MARTIN
ENVIRONMENTAL
SOLUTIONS LTD

Acoustic and Odour Assessment for Proposed Dark Kitchen on Land at Meadow Lane, Dewsbury, WF13 2BE.

Prepared for:

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Contents

1. Introduction

1.1. Martin Environmental Solutions has been commissioned to undertake an acoustic and odour assessment to support a planning application for a dark kitchen on land at Meadow Lane, Dewsbury, WF13 2BE.

Site Location and Context

1.2. The development site is situated to the south of a large industrial mill building. To the east is the access road with industrial units on the opposite site, more industrial units to the south and east. The nearest residential units are located to the east 46m away and 47m to the north.

1.3. An aerial Photograph is enclosed in Figure 1.

1.4. The report has been produced to clarify the potential impact on the proposed development and to identify mitigation measures if required to ensure the development is appropriate in terms of noise impact.

2. Policy and Guidance

Noise

2.1. The impact of noise can be a material consideration in the determination of planning applications. The planning system has the task of guiding development to the most appropriate locations. It is recognised that on occasions it will be difficult to reconcile some land uses, such as housing, hospitals, or schools, with other activities that generate high levels of noise. However, the planning system is tasked to ensure that, wherever practicable, noise-sensitive developments are separated from major sources of noise (such as road, rail and air transport and certain types of industrial development).

2.2. The Government's publication of the National Planning Policy Framework (NPPF), updated in December 2023, states that planning policies and decisions should prevent new and existing development from contributing to or being put at unacceptable risk from, of being adversely affected by unacceptable levels of noise pollution.

2.3. The Government have also issued the Noise Policy Statement for England (NPSE). The NPSE clarifies the Government's underlying principles and aims in relation to noise and sets a vision to promote good health and a good quality of life through the effective management of noise while having regard to the Government's sustainable development strategy. The NPSE aims to mitigate and minimise adverse impacts on health and quality of life through the effective management and control of noise.

2.4. The NPSE introduces the following terms, although no sound levels are given to represent these, many authorities have identified the sound level criteria in line with the World Health Organisation, BS8233:2014 and BS4142: 2014 levels. The terms introduced by the NPSE are:

NOEL – No Observed Effect Level (<30dB(A)inside <50dB(A) outside, 10dB below background)
LOAEL – Lowest Observed Adverse Effect Level (30-35dB(A) inside 50-55dB(A) outside, background to +5dB)
SOAEL – Significant Observed Adverse Effect Level (>35dB(A) inside, >55dB(A) outside, >+10dB above background)

2.5. The sound levels within the brackets of the previous paragraph are those determined as appropriate levels to indicate the relevant effect levels represented by the NPSE.

2.6. Other commonly used examples of standards utilised by Local Planning authorities for the consideration of noise impacts include comparison of the likely noise levels to be experienced at a development, with levels that have been recommended by the World Health Organisation (WHO) as Guidelines for the prevention of Community Noise Annoyance and within BS8233: 2014.

2.7. The WHO recommended noise levels for outdoor amenity areas (gardens) that should not be exceeded are 55dB(A) $L_{Aeq,16hr}$ in order to avoid 'Serious Community Annoyance or 50dB(A) $L_{Aeq,16hr}$ to avoid 'Moderate Community Annoyance' during the day. For indoor levels WHO set 35dB(A) $L_{Aeq,16hr}$ during the day to prevent Moderate Annoyance and 30 dB(A) $L_{Aeq,8hr}$ at night to prevent sleep disturbance.

2.8. The WHO guidance also recommends that maximum sound levels at night should not regularly exceed 45dB(A) within bedrooms to prevent sleep disturbance. Regularly is considered to be more than 10 times during any 8-hour night-time period.

2.9. BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings' also specifies desirable noise levels to be achieved inside dwellings.

2.10. BS 8233:2014 'Sound insulation and noise reduction for buildings – Code of Practice' also specifies desirable noise levels to be achieved inside dwellings. BS 8233 presents two levels, the first between the hours of 07:00 – 23:00 and the second between 23:00 -07:00.

