

Horncastle Care Centre, Plawhatch Lane, Sharpthorne
Ventilation Strategy – Noise and Odour
May 2025
Our Ref: 29528-ENV-0402

Introduction

MEC Consulting Group Ltd (MEC) has been commissioned by Splendid Projects Limited to prepare a Ventilation Strategy for Noise and Odour, in support of the proposed Horncastle Care Centre, at Plawhatch Lane, Sharpthorne (hereafter referred to as 'the Site').

The Site will include an on-site restaurant/kitchen for residents and the Local Planning Authority (LPA) has requested an assessment that deals with the potential effects of noise and odour that could result from any extract system.

Relevant national guidance on noise and odour is presented in **Appendix A**.

Noise

Background Sound Levels

Ambient sound levels at the Site were monitored between Tuesday 22nd and Wednesday 23rd April 2025. The Continuous Measurement Position (CMP) is identified in Figure 1.

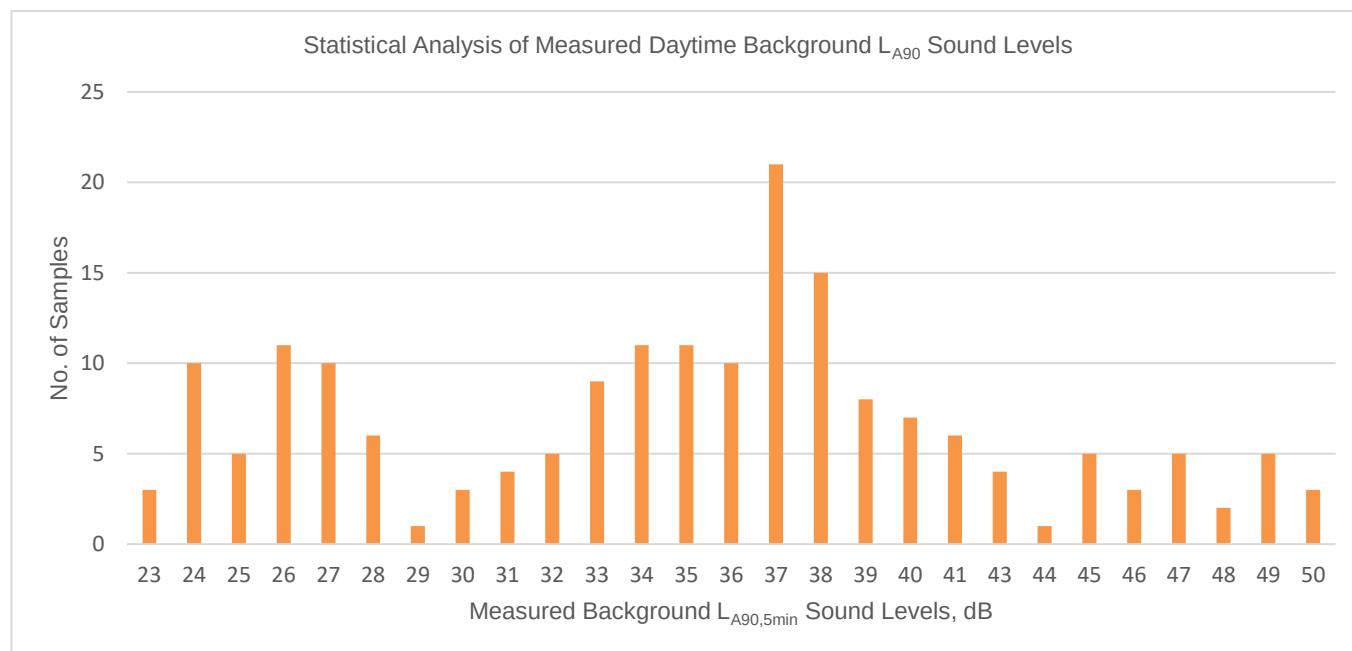
Figure 1: Continuous Measurement Position



Full details of the survey are presented in **Appendix B**, and a statistical analysis of the measured background sound levels during the day and night-time is presented in Figure 2 and Figure 3 respectively.

