

Environmental Noise Assessment

Proposed replacement external HVAC plant
McDonald's restaurant
144 High Street
Ruislip
HA4 8LJ



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Project Name: replacement external HVAC plant at McDonald's, 140 High Street,
Ruislip HA4 8LJ

Project Ref: 8178

Report Title: Environmental Noise Assessment

Date: 20th May 2025

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1 Executive Summary

McDonald's have recently been granted permission by Hillingdon Council to reconfigure their shop front incorporating that of 144A (planning ref 42185/APP/2024/3268) next door to their existing restaurant at 144 High Street Ruislip, HA4 8LJ. This works will form part of a wider refurbishment of the restaurant, which will include the replacing of the existing roof plant.

This report has been commissioned by McDonald's to accompany the forthcoming application for the plant replacement, which has reached the end of its serviceable life.

The new plant will see the three packaged Trane air handling units replaced with modern Weatherite air handling units only, with separate air source heat pumps. The old twin belt driven kitchen extract fan will be replaced with a direct drive unit, a new hot water system will also be installed (with its own air source heat pump), along with three further heat pumps servicing the Office, Crew Room and Air door curtain. The existing Freezer and Chiller condensers will be retained.

The new kitchen extract fan will be mounted in an acoustic enclosure and fitted with a high performance discharge silencer reducing levels by around 20 dBA.

The new air handling units and their air source heat pumps will offer far greater thermal efficiency than the packed units they will replace with a 10 dBA reduction in noise levels as well.

This report sets out a recent on-site survey detailing existing plant noise levels, levels overnight when the McDonald's plant was off as well as estimated background sound levels, which were dominated by the Iceland's external plant on the roof next to McDonald's.

To ensure that noise from the replacement plant meets the requirements of Hillingdon Council, it will need to be limited to a *rating level 5 dB below* the existing background sound level.

Currently McDonald's is open from 5am to 11pm seven days a week with the plant starting an hour before opening and stopping an hour after closing and this will remain so for the replacement plant. The background at the nearest overlooking residential windows is currently 54 dB L_{490,T} overnight, when McDonald's existing plant is not running.

To be able to comply with Hillingdon's requirements the following noise control equipment should be installed;

- Kitchen extract fan fitted in a full acoustic enclosure and with a 2.1m long discharge silencer,
- All three AHUs to be fitted with 1200mm long fresh air inlet silencers.

2 Introduction

2.1 Overview

It is proposed to replace the existing roof plant, which after many years of operation has reached the end of its serviceable life, with modern high efficiency equipment using air source heat pumps rather than gas to heat and cool the restaurant at 140 High Street Ruislip.

This Noise Impact Assessment accompanies the planning application for the replacement plant and seeks to regularize the hours of operation to coincide with the now permitted opening hours of 6am to 11pm.

2.2 Objectives

To monitor existing sound levels closest to the neighbours and assess the likely mitigation that will be required to prevent any adverse impacts on the neighbours from the noise generated by replacement plant.

This report will set out a summary of the necessary mitigation measures that will be required to ensure compliance with local and National planning policy.

3 Planning Policy

3.1 National Planning Policy

National Planning Policy Framework (NPPF¹) provides noise policy aims within Section 15 “Conserving and enhancing the natural environment” and paragraph 180 states;

180. 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*

¹ Revised 19th December 2023

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 191 also refers to noise and states;

191. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

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

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.

3.2 Local Planning Policy

Hillingdon Council's Local Plan Strategic Policies (Adopted November 2012), refers in part to noise and states at page 126, where **Policy EM8 (Land, Water, Air and Noise) states;**

The Council will seek to ensure that noise sensitive development and noise generating development are only permitted if noise impacts can be adequately controlled and mitigated.

It is understood that Hillingdon Council typically required noise from commercial fixed plant to be no louder than the background minus 5 dB, when measured as a rating level (BS4142) at the nearest residential premises.

3.3 BS4142 assessment of plant noise

BS4142:2015+A:2019 provides a method for assessing the likely impact industrial and commercial noise will have on residential neighbours that depend on the margin by which the Rating Level of the specific sound exceeds the background sound and the context in which the sound occurs.