2.11. The daytime period suggests internal noise levels of 35dB $L_{Aeq,16hr}$, for resting in living rooms and bedrooms while for night-time a level of 30dB LAeq,8hr is recommended. Criteria for external areas mirrors that within the WHO guidance.

2.12. Another commonly used standard is British Standard 4142:2014 'Method for rating industrial and commercial sound' compares the sound predicted by the source in question against the background, L_{A90} sound levels.

2.13. The "residual" L_{Aeq} measurement is then subtracted from the "ambient" L_{Aeq} measurement (with the sound source) to calculate the sound level created by the "problem" sound alone -termed the "specific" sound level.

2.14. If the "problem" sound is tonal, such as whine or hum, or if it is impulsive such as bangs or clatters or if it is irregular enough to attract attention a correction is added to the "specific level" to produce the "rating level". The "background" L_{A90} measurement is then compared against the "rating level".

2.15. If the "rating level" exceeds the "background" by around 10dB(A) or more this "indicates a significant adverse impact". A difference of around 5dB(A) 'indicates an adverse impact. The lower the commercial noise level is, the lower the likely impact.

2.16. In addition, the 'ProPG Planning & Noise, Professional Practice Guidance on Planning & Noise, New Residential Development' provides a 4-staged approach to undertaking a risk assessment in relation to anticipated sound levels at new residential development and the provision of mitigation measures. The guidance is principally aimed at sites exposed predominantly to noise from transportation sources.

2.17. The first stage consists of an initial noise risk assessment, based on indicative day and night-time *noise* levels. Simply put, the higher the ambient noise in an area the greater the impact. The levels given are shown below although it should be noted that these are in excess of both the WHO and BS 8233: 2014 guidance.

Noise Risk Category*	Potential Effect if Unmitigated	Pre-Planning Application Guidance
0 – Negligible $L_{Aeq,16hr}$ **<50dB** $L_{Aeq,8hr}$ **<40dB**	May be noticeable but no adverse effect on health and quality of life	In this category the development is likely to be acceptable from a noise perspective, nevertheless a good acoustic design process is encouraged to improve the existing environment and/or safeguard against possible future deterioration and to protect any designated tranquil areas. A noise assessment may be requested to demonstrate no adverse impact from noise. Application need not normally be delayed on noise grounds.
1 – Low $L_{Aeq,16hr}$ **50-63dB** $L_{Aeq,8hr}$ **40-55dB**	Adverse effect on health and quality of life	In this category the development may be refused unless a good acoustic design process is followed and is demonstrated via a Level 1 Acoustic Design Statement which confirms how the adverse impacts of noise on the new development will be mitigated and minimised and that a significant adverse impact will not arise in the finished development. Planning conditions and other measures to control noise may be required.
2 – Medium $L_{Aeq,16hr}$ **63-69dB** $L_{Aeq,8hr}$ **55-60dB** L_{AFmax} **>80dB****	Significant adverse effect on health and quality of life	In this category the development is likely to be refused unless good acoustic design process is followed and is demonstrated via a Level 2 Acoustic Design Statement which confirms how the adverse impacts of noise on the new development will be mitigated and minimised, and clearly demonstrates that a significant adverse noise impact will not arise in the finished development. Planning conditions and other measures to control noise will normally be required.
3 – High $L_{Aeq,16hr}$ **>69dB** $L_{Aeq,8hr}$ **>60dB** L_{AFmax} **>80dB****	Unacceptable adverse effect of health and quality of life	In this category the development is very likely to be refused on noise grounds, even if a good acoustic design process is followed and is demonstrated via a Level 2 Acoustic Design Statement. Applicants are advised to seek expert advice on possible mitigation measures. Advice on the circumstances when the refusal of a new housing on noise grounds should normally be anticipated is included in the ProPG.

2.18. Stage 2, consists of a full assessment of the prevailing ambient noise and requires 4 elements to be considered:

I. Element 1 – Good Acoustic Design
II. Element 2 – Internal Noise Level Guidelines
III. Element 3 – External Amenity Area Noise Assessment
IV. Element 4 – Assessment of Other Relevant Issues

2.19. A good acoustic design is implicit in meeting the requirements of the NPPF and can help to resolve many potential acoustic issues.