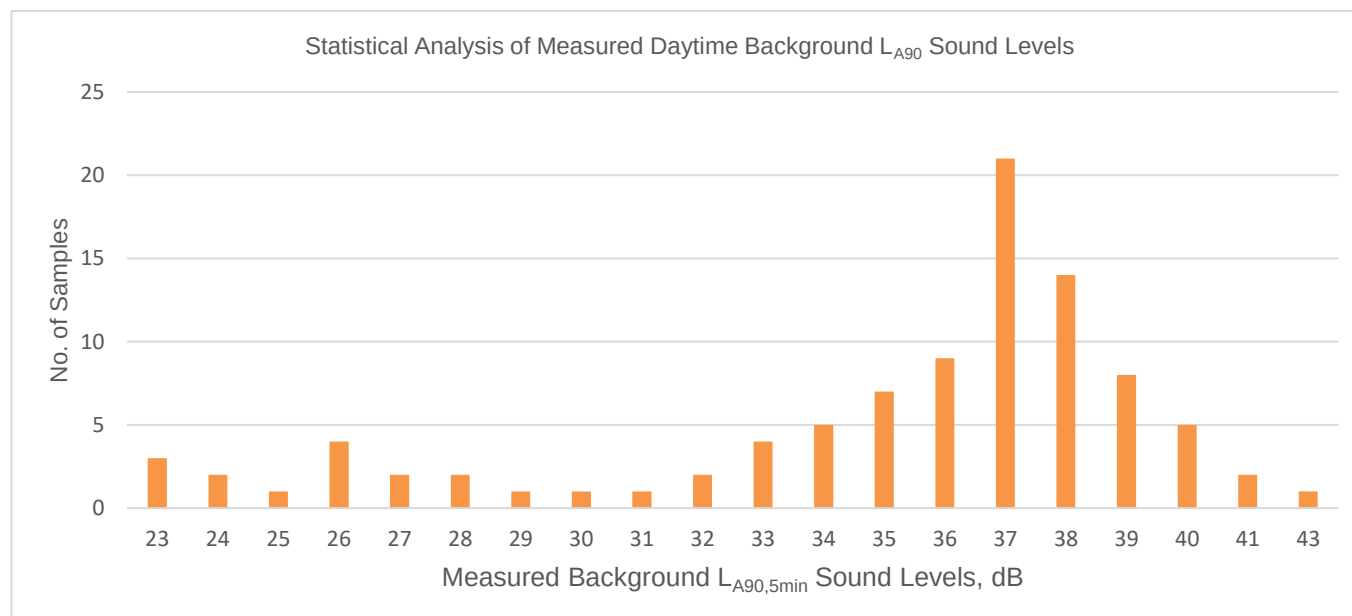


Figure 2: Statistical Analysis of Measured Daytime Background L_{A90} Sound Levels, dB



During the daytime hours, the data shows a clear distribution pattern centred around 37 dB, with an overall range of daytime values extending from 23 dB to 50 dB $L_{A90,5min}$. The maximum number of samples (11.4%) fell within 37 dB, followed by 8.2% at 38 dB.

Figure 3: Statistical Analysis of Measured Night-time Background L_{A90} Sound Levels, dB



During the night-time hours, the data shows a distribution pattern extending from 23 to 43 dB $L_{A90,5min}$. The maximum number of samples (22.1%) again fell within 37 dB, followed by 14.7% at 38 dB, and 9.5% at 36 dB.

The data demonstrates a fairly consistent background sound level during both the day and night-time due to the rural nature of the Site and subsequently, 37 dB $L_{A90,T}$ is considered to be an appropriate value to use for assessment purposes.

External Plant (Kitchen Extracts)

The floor and elevation plans presented in **Appendix C** show the kitchen located within the service wing on the second floor. At this stage of the development's design, it is not possible to identify the specific type or location of equipment that will form the kitchen extract system, or indeed any other forms of mechanical/electrical service plant that might be required within the development. Therefore, the approach has been to devise an appropriate noise criterion that, applied to the selection and siting of equipment during the detailed design, will enable the equipment to operate during the more sensitive evening periods without adversely affecting the ambient noise climate and without causing complaints from existing residents adjacent to the development.

A design criterion frequently applied to mechanical/electrical service plant is for the operational sound level to lie 10 dB below the existing background sound level. Based on the logarithmic nature of sound, this means that there would be no change to the existing background sound level and, therefore, no risk of complaints since the noise would be inaudible. A sound level 5 dB below the background would result in the background sound level being increased by approximately 1 dB, which would similarly be an inaudible noise change unlikely to give rise to complaint.

However, some degree of noise can equally be allowed without causing complaints since BS 4142¹ indicates that a Rating Level equal to the background sound level is likewise unlikely to give rise to complaints, and a Rating Level 5 dB above the background sound level is only classed as 'marginal'.

Using the above information, possible design standards for mechanical/electrical service plant are set out in Table 1.

Table 1: Derived Assessment Levels, dB

Criterion	Sound Level
Baseline L _{A90}	37
Operational noise 10 dB below L _{A90}	27
Operational noise 5 dB below L _{A90}	32
Rating Level not to exceed L _{A90} ^(a)	37
^(a) The Rating Level must allow for tonal content through the addition of appropriate acoustic character corrections where tonal noise is present	

Given that some additional noise from a new development is to be expected, and since the mechanical/electrical service plant would not be expected to operate during the most sensitive night-time period, a realistic noise limit is likely to be based on a requirement for the operational noise to be 5 dB below the background sound level at noise sensitive receptors (e.g. 32 dB), or for the Rating Level, which should include any acoustic character corrections to account for tonality, not to exceed the background sound level at noise sensitive receptors (e.g. 37 dB).

In order for there to be no tonal content from the new plant, an indicative noise limit based on the octave band centre frequency would be as shown in Table 2.

Table 2: Indicative Octave Band Frequency Noise Limits

Situation	Octave Band Frequency, Hz												
	8	16	31.5	63	125	250	500	1k	2k	4k	8k	16k	dBA
Baseline	59.1	54.6	48.3	43.6	37.2	33.1	31.4	30.2	25.5	26.9	24.3	16.6	36.8
Noise Limit (-5)	54.1	49.6	43.3	38.6	32.2	28.1	26.4	25.2	20.5	21.9	19.3	11.6	31.8

If an electrical sub-station is required within the development, any noise from this could be controlled in the same way as that from the mechanical/electrical service plant through application of the design limits suggested above.

¹ BS 4142:2014 +A1:2019 'Methods for rating and assessing industrial and commercial sound.'

Internal Plant (Mechanical Ventilation Systems)

Where a mechanical ventilation system is to be employed to obtain suitable internal ventilation conditions, the system should adhere to the noise limits outlined in Table 3 for AD-F² purposes and, ideally target the guidance values for overheating conditions.

The purpose of the guidance values during overheating periods is due to the fact that research indicates any increase in the noise produced by Mechanical Systems during periods of overheating, above that outlined below, is likely to result in residents turning off, or reducing the performance of such systems, which would result in a poor living environment. Once a Mechanical & Electrical engineer has specified the system to be installed, further acoustic calculations should be undertaken to determine appropriate in-line attenuation measures accordingly.