The table below details the likely impact based on the excess of the background;

Difference between background sound and Rating Level	BS4142 Assessment
+10 dB	Indication of a significant adverse impact
+ 5 dB	Indication of an adverse impact
0 dB	Indication of low impact

Table 1 BS4142 impacts

BS4142 requires that character penalties, if any tonality, intermittency, impulsivity or “other characteristics” are present in the noise are added to the assessed $L_{Aeq,T}$ level of plant noise to provide a Rating Level ($L_{A,r}$).

The table below summarizes acoustic feature penalties;

Acoustic Feature	Correction dB		
	Just perceptible	Clearly perceptible	Highly perceptible
Tonality	2	4	6
Impulsivity	3	6	9
Intermittency		3	
Other characteristics		3	

Table 2 acoustic feature penalties

These penalties are additive, however the combine correction, for a clearly audible source would not be expected to be greater than 10 dB. Where the source, in this case McDonald's fans and condensers, is no louder than the background and has no readily perceptible features the Rating Level is often equal to the $L_{Aeq,T}$ level.

It is proposed that noise from McDonald's' fixed plant should be no louder than background minus 5 dB, when assessed in accordance with BS4142 at the nearest residential neighbour.

4 The proposed development

The proposed and existing plant layouts are shown on CDM's drawing No. 9663 M1010A a copy is provided at the rear of this report.

Details of the proposed HVAC equipment are shown in Appendix 1 at the rear of this report.

The potential operational hours of the plant are 1 hour prior to opening at 6am and 1 hour after services closes in the evening at midnight.

5 Nearest overlooking residential dwellings

The aerial below shows McDonald's roof plant area (highlighted in pink), with Iceland's roof plant next door (highlighted in blue);



Figure 1 aerial view of McDonald's roof plant and location of neighbours

The closest overlooking residential windows appear to be those shown in the photograph below, a former office building now converted for residential use and subsequently referred to in this report as Princess House;



Figure 2 view from McDonald's roof, over Iceland's to Princess House

These windows are some 20m from the closest edge of McDonald's roof plant.

6 Existing Sound levels

6.1 Existing background sound levels

Mr Eddie Oxborough MSc MIoA ANC of Acoustic Associates SW Ltd attended site during the morning of Tuesday 6th May 2025 to set up a logging sound level meter on the roof edge overlooking Princess House, as shown below;



Figure 3 showing the SLM overlooking Princess House

McDonald's plant ran from 5am through to 1am and it is believed that Iceland's plant operates on a 24/ basis.

The sound meter/pre-amp/microphone was calibrated using a hand held calibrator before and after the survey which ran from Tuesday 7th May through to Thursday 9th May 2025, with no adverse variants being observed.

Details of the equipment used are given in the table over page.

Meter Make	Model	Serial No.	Calibration Date	Calibration Certificate No.	Calibration due date
Rion	NL52	00253718	12-8-24	1166212	12-8-26
Rion	NC74	34794316	6-6-24	1163294	6-6-25

Table 3 showing measurement equipment details

The weather during the survey was largely fine with light winds and generally suitable for repeatable environmental sound measurement².

² <https://www.timeanddate.com/weather/@2638976/historic?month=5&year=2024>

6.2 Background sound measurements L_{A90}

The chart below shows the recorded sound levels;