2.20. Details of the criteria considered suitable are provided above for both internal and external sound levels. Element 4 includes such issues as local and national policy, likely occupants, wider planning objectives.

Odour

2.21. The Government sets out its policy in relation to planning in the National Planning Policy Framework (NPPF). The NPPF states that planning policies and decisions should "preventing new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability"; and "In preparing plans to meet development needs, the aim should be to minimise pollution and other adverse effects on the local and natural environment".

2.22. While Odour is not specifically mentioned in is implied by the above and the Planning Practice Guidance (PPG) note issued by the government on Air Quality states "odour and dust can also be a planning concern, for example, because of the effects on local amenity" it continues to state, "mitigation options where necessary, will depend on the proposed development and should be proportionate to the likely impact".

2.23. Before an odour can be present an adverse effect, there must be exposure to the odour and therefore a source, a pathway, and a receptor without these three links no exposure can occur. In the case of this application the source is the take-away. The pathway is the air, and the receptor are the occupants of the nearby existing dwellings.

2.24. In assessing the impact of odour on or from a development the scale of the exposure and therefore impact is determined by the parameters collectively known as the FIDO factors (Frequency, Intensity, Duration and Offensiveness) In addition the sensitivity of the receptor (location) will determine the magnitude of the exposure. Factors that influence the magnitude of a commercial odour problem include the size/volume of the cooking facility, the type of food being prepared, and the type of cooking appliances being used.

2.25. Furthermore, updated guidance on assessing the impact of extraction systems from commercial kitchens has been published by EMAQ *'Control of Odour and Noise from Commercial Kitchen Extraction Systems' 2018*.

2.26. This document details a methodology which should be followed to assess the potential impact from commercial kitchen extraction systems on nearby land uses and how to identify suitable control and mitigation measures as required.

3. The Assessment

The development

3.1 The proposed development consists of the conversion of units to the south of the existing Mill building into a dark kitchen. The dark kitchen will see no customers visiting the site with delivery orders only being accepted.

3.2 The development will include a new extraction system, full details of which have not been confirmed but the system will include carbon filtration and electrostatic precipitators to deal with any odours. The new flue will terminate above the eaves of the main mill building to the north.

3.3 The recommended internal sound level for night-time (23:00-07:00) hours is 30dB(A). Given a 15dB attenuation[1] for an open window this places the external sound level at 45dB(A). Recent research has suggested a slightly lower reduction for an open window and some authorities use a 13dB(A) reduction. Thus, an external sound level of 43dB(A), to ensure the recommended internal sound level is not exceeded.

3.4 The above recommended external sound level of 43dB(A) is also below the recommended daytime external value of 50dB(A). As such is a suitable criterion to be used in the assessment.

3.5 The nearest residential properties are located 47m from the development/extraction flue. A reduction of 44dB will be experienced at this distance meaning the maximum sound emissions from the extraction flue must be below 87dB(A) to ensure no adverse impact on the nearby residential dwellings.

3.6 While the full design of the kitchen and extraction range has still be confirmed the above provides a maximum sound emission level that cannot be exceeded. It is

[1] BS8233: 2014; Guidance on sound insulation and noise reduction for buildings

however recommended that a Flaktwood PowerBox 3 67-450-1 fan be utilised within the design, to the outlet side of this an Acoustica RO2-2-900 rectangular silencer should be installed. The extraction system should be installed with appropriate anti-vibrations and mounts and connections.

3.7 The above system resulting in a sound level of 8.4dB(A) at the nearest properties, see Appendix A for product details and Appendix B for calculations.

3.8 The resulting sound level being significantly below the recommended sound levels at the nearby receptors.

3.9 In terms of a BS4142:2014+A1:2019 assessment. Monitoring has not been undertaken but given the built-up location, nearby road networks and industrial units the area is not considered to be particularly quiet so the above recommended levels/criterion are appropriate.