'Noise Sensitive Rooms' are defined as bedrooms and living rooms with the likes of kitchens and bathrooms defined as 'Less Sensitive.' The overheating guidance values are derived from AVOG and AD-O and is a reasonable target during brief overheating periods.

Table 3: Mechanical System Noise Limits

Area	Typical Conditions Limit ^(a) L _{Aeq,T} dB	Overheating Conditions Guidance Value ^(b) L _{Aeq,T} dB
Noise Sensitive Rooms	30	30 (±5)
Less Sensitive Rooms	45	35 (±5)
^(a) Taken from section 1.7 of Approved Document F, Volume 1, 2021 Edition.		
^(b) Taken from AVOG ³ .		

Odour

An assessment of the odour risk and hence the specific requirement for odour control is presented in Table 4. The scores for the proximity of the receptors, the size of kitchen and the cooking type remain constant and it is the dispersion characteristics relating to the stack height and discharge rate that determine the level of odour risk.

The floor and elevation plans in **Appendix C** show the kitchen extract to be located in the centre of the roof line and therefore, the assessment assumes moderate dispersion with the discharge point at 1m above eaves and a discharge velocity of 10 m/s.

The closest sensitive receptors to the proposed kitchen, whether these are taken to be the first floor bedroom of the new building, maple lodge to the northeast with existing residential receptors located beyond, or the existing residential receptors to the west, would tend to be approximately 25-95m from the position of the discharge from the kitchen extract, and result in the same score rating for this aspect of the assessment.

It has been assumed that the type of cooking will not represent a high level of fried food, nor will it comprise highly seasoned foods capable of emitting characteristic odours, but will comprise commonly cooked food associated with most pubs, Italian, French, Pizza or steakhouse type restaurants.

The assessment of odour risk is presented in Table 4

² The Building Regulations 2010, Ventilation, Approved Document 'F'.

³ Acoustics Ventilation and Overheating, Residential Design Guide, V1.1. January 2020.



Table 4: Assessment of Odour Risk

Criteria	Rating		Details	Score
Dispersion	Very poor	20	Low level discharge, into courtyard or restriction on stack	
	Poor	15	Not low level but below eaves, or discharge at below 10 m/s	
	Moderate	10	Discharging 1m above eaves at 10-15 m/s	10
	Good	5	Discharging 1m above ridge at 15 m/s	
Proximity of receptors	Close	10	Closest sensitive receptor <20m from kitchen discharge	
	Medium	5	Closest sensitive receptor between 20 and 100m from kitchen discharge	5
	Far	1	Closest sensitive receptor >100m from kitchen discharge	
Size of kitchen	Large	5	More than 100 covers or large sized take away	
	Medium	3	Between 30 and 100 covers or medium sized take away	3
	Small	1	<100 covers or small take away	
Cooking type (odour and grease loading)	Very high	10	Pub (high level of fried food), fried chicken, burgers or fish & chips	
	High	7	Kebab, Vietnamese, Thai or Indian	
	Medium	4	Cantonese, Japanese or Chinese	
	Low	1	Most pubs, Italian, French, Pizza or steakhouse	1
Assessment Total				19
Impact Risk				Low to Medium

The assessment results in a score of 19, which falls within the low to medium risk category. Therefore, the type of odour controls necessary to prevent adverse impact on local residents would not reflect the extreme end of the spectrum but would represent the type of controls commonly applied to provide a low to medium level of odour control within built up areas. At no time is the risk assessed as 'high', which would require a high level of odour control.

At all times the kitchen extract would exhaust above local window levels and subsequently, the principal factor affecting the dispersion of emissions will be the local meteorology, e.g., factors such as wind speed and direction.

Therefore, given that the extract is proposed to be located in the centre of the roof line, i.e., higher than the bedroom windows located on the ground and first floors, coupled with the fact that for new residents within the ground and first floor bedrooms, the odours would be associable with their own meal-times, it is considered inappropriate to assess odour impact on new receptors within the new building further.

Wind Data

The closest meteorological station to the Site with usable windrose data is Gatwick observation station, located approximately 15km from the Site, and a recent windrose for this station is shown in **Appendix D**. Prevailing winds are primarily from the southwest, which means that for the most part, winds will tend to blow away from the existing receptors to the west, but towards new receptors within Maple Lodge to the northeast, and the existing receptors located beyond.

Analysis of the wind data shows the predominant wind speeds to range from 0.5 m/s to 7 m/s, with an average wind speed of 3.7 m/s and this value is used below in the discharge height considerations.

Odours will be most noticeable under conditions conducive to the transmission of odours across the Site, e.g., when wind speeds are relatively light (ranging from 0.2 to 1.2 m/s) such that significant mixing/dilution of odours does not occur. Local wind data has been analysed to establish the percentage per year when weather conditions are conducive for the transmission of any odours towards the sensitive development areas, i.e., when winds blow from between 180° to 250° relative to north for new receptors within Maple Lodge and the existing receptors beyond, and between 80° to 100° relative to north for existing receptors to the west, but wind speeds are low, <2 m/s, which will minimise the dispersion and dilution effects. The results show a total of 8.6% of the time for Maple Lodge and the existing receptors located beyond, and 3% of the time for existing receptors to the west.

Higher concentrations generally occur as wind speeds become lighter and as the atmosphere becomes more stable. Meteorological data is subdivided into different classes of stability referred to as Pasquill Stability Categories, ranging from A, very unstable, to G, very stable. Generally, category F (moderately stable) provides the worst case for sources up to 7 metres in height free of building wake effects. Such stable conditions tend to be most frequent during the night-time.

Consequently, of the % times identified above, as being most likely to cause emissions to be blown across sensitive receptors, a large percentage of this will arise during the night-time, i.e., when the kitchen is not in use.