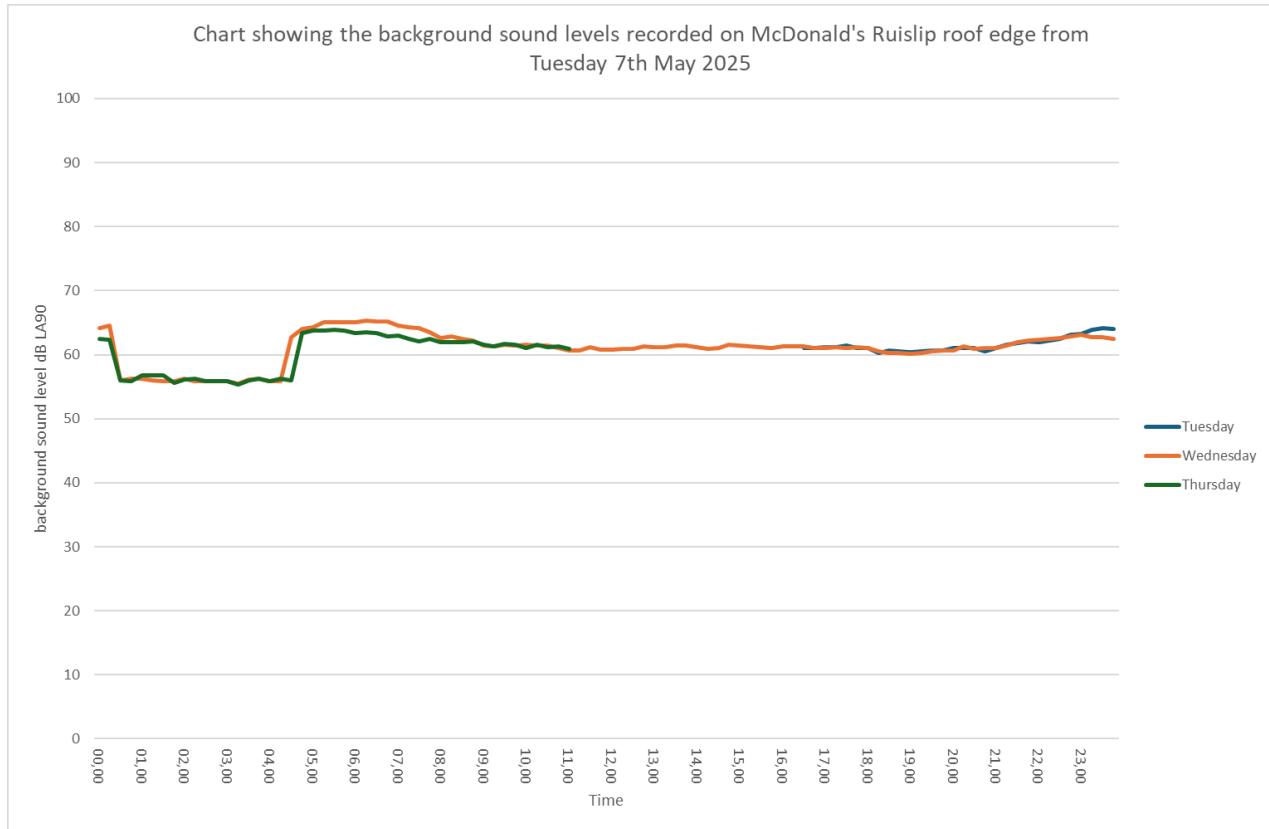


Figure 4 showing recorded background levels

This chart shows that when the existing McDonald's plant switches off just after midnight the background falls to a constant 56 dB L_{A90} and it is believed that this is controlled by Iceland's adjacent plant. On this basis the background at the nearest residential window (Princess House), will be 54 dB L_{A90} .

6.3 Sound measurements of existing McDonald's plant

Sound levels were also recorded on McDonald's roof, with their plant running as shown on the block plan below;

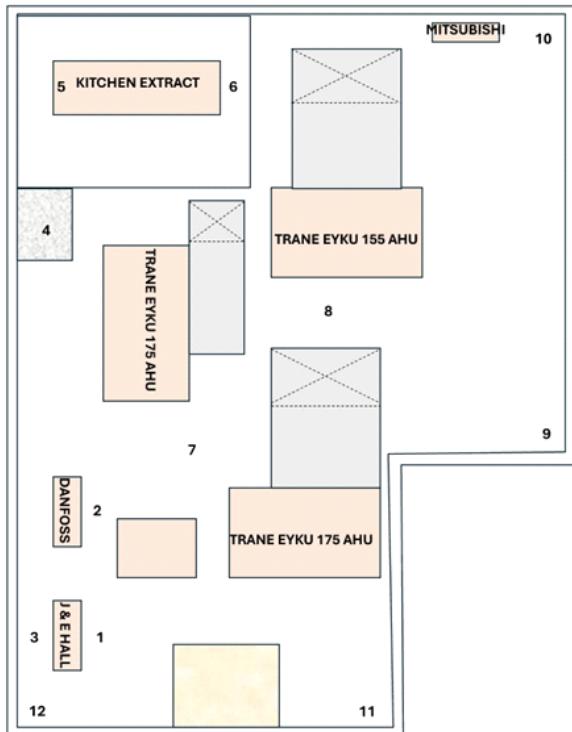


Figure 5 existing plant layout

The table below details the sound levels recorded;