3.10 The extraction system, when operational will be on continuously, there will be no impulsive noise associated with the extraction system and given the very low resulting sound level at the receptor location will not be otherwise characteristic. Furthermore, the fan is designed not to be tonal but only octave data is available, as such a +2dB correction has been applied to the specific sound level.

3.11 A rating level of 10.4dB(A) is therefore experienced at the nearest residential receptor, this would be audible internally and will be well below the prevailing background sound level. As such the inclusion of the silencer with the above fan will not result in any adverse impact on the nearby residential receptors.

Odour

Prevailing Wind Direction

3.12 The prevailing wind direction for the area, identified from weather stations at Normanton and Huddersfield as westerly, south-westerly, see Appendix C, taking odours away from the residential receptors to the north and east.

Assessment

3.13 The extraction system is to terminate at least m above the eaves of the adjacent building, with receptor locations over 40m away. The size of the kitchen is considered to be small.

3.14 An assessment of the potential impact on the identified receptors has been untaken in accordance to the EMAQ guidance document. This assessment is shown in Appendix D and includes the following considerations;

3.15 The extraction system will terminate above the eaves of the adjacent building via a jet cowl, in line with the guidance a score of 10 is applied.

3.16 The nearest residential receptor is located over 20m away, but less than 100m, as such a score of 5 is applied.

3.17 The business has identified as ‘small’, and therefore score 1 has been applied.

3.18 The odour characteristics from the venue are considered to be very high, in line with the guidance document, a score of 10 has therefore been applied.

3.19 This results in a score of 26 or high and as such a high level of odour control is required.

3.20 In order to mitigate against this potential impact and to ensure no adverse impact will be experienced by the identified receptors, in line with the guidance, the following measures are recommended as part of the extraction system.

- Prefilters (baffle filters) attached to the extraction hood, reducing grease loading by 65-80%
- An electrostatic precipitator (ESP) unit to remove oil, grease and smoke particles, a RydAir unit, appropriately sized for the final kitchen design is to be used, resulting in at least 95% efficiency at removing particles.
- Following the ESP a Vent Direct Tri-carb activated carbon filter is to be installed to remove any residual, the size of the filter will again be appropriately sized based on the final design of the kitchen and the extraction rate.
- Finally, a jet cowl will be installed at the final exist point to increasing the velocity of the discharged air vertically into the atmosphere for dispersion.

- The discharge point will be ≥1m above the eaves of the building

3.21 The system will need to be maintained and cleaned in line with the manufacturer's instructions and a separate cleaning schedule will be produced and maintained once the chosen unit has been installed.

3.22 The installation of the above mitigation measures will ensure high level of grease and odour removal from the extraction system, preventing any adverse impact on the identified receptors.

4 Conclusion

Noise

4.1 The sound emissions from the proposed extraction system have been calculated at the nearest noise sensitive receptors based on manufacturers published data.

4.2 This has confirmed that the identified extraction system, fan and silencer will result in sound levels significantly below the identified criterion for both façade and internal environments.

4.3 A consideration of BS4142:2014 has confirming no adverse impact will be experienced from the development.

4.4 The development will ensure that the internal and external sound levels are acceptable and will result in a No Observe Effect on the future residents in line with the Noise Policy Statement for England.

4.5 As such the development will meet the objectives of the National Planning Policy Framework in ensuring that no significant adverse impact is experienced by the future residents. The development is therefore considered to be acceptable in terms of noise.

Odour

4.6 A consideration of the proposed development has been undertaken and a risk assessment produced in accordance with the EMAQ *'Control of Odour and Noise from Commercial Kitchen Extraction Systems' 2018* guidance document.

4.7 This has identified a high risk of adverse impact from odour and as such control measures in the form of baffles, ESP and a carbon filtration system have been recommended.

4.8 The inclusion of the above control measures will treat and remove odour and grease from the extracted air resulting in no adverse impact on the nearby residential receptor locations.

4.9 As such the development will meet the objectives of the National Planning Policy Framework in ensuring that no significant adverse impact is experienced by the future residents. The development is therefore considered to be acceptable in terms of odour.