Discharge Height

The kitchen discharge should ideally be outside the wake of nearby buildings to prevent downwash of emissions. A situation where the proposed outlet is higher than the eaves height of the main building by at least 1m will, therefore, minimise the effects of downwash caused by the new building. There are no other buildings within approximately 25m of the new building that would counter the effects of the discharge velocity and affect plume rise.

The discharge velocity influences the plume rise and therefore the effective discharge height. The effective discharge or stack height, H , is equal to the physical discharge height, h , plus the plume rise, Δh , and can be estimated using the following equation:

$$\Delta h = 3W * (d/U)$$

Where: W (m/s) is the efflux speed at the chimney top
 U (m/s) is the wind speed at the height of the stack
 d (m) is the internal diameter of the stack.

Guidance states that ideally W/U should be greater than 4, and that if W/U is less than 1.5, then down wash will occur resulting in a reduced effective stack height. However, the exit velocity will reduce downwash when it is greater than 1.5 times the wind speed at the stack exit.

The average wind speed is approximately 3.7 m/s, although this is the value measured at the normal wind vane height of 10m above ground level. The wind speed at the height of an extract outlet along the ridge line, which is estimated to be approximately 10.5m above local ground level, can be derived from the following equation:

$$U = u_0 * (h/h_0)^n$$

Where: u_0 is the weather station wind speed, m/s
 h is the elevation height, m
 h_0 is the weather station elevation, m, and
 n is the stability parameter, which is typically 0.5 under stable conditions and 0.25 under unstable conditions.

Therefore, for an average wind speed of 3.7 m/s, the actual wind speed at the kitchen extract outlet exit will be 3.79 m/s under stable conditions and 3.75 m/s under unstable conditions, which results in an average value of 3.77 m/s, i.e., similar to the measured data.

In order to reduce downwash, the exit velocity needs to be at least 1.5 times the wind speed of 3.77 m/s, which equates to a minimum efflux velocity of 5.7 m/s. The recommended minimum of 10 m/s would, therefore, be better than the minimum required to reduce downwash.

If one assumes a typical internal stack diameter for the kitchen extract to be approximately 0.5m, and applies this to the equation shown above ($\Delta h = 3W * (d/U)$) together with a wind speed of 3.77 m/s and an efflux velocity of 5.7m/s, the calculated plume rise (Δh) would be as shown in Table 5. Adding these values to the outlet height (10.5m) results in an effective stack height for odour dispersion purposes of 12.76m for a 5.7 m/s discharge velocity.

Table 5: Calculated Plume Rise, m

Criterion	Sound Level
Discharge velocity, m/s	5.7
Plume rise, m	2.26
Effective stack height, m	12.76

Table 6 shows the calculated W/U ratio for the typical range of local wind speeds and possible efflux speeds, with the data relating to the calculated mean wind speed at the stack exit highlighted.

Table 6: Ratio of W/U

W=efflux speed	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
U=wind speed															
0.5	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.5	0.7	1.3	2	2.7	3.3	4	4.7	5.3	6	6.7	7.3	8	8.7	9.3	10
2	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5
2.5	0.4	0.8	1.2	1.6	2	2.4	2.8	3.2	3.6	4	4.4	4.8	5.2	5.6	6
3	0.3	0.7	1	1.3	1.7	2	2.3	2.7	3	3.3	3.7	4	4.3	4.7	5
3.5	0.3	0.6	0.9	1.1	1.4	1.7	2	2.3	2.6	2.9	3.1	3.4	3.7	4	4.3
4	0.3	0.5	0.8	1	1.3	1.5	1.8	2	2.3	2.5	2.8	3	3.3	3.5	3.8
4.5	0.2	0.4	0.7	0.9	1.1	1.3	1.6	1.8	2	2.2	2.4	2.7	2.9	3.1	3.3
5	0.2	0.4	0.6	0.8	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3
5.5	0.2	0.4	0.5	0.7	0.9	1.1	1.3	1.5	1.6	1.8	2	2.2	2.4	2.5	2.7
6	0.2	0.3	0.5	0.7	0.8	1	1.2	1.3	1.5	1.7	1.8	2	2.2	2.3	2.5
6.5	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	1.5	1.7	1.8	2	2.2	2.3
7	0.1	0.3	0.4	0.6	0.7	0.9	1	1.1	1.3	1.4	1.6	1.7	1.9	2	2.1
7.5	0.1	0.3	0.4	0.5	0.7	0.8	0.9	1.1	1.2	1.3	1.5	1.6	1.7	1.9	2
8	0.1	0.3	0.4	0.5	0.6	0.8	0.9	1	1.1	1.3	1.4	1.5	1.6	1.8	1.9
8.5	0.1	0.2	0.4	0.5	0.6	0.7	0.8	0.9	1.1	1.2	1.3	1.4	1.5	1.6	1.8
9	0.1	0.2	0.3	0.4	0.6	0.7	0.8	0.9	1	1.1	1.2	1.3	1.4	1.6	1.7
9.5	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.1	1.2	1.3	1.4	1.5	1.6
10	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1	1.1	1.2	1.3	1.4	1.5

The information in Table 6 demonstrates that an efflux speed of 6 m/s or more is all that is required in order to achieve a ratio of 1.5 or more, which will at all times prevent downwash occurring for mean wind speed conditions.

For higher wind speeds, a higher discharge velocity is required in order to prevent downwash. However, higher wind speeds will also provide much greater mixing and hence dilution of any odours emitted from the stack, such that odour problems would be less likely to arise during conditions of high wind speed.