Measurement Position	Measurement Location	Sound level dB L _{Aeq}
1	1m from inlet of J & E Hall unit	67
2	1m from inlet of Danfoss Unit	65
3	1m from discharge of J & E Hall unit	65
4	On platform into kitchen extract fan housing	78
5	1m above Kitchen Extract fan	85
6	On the back of ducting	81
7	In between units	64
8	In between units	63
9	Corner of roof	56
10	Corner of roof	58
11	Corner of roof	58
12	Corner of roof	62

Table 4 sound levels on McDonald's plant roof deck

This table shows that the kitchen extract fan is the loudest item of plant currently running, making up to 85 dB L_{Aeq} at 1m from the discharge. The photograph below shows the fan;



Figure 6 existing kitchen extract fan

7 Replacement plant noise levels

7.1 Plant location and prediction of noise levels

The new plant will directly replace the existing old plant and will be located on the rear 2nd floor flat roof as shown on CDM HVAC layout drawing NO. 9663 M1010, a copy of which is provided at the rear of this report.

The level of sound created by all the plant running at full duty simultaneously as well as for typical night time operation³ has been calculated using iNoise implementing the requirements of ISO9613 Part 2⁴.

7.2 Plant Mitigation

The following noise control measures have been assumed will be fitted;

Noise Control Item	octave band centre frequency Hz					
	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
kit ext discharge silencer 900 x 900 x 2100m long dB DIL	17	26	49	49	35	20
Kit ext fan enclosure dB D' _w	22	32	38	45	43	40
S1, S2 & S3 AHU FAIs 1200mm long dB DIL	11	20	36	39	31	21

Table 5 showing noise reduction requirements

³ Details of typical time night plant operation are shown in Appendix 1

⁴ ISO 9613-2:1996 (Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation) including ISO/TR 17534-3:2015 (Acoustics - Software for the calculation of sound outdoors - Part 3: Recommendations for quality assured implementation of ISO 9613-2 in software according to ISO 17534-1).

The image below shows the HVAC roof plant identified by red crosses;

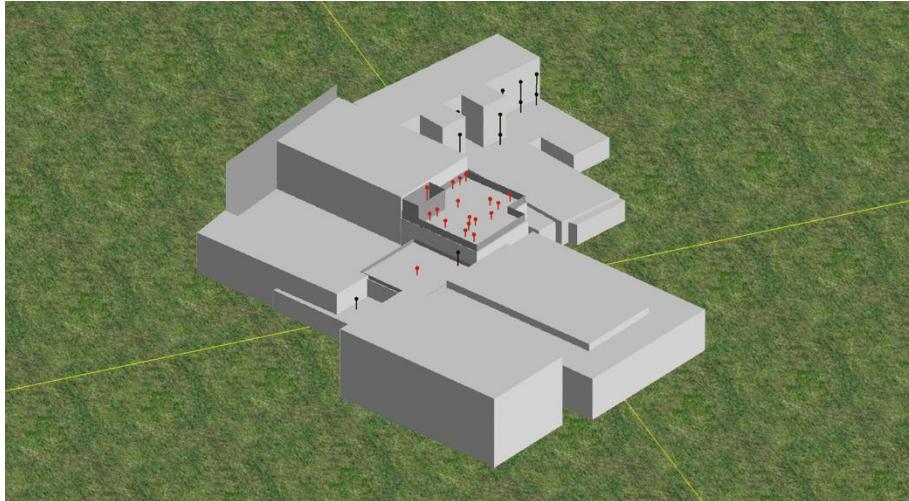


Figure 7 showing 3D view taken from noise modelling software

The plan below shows the receiver locations;



Figure 8 plan showing receiver locations

The table below shows the predicted plant sound levels at the neighbours⁵;

Description	Height m	Plant noise level dB Laeq,T
A	4.5	35
A	7.5	40
B	4.5	34
B	7.5	38
C	4.5	37
C	7.5	41
D	4.5	29
D	7.5	34
E	4.5	35
E	7.5	38

⁵ Details of full calculations can be made available upon request

F	4.5	36
F	7.5	38
Flat over Fields	4.5	37
Princess Lane	7.5	44

Table 6 showing predicted mitigated plant noise

This shows that the highest predicted mitigated plant noise levels will be outside the upper floor windows of Princess, no higher than 44dB $L_{Aeq,T}$, but 10 dBA less than the current overnight background sound level.

8 Assessment of impacts

8.1 BS4142 assessment of impact of plant noise

BS4142:2015+A:2019 provides a method for assessing the likely impact industrial and commercial noise will have on residential neighbours. This Standard requires that *character penalties*, if any tonality, intermittency, impulsivity or “other characteristics” are present in the noise are added to the assessed $L_{Aeq,T}$ level of plant noise to provide a Rating Level.