Figure 1 – Aerial Photograph

Appendix A – Extraction Product Details

Power Box Fan

FlaktWoods Limited
Fan Selector - Technical Datasheet

FläktGroup

Project : **Customer :** **Project Code :**
Quotation : **Date :** 16 May 2024

PowerBox3

Powerbox3 67-450-1

PRODUCT

Model Code	Powerbox3 67-450-1
Fan Diameter	450 mm
Installation	Type D

PERFORMANCE

Requested Duty	1.11 m³/s @ 401 Pa (Static)
Outlet Dynamic Pressure	5.69 Pa
Velocity	3.08 m/s

MOTOR

Motor Rating	1.05 kW [Integral Frame]
Full Load Current	3.3 A
Starting Current	3.3 A
Electrical Supply	220 - 240 Volts 50 Hz 1 Phase
Motor Winding	Standard
Motor Type	Class F Insulation

EFFICIENCY GRADES

Regulation 1253 - 2014	
UVU Efficiency	44.7% (ErP Compliant) ✓
Nominal Flow Rate	1.10 m³/s @ 428 Pa
Effective Input Power	1.05 kW
Nominal RPM	1440 rpm

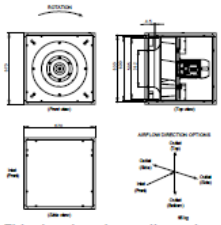
ENVIRONMENT

Air Density	1.2 kg/m³ / 20 °C / 0 m / 40% RH
Smoke Venting	No Smoke Venting
Operating Environment	Normal

RUNNING COSTS

Power from mains	0.759 KWh
Energy Consumption	1,517.38 (2,000.00 h/Year)
Running Cost / Year	£379.34
CO2 per Year	533.45 kgCO2e
SFP value	0.68 W/l/s @ Actual Duty

PRODUCT DIMENSIONS



This drawing shows dimensions that should be used as a guide only and are subject to change. Certified drawings are available on request.

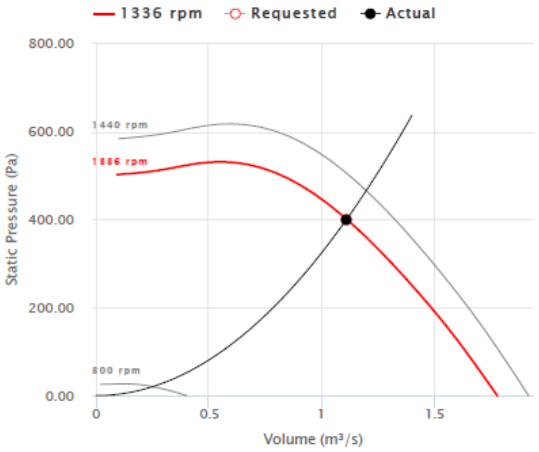
MECHANICAL

Operating Temperatures	-20 °C to 50 °C
Weight	65kg

COMMENTS

This product must be used with an Inverter either supplied by Woods or from an external source supplied locally.

FAN PERFORMANCE CURVE



ACOUSTICS

	Sound Spectrum (Hz)								Overall		Distance (3 m)
	63	125	250	500	1k	2k	4k	8k	Lw*	LwA*	LpA @ 3 m **
Inlet	81	86	78	76	70	74	71	67	88	80	60
Outlet	82	83	76	76	75	75	73	70	87	81	61
Breakout	62	68	65	55	56	48	46	39	71	61	41

Sound Data At Requested Duty. * Lw dB re 10^{-12} W ** dBA re $2x10^{-5}$ Pa

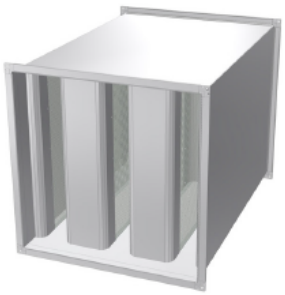
FAN & ACCESSORIES

Item Description	Qty
Powerbox3 67-450-1	1
IEDXB20 - 1ph to 3ph Inverter	1

R02
Rectangular Silencers

R02 - 2 - Attenuator

Available in seven standard lengths R02 2 Rectangular Duct Mounted Silencers have excellent attenuation properties, achieved with sound absorbing infill splitters, retained in the attenuator casing by a perforated liner. The resistance to airflow is a function of the face velocity and length. It is not recommended to select the R02 2 Silencers with a face velocity above 2.5 metres per second without asking advice regarding re-generated self noise. We can advise on the selections and can perform system analysis to ensure the correct unit is specified.