Guidance provides three options for achieving an acceptable standard of odour control by means of the discharge height, and these are that the discharge stack shall:

1. Discharge the extracted air not less than 1m above the roof ridge of any building within 20m of the building housing the commercial kitchen; or
2. If 1 cannot be complied with for planning reasons, then the extracted air shall be discharged not less than 1m above the roof eaves or dormer window of the building housing the commercial kitchen. Additional odour control measures may be required; or
3. If 1 or 2 cannot be complied with for planning reasons, then an exceptionally high level of odour control will be required.

There are no existing buildings within 20m of the proposed kitchen. In this situation, the guidance states that if the requirement under Point 1 cannot be complied with for planning reasons, then the extracted air shall be discharged not less than 1m above the roof eaves of the building housing the commercial kitchen, in which case additional odour control measures are recommended, such as those outlined in **Appendix E**. Therefore, the minimum discharge height for the proposed kitchen is for the extracted air to discharge not less than 1 m above the eaves of the building with additional odour controls as deemed necessary.

Point 3 deals with situations where Points 1 or 2 cannot be complied with for planning reasons, in which case an exceptionally high level of odour control will be required. It has been demonstrated that the actual situation at the proposed kitchen will correspond to Point 2, therefore, there is no requirement for an exceptionally high level of odour control.

The odour controls considered to meet best practice for Point 2 are also shown in **Appendix E** and, in order to meet the required low level of odour control, these are:

- i) Fine filtration or ESP following by carbon filtration (carbon filters rated with a 0.1 second residence time), or
- ii) Fine filtration followed by counteractant/neutralising system to achieve the same level of control as (i).

Based on the above assessments, the following odour control measures are recommended in order to meet the low standard of odour control defined by the EMAQ guidance, which is the standard required for premises that fall within the low to medium impact risk category, as determined for the proposed development.

1. The extracted air shall be discharged not less than 1m above the eaves of the building housing the commercial kitchen;
2. The discharge velocity shall be no less than 6 m/s in order to prevent downwash occurring for mean wind speed conditions, and ideally should be 10 m/s or more in order to achieve EMAQ's moderate dispersion rating; and
3. Odour control measures employed inside the kitchen shall include either:
 - i) Fine filtration or ESP following by carbon filtration (carbon filters rated with a 0.1 second residence time), or
 - ii) Fine filtration followed by counteractant/neutralising system to achieve the same level of control as (i).

The measures discussed above are consistent with the performance requirements listed in the best practice guide and will provide an acceptable standard of odour control that fully satisfies the requirements of relevant guidance aimed at preventing odour nuisance for sensitive premises in the vicinity.

Best practice requires that in order for the required standard of odour control to be sustained, an appropriate maintenance regime be implemented and regularly carried out. This is a matter that can be checked by the Local Planning Authority through their routine food hygiene inspections.



REGISTRATION OF AMENDMENTS

Date	Rev	Comment	Prepared By	Checked By	Approved By
May 2025	-	First issue	Neil Forsdyke MIOA Associate Acoustics and Air Quality Consultant	Daniel Newbery BSc (Hons) MIOA AIAQM MEnvSc Senior Acoustics and Air Quality Consultant	Tim Rose BA (Hons) MCIHT MTPS Regional Director

Appendices

- A. Assessment Criteria
- B. Environmental Sound Survey
- C. Floor and Elevation Plans
- D. Wind Rose Data (Gatwick Observation Station 2020 – 2024)
- E. Best practice for design and operation of commercial kitchen ventilation systems: performance requirements

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APPENDICES



APPENDIX A

Assessment Criteria

Noise

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

BS 4142 describes methods for rating and assessing industrial and/or commercial sound and includes, but is not limited to, the assessment of:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical equipment;
- Sound from the (un)loading of goods and materials at industrial/commercial premises; and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes such as that from forklift trucks on or around an industrial and/or commercial site.

The methods described in BS 4142 use outdoor sound levels to assess the likely effects of sound on people who are typically outside residential premises. Although indoor effects can be indicated where the façade composition is known. A summary of the approach set out in BS 4142 is set out below:

- Establish or predict the specific sound level of the source(s) by considering both the ambient (includes the source to be assessed) and residual (excludes the source to be assessed but includes all remaining sources) sound level;
- Measure the representative background sound levels, typically by measuring close to the receptor location;
- Rate the specific sound level to account for any distinguishing characteristics (see below);
- Estimate the impact by subtracting the background sound level from the rating level; and
- Consider the initial estimate of impact, as determined above, in the context of the noise and its environment.

The specific sound level is rated to account for distinguishing characteristics by using penalties for tonality, impulsivity, intermittency and other sound characteristics. The dominant acoustic characteristic should be applied to avoid large penalties which is in accordance with the Institute of Acoustics response to BS 4142.

The character corrections are flexible according to whether the acoustic character is just perceptible at the noise receptor, or is clearly perceptible or highly perceptible, and range from 0 to 6 dB for tonal noise, 3 to 9 dB for impulsive noise, and 3 dB for other non-tonal/impulsive acoustic characteristics.

An initial estimate of impact of the specific sound is obtained by subtracting the background sound level from the rating level. Typically, the greater the difference, the greater the magnitude of 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;
- At differences lower than +5 dB a low impact is likely, depending on the context. The lower the rating level is to the measured background sound level, the less likely it is that the specific sound source will have an impact.

The results of the initial assessment should then be considered in light of all pertinent contextual factors.

Odour

EMAQ 'Control of Odour and Noise from Commercial Kitchen Exhaust Systems'

The EMAQ guidance provides information on best practice techniques for the minimisation of odour and noise from kitchen exhaust systems. The document acknowledges that 'many kitchen systems are well designed, well maintained and seldom cause nuisance problems, but that others can provide a significant and recurring source of nuisance'. It is clear that if a new kitchen is designed in accordance with EMAQ's best practice then it will fall within the category that seldom causes nuisance problems.