Here the McDonald's plant will run without any tonality or discernable intermittency or impulsivity and at a level more than below both the day and night time background sound levels and therefore will not attract any characteristic penalties.

Location	Princess House
Predicted plant noise level dB L_{Aeq}	44
character penalties	
Tonality dB	0
Impulsivity dB	0
Intermittency dB	0
other characteristics dB	0
Plant Rating Level dB $L_{A,r}$	44
Background sound level (lowest during day/night) dB L_{A90}	54
Excess over background dB	-10
Likely impact	very low

Table 7 BS4142 assessment of plant noise

This shows that plant noise will have a “very low” impact right across its running hours.

8.2 Uncertainty effects on assessment conclusions

There is a degree of uncertainty at each stage of these assessments, most will be small and not all additive, but if the uncertainty was large and the assessment conclusion was on the threshold of acceptability, then it might change the assessment outcome.

The magnitude of the impact of fixed plant noise on the neighbours has been based on the results of an on-site ambient noise survey, where levels were monitored in a location representative of that experienced by the neighbours.

Any on-site sound survey will only provide a snap shot of historical levels. For these levels to provide the basis upon which future impacts can be assessed, then the snap shot should, at the very least, cover the hours under assessment and during normal circumstances. Measuring next

to a road which has temporary traffic lights in place may well underestimate sound levels when the traffic is passing freely, for example, should be avoided.

Here the survey was conducted over three days, during clement weather conditions across the hours when the existing McDonald's plant is off.

The plant to be used on the roof of the proposed McDonald's restaurant has been tried and tested on countless other McDonald's around the country and the noise levels used in this assessment for the plant can be relied upon.

The maximum noise that all the plant running at 100% duty will create here, has been compared with the minimum representative night time background sound levels. Practically during the first and last hour of running, when the background is at its quietest, all the plant will not be running flat out. The air-conditioning fans and condensers will be ticking over and even the main kitchen extract fan will automatically reduce in speed when no cooking is taking place.

The mitigation requirements set out in this report are therefore robust and will not be adversely effected by uncertainty.

HVAC Layout CDM drawing No. 9663 M1010A



Appendix 1 – schedule of plant noise data

Reference	Service	Make	Model	Indices	dBA	linear octave band centre frequency Hz							
						63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
S1	kitchen supply	Weathrite	IL200-2LS1	Lw	88	83	89	85	85	81	80	76	77
S1/C1, C2 & C3	S1 condensers 1,2&3	Mitsubishi	PUZ ZM250YKA	Lp at 1m	62	65	62	60	59	58	52	48	42
S2	GF Dining supply	Weatherite	IL150-2RS2	Lw	82	78	82	79	80	77	75	72	68
S2/C1 & C2	S2 condensers 1&2	Mitsubishi	PUZ ZM250YKA	Lp at 1m	62	61	61	60	59	58	52	46	42
AC01/C1	Manger Rn condenser	Mitsubishi	SUZ M35FA	Lp at 1m	48	51	53	51	45	52	39	31	25
AC02/C1	Crew Rm condenser	Mitsubishi	SUZ M50FA	Lp at 1m	49	57	57	56	54	52	48	41	45
AC03/C1	Office condenser	Mitsubishi	PUZ-ZM71VHA	Lp at 1m	49	53	52	53	45	42	39	34	28
S3	GF Dining supply	Weatherite	IL150-2RS2	Lw	82	78	82	79	80	77	75	72	68
S3/C1 & C2	S3 condensers 1&2	Mitsubishi	PUZ ZM250YKA	Lp at 1m	62	61	61	60	59	58	52	46	42
	Door Curtain condenser	Mitsubishi	PUHX-RP125R WSIBCW38 5/100-97	Lp at 1m	45	52	45	45	40	39	35	27	13
E1	kitchen extract	Woodcock & Wilcox		induct Lw	97	104	95	100	98	84	80	77	68
				case BO Lw	89	92	79	91	86	84	78	67	54
HWS	ASHP	Cosmic Gas	FRYO-13PI	Lp	59	60	58	49	46	46	43	38	39
ABS	condenser	Manitowoc	ICVD 1195-261	Lp	66	55	64	63	62	61	58	57	54