- High performance rectangular duct silencer
- Seven standard lengths
- Many connection options
- Cross section dimensions in 1mm increments
- System pressure within ducted systems to 1500 Pa
- Special lengths on request

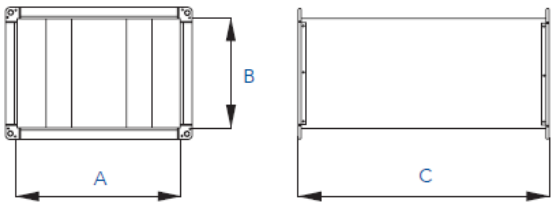
Insertion Loss (dB) - Centre Band Frequency

Product Code	Length (mm)	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
R02 - 2 - 600	600	7	12	20	31	39	40	38	27
R02 - 2 - 900	900	9	16	25	42	50	50	50	41
R02 - 2 - 1200	1200	11	20	20	50	50	50	50	48
R02 - 2 - 1500	1500	13	24	25	50	50	50	50	50
R02 - 2 - 1800	1800	15	30	20	50	50	50	50	50
R02 - 2 - 2100	2100	16	33	25	50	50	50	50	50
R02 - 2 - 2400	2400	7	38	20	50	50	50	50	50

Insertion loss data is derived from continual testing to BS4718 and other standards in independent UKAS certified laboratories, which includes where appropriate, re-generated or self noise testing in both forward and reverse flow conditions. If you request system analysis from our technicians all predictions will be assessed using the relevant certified insertion loss data together with relevant dynamic corrections.

Dimensional Data

Code	A Min	A Max	B Min	B Max	C Min	C Max
R01 - 2	100	1200	100	1200	400	2400



Resitance to Airflow (Pa)

Product Code	1.0m/s	1.5m/s	2.0m/s	2.5m/s	3.0m/s
R02 - 2 - 600	9	29	52	80	108
R02 - 2 - 900	9	30	54	82	111
R02 - 2 - 1200	10	31	55	84	114
R02 - 2 - 1500	10	31	56	85	116
R02 - 2 - 1800	11	32	57	88	119
R02 - 2 - 2100	11	34	57	90	123
R02 - 2 - 2400	12	36	60	95	133

Appendix B – Calculations

Sound level at nearest receptors

Oultlet										
	63	125	250	500	1000	2000	4000	8000	Lw	Lp@47m
PowerBox 3 67-450-1	82	83	76	76	75	75	73	70	87	
silencer - RO2-2-900	9	16	25	42	50	50	50	41		
a-weighting	-26.2	-16.1	-8.6	-3.2	0	1.2	1	-1.1		
resulting sound level	46.8	50.9	42.4	30.8	25	26.2	24	27.9	52.8	8.4