Extracts from EMAQ's best practice relating specifically to odour control are presented in **Appendix E**.

Odour control must be designed to prevent odour nuisance in a given situation and to achieve this the EMAQ guidance provides a score methodology as a means of determining odour control requirements using a simple risk assessment approach. The odour control requirements considered by this approach are consistent with the performance requirements listed in the best practice guide presented in **Appendix E**.

Table 1 defines the impact risk and Table 2 the scoring procedures used to identify the risk.

Table 1: Significance Criteria for Defining Impact Risk

Impact Risk	Odour Control Requirement	Significance Score ^(a)
Low to Medium	Low level odour control	<20
High	High level odour control	20-35
Very High	Very high level odour control	>35

^(a) Based on the sum of contributions from dispersion, proximity of receptors, size of kitchen and cooking type.

Table 2: Score Methodology

Criteria	Rating		Details
Dispersion	Very poor	20	Low level discharge, into courtyard or restriction on stack
	Poor	15	Not low level but below eaves, or discharge at below 10 m/s
	Moderate	10	Discharging 1m above eaves at 10-15 m/s
	Good	5	Discharging 1m above ridge at 15 m/s
Proximity of receptors	Close	10	Closest sensitive receptor <20m from kitchen discharge
	Medium	5	Closest sensitive receptor between 20 and 100m from kitchen discharge
	Far	1	Closest sensitive receptor >100m from kitchen discharge
Size of kitchen	Large	5	More than 100 covers or large sized take away
	Medium	3	Between 30 and 100 covers or medium sized take away
	Small	1	<100 covers or small take away
Cooking type (odour and grease loading)	Very high	10	Pub (high level of fried food), fried chicken, burgers or fish & chips
	High	7	Kebab, Vietnamese, Thai or Indian
	Medium	4	Cantonese, Japanese or Chinese
	Low	1	Most pubs, Italian, French, Pizza or steakhouse



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APPENDICES



APPENDIX B

Environmental Sound Survey

Equipment

Measurements were taken using Class 1 integrating/averaging SLM housed in environmental protection apparatus. The SLM was installed in a free field position at a height of 1.5m above local ground level, and field calibrated before and after the survey using a Class 1 calibrator, with no significant drift in calibration noted.

The SLM was set up to capture the following parameters at a minimum: L_{A90} , L_{Aeq} and L_{AFmax} values, and full details of the equipment used to undertake the survey are presented in Table 1.

Table 1: Equipment and Calibration Details

Description	Manufacturer & Type No.	Serial No.	Calibration Due Date
Sound Level Meter	Type NOR140	1407932	22/02/2027
Pre-Amplifier	Type 1209	23695	
Microphone	Type 1225	505583	
Calibrator	Norsonic 1255	125525772	18/11/2025

Meteorological Conditions

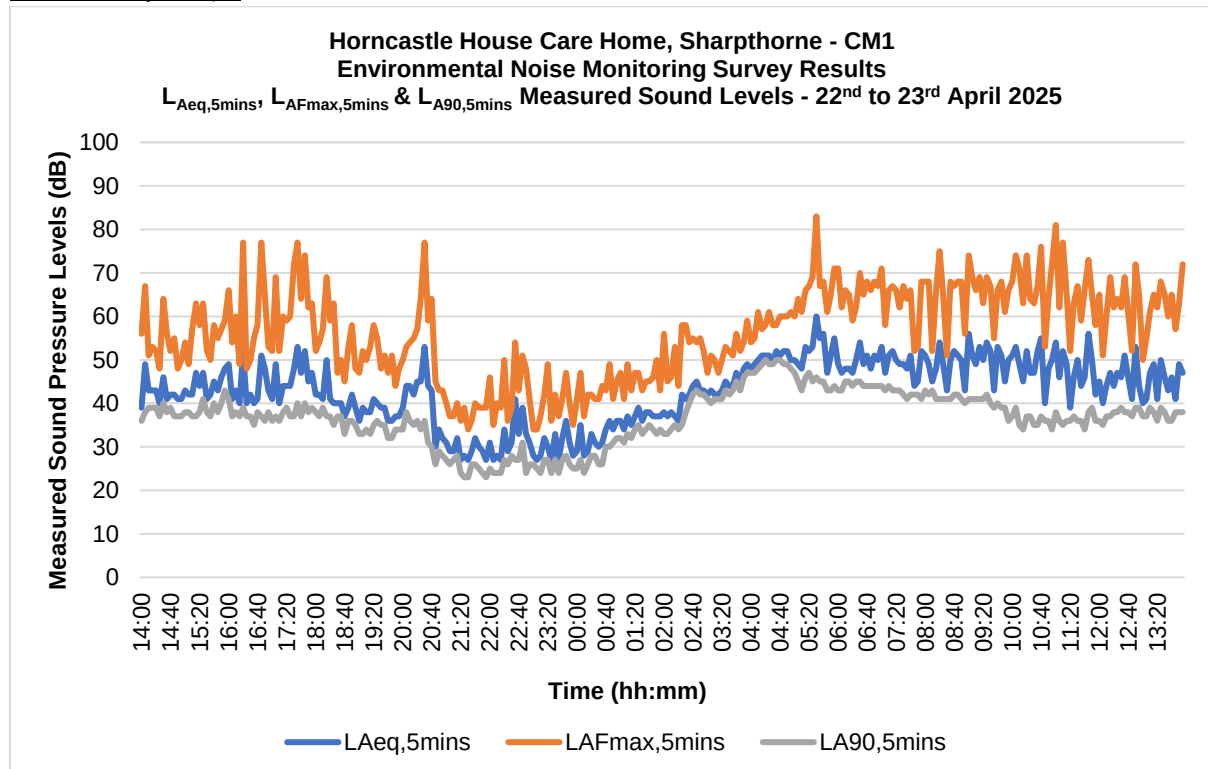
During setup of the SLM, weather conditions were noted to be warm, with south westerly winds of up to 2.7 m/s. On collection, conditions were overcast, with a very light drizzle and no wind.

