that is mandatory and applicable to all sources of noise in all situations.

"Effective management of noise"

2.16 This concept confirms that the policy applies to all types of "noise" (environmental, neighbour and neighbourhood) and that the solution could be more than simply minimising the noise.

"Within the context of Government policy on sustainable development"

2.17 Sustainable development is a core principle underpinning all government policy. For the UK Government the goal of sustainable development is being pursued in an integrated way through a sustainable, innovative and productive economy that delivers high levels of employment and a just society that promotes social inclusion, sustainable communities and personal wellbeing. The goal is pursued in ways that protect and enhance the physical and natural environment, and that use resources and energy as efficiently as possible.

2.18 There is a need to integrate consideration of the economic and social benefit of the activity or policy under examination with proper consideration of the adverse environmental effects, including the impact of noise on health and quality of life. This should avoid noise being treated in isolation in any particular situation, i.e. not focusing solely on the noise impact without taking into account other related factors.

4.2 Noise Policy Statement for England

The document "Noise Policy Statement for England" referenced within the NPPF sets out the following vision for on-going noise policy:

> *"Promote good health and quality of life through the effective management of noise within the context of Government policy on sustainable development."*
> *This vision should be achieved through the following 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".*

To achieve these objectives, the Noise Policy Statement sets out three noise levels to be defined by the assessor:

> **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.

The Noise Policy Statement considers that noise levels above the SOAEL would be seen to have, by definition, significant adverse effects and would be considered unacceptable. Where the assessed noise levels fall between the LOAEL and the SOAEL noise levels, the Policy Statement requires that:

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

Where noise levels are below the LOAEL it is considered there will be no adverse effect. Once noise levels are below the NOEL there will be no observable change. No objective values are offered within the NPSE, as the document does indicate that each site should be considered on its own merits.

4.3 Local Planning Policy

Manchester City Council's Core Strategy 2012 to 2027 contains Policy DM 6 which refers to *Noise*[7] and states;

> *Policy DM 1*
> *Development Management*
> *All development should have regard to the following specific issues for which more detailed guidance may be given within a supplementary planning document:-*
>
> - *Appropriate siting, layout, scale, form, massing, materials and detail.*
> - *Impact on the surrounding areas in terms of the design, scale and appearance of the proposed development. Development should have regard to the character of the surrounding area.*
> - *Effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation. This could*

[7]https://www.birmingham.gov.uk/downloads/file/21273/development_management_in_birmingham_dpd

also include proposals which would be sensitive to existing environmental conditions, such as noise.

- *Accessibility: buildings and neighbourhoods fully accessible to disabled people, access to new development by sustainable transport modes.*
- *Community safety and crime prevention.*
- *Design for health.*
- *Adequacy of internal accommodation and external amenity space.*
- *Refuse storage and collection.*

Further guidance on suitable criteria for fixed plant noise from this development is provided in Manchester City Council's Planning & Noise Technical Guidance[8] in which it states that on page 24 the following;

> *'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 5dB (L_{Aeq}) below the typical background (LA90) level at the nearest noise sensitive location'.*

5 Assessment of noise from replacement condensers

Defra has published Strategic noise mapping (2017)[9] that give a snapshot of the estimated noise from major road and rail sources across England in 2017. The data was developed as part of implementing the Environmental Noise Directive.

The image below shows the site and its environs with the predicted noise levels[10];

[8] file:///C:/Users/Peter%20Ashford/Downloads/Noiseandplanning_guidance_Jun22.pdf
[9] https://www.gov.uk/government/publications/strategic-noise-mapping-2019
[10] https://ssi.noiseconsultants.co.uk/?dm_i=142S,6W9FQ,ET8MUU,RP71F,1

This shows at the closest neighbour transport noise will fall in the range;

55 dB $L_{Aeq,day}$
45 dB $L_{Aeq,night}$

It can be expected that the minimum night time background sound levels at 60m from an arterial road will be approximately 8 dB less than the $L_{Aeq,night,}$ giving an overnight background sound level of 37 dB $L_{A90,T}$ at the closest neighbours.

On this basis noise from the replacement condensers at 26 dB L_{Aeq} can be seen to be more than 5 dB below the minimum background sound level at the NSR and therefore satisfy the objective set out in Manchester City Councils Policy DM 1 – Development Management.