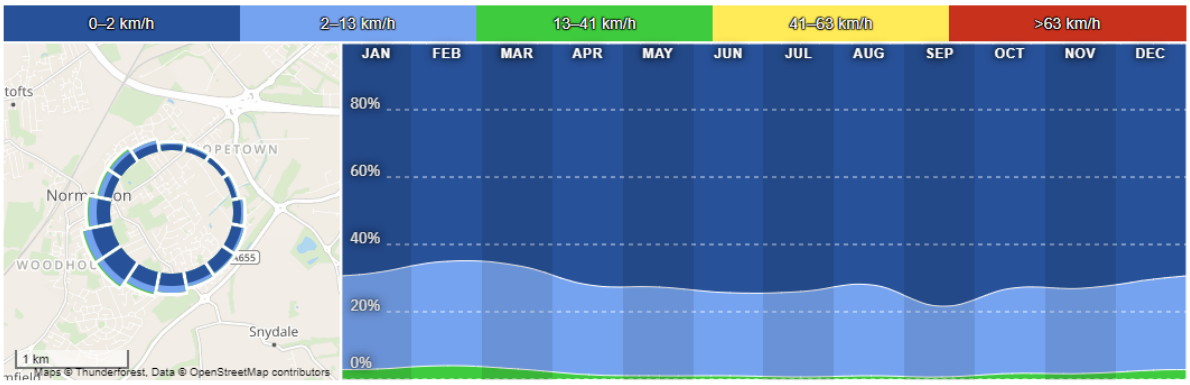
Appendix C – Prevailing Weather Data

Monthly wind speed statistics and directions for Normanton

Dominant wind direction

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
WSW	WSW	WSW	W	W	WSW	WSW	WSW	WSW	SW	WSW	SW

Monthly wind direction and strength distribution

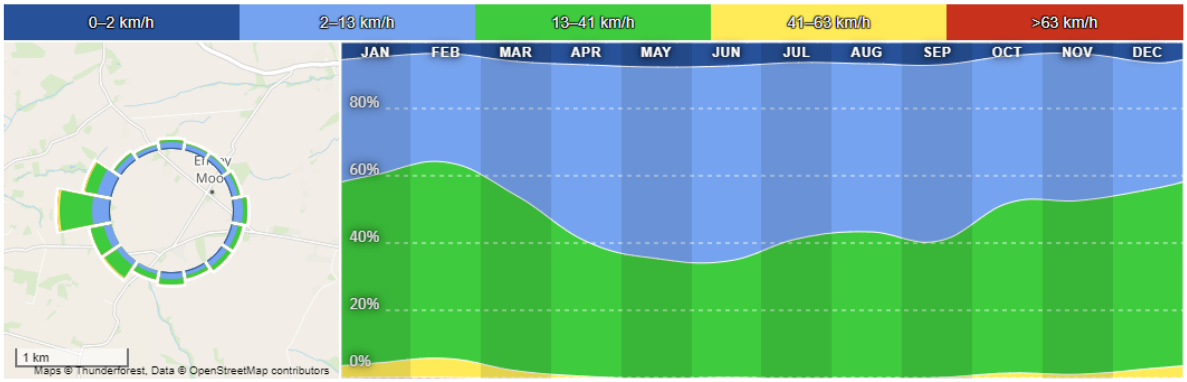


Monthly wind speed statistics and directions for Emley Moor/Huddersfield

Dominant wind direction

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
WSW	WSW	WSW	W	W	W	W	WSW	WSW	WSW	WSW	WSW

Monthly wind direction and strength distribution



Appendix D – EMAQ Odour Risk Assessment

Impact Risk	Odour Control Requirement	Significance Score*
Low to Medium	Low level odour control	Less than 20
High	High level odour control	20 to 35
Very high	Very high level odour control	more than 35

Criteria	Score	Score	Details
Dispersion	Moderate	10	Discharging above the eaves
Proximity to Receptors	Medium	5	Closest sensitive receptor 475m from kitchen discharge (below)
Size of Kitchen	Small	1	Small takeaway
Cooking type	V.High	10	Fast food
Total	High	**26**	

Appendix E – Report Author Details

This report has been produced by Neil Martin, BSc (Hons), PGDip, CEnvH MCIEH, MIOA.

Neil is the principal acoustic consultant at Martin Environmental Solutions Ltd, a consultancy company specialising in Environmental Health disciplines including environmental noise assessment and control. He holds a Bachler's degree in Environmental Health and Diploma in Acoustics. He is a Chartered Member of the Chartered Institute of Environmental Health and a Full member of the Institute of Acoustics.

Neil has over 20year's experience working within a Local Authority Environmental Health setting, principally in the Environmental Protection and Public Health areas and has been working as an acoustic consultant since 2011.

Since its formation, Martin Environmental Solutions has advised and assisted many groups including residents, developers and local authorities about the problems of noise and vibration in the environment and the possible solutions. Neil also acts as an expert witness in the area of acoustics.