It can therefore be concluded that there were no significant adverse meteorological conditions that could influence the survey outcomes.

Observations

Site notes indicate the dominant source of noise influencing sound levels across the Site to be from distant road traffic and bird song.

Time History Graph



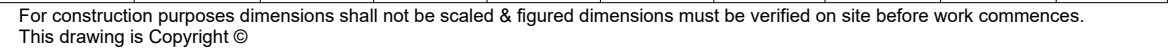


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APPENDICES

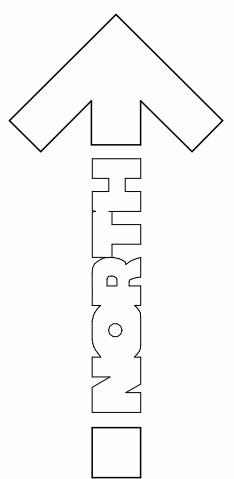


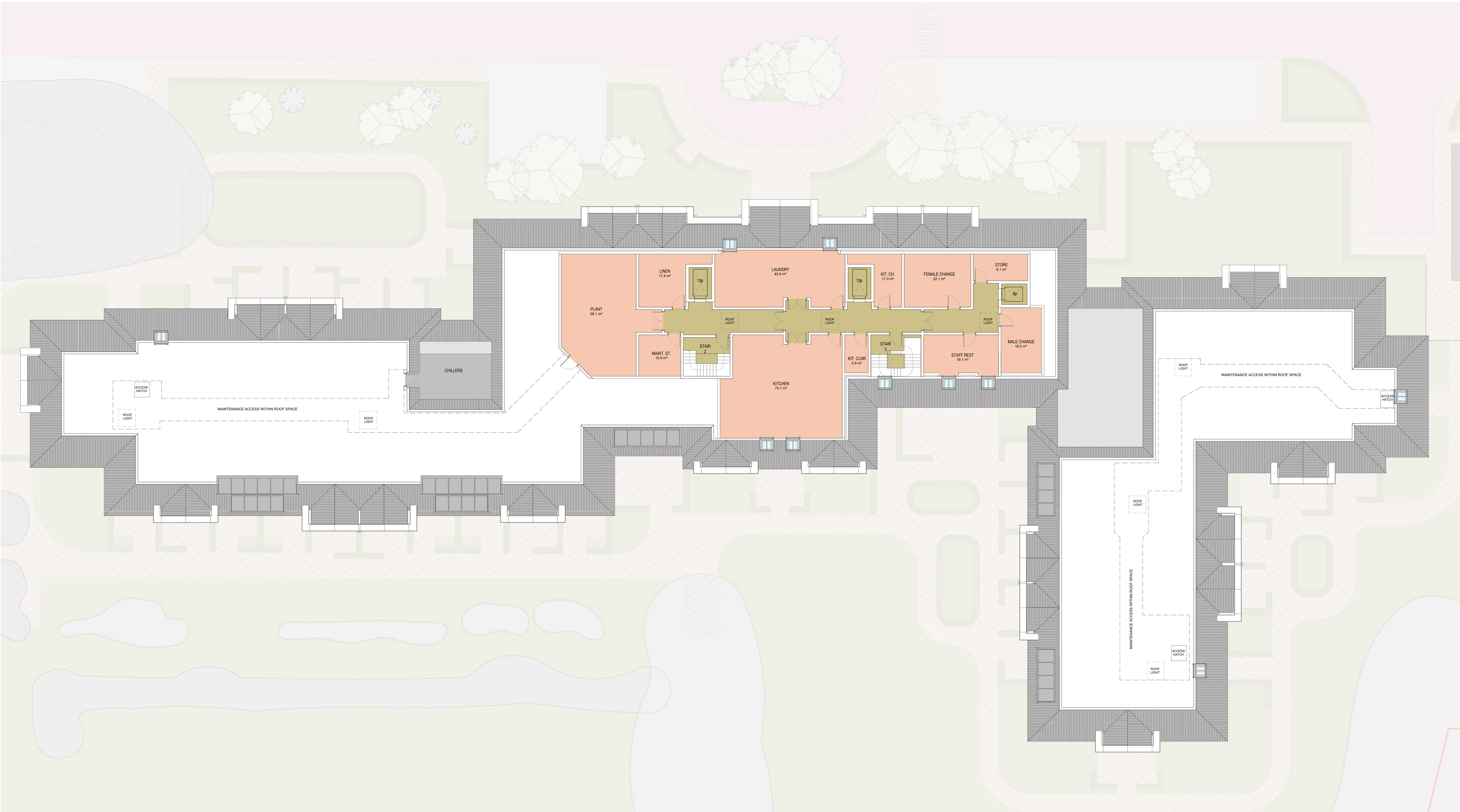
APPENDIX C





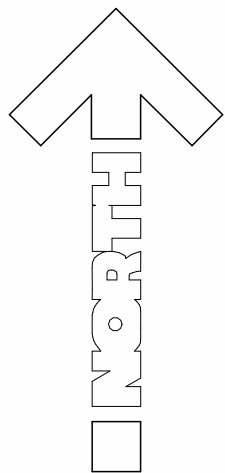
-  CIRCULATION ROUTES
-  COMMUNAL / ACTIVITY SPACE
-  EXTERNAL AREAS
-  RESIDENT BEDROOM
-  STAFF AND SERVICE AREA

38



SECOND FLOOR PLAN
411 m²
SERVICE WING

- KEY:
- CIRCULATION ROUTES
 - EXTERNAL AREAS
 - STAFF AND SERVICE AREA



P6	ISSUED FOR COORDINATION	MD	VK	03/04/2025
P5	DESIGN REVIEW PANEL	MD	PK	12/12/2024
P4	ISSUED FOR COMMENTS	MD	PK	28/06/2024
P3	ISSUED FOR COMMENTS	MD	PK	30/05/2024
P2	ISSUED FOR COMMENTS	MD	PK	01/03/2024

Rev.	Description	Author	Checked	Date
01628 665131	enquiries@carless-adams.co.uk			
carless-adams.co.uk				

Client: SPLENDID HEALTHCARE

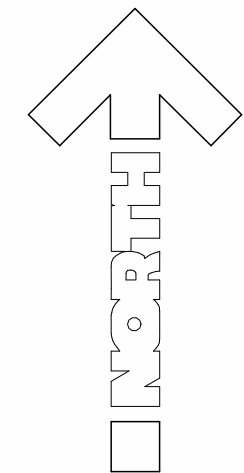
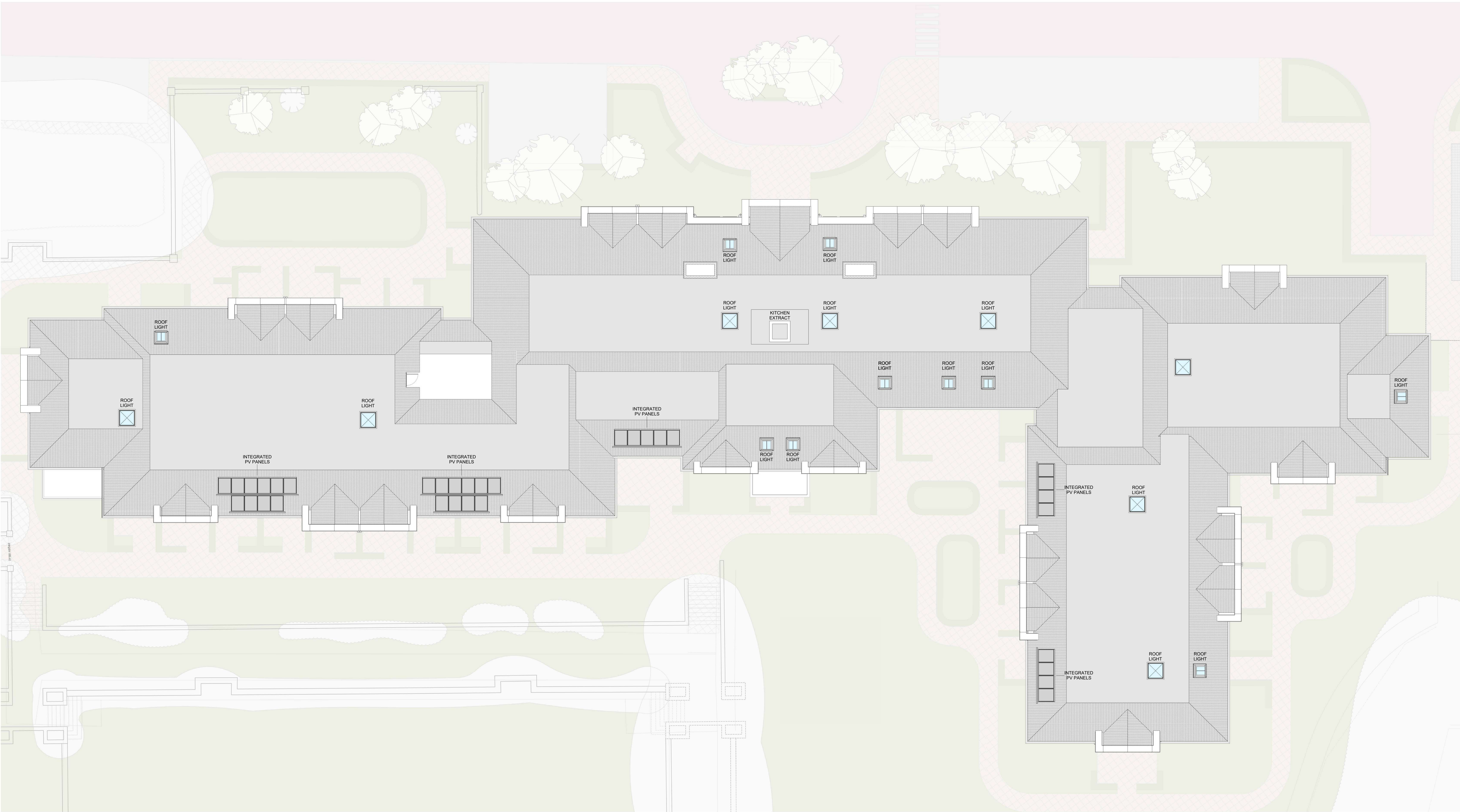
Project: HORNCastle
EAST GRINSTEAD

Title: SECOND FLOOR PLAN	CAP no. A
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scale: 1 : 100	author: SR	CHKD: MD	date: 21/02/2024	sheet size: A0
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project: 1034	org: CA	zone: 01	level:	type: A	class:	num: 12	status:	rev: P6
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P3

ISSUED FOR COORDINATION

P2

DESIGN REVIEW PANEL

P1

ISSUED FOR COMMENTS

MD

VK

03/04/2025

MD

PK

12/12/2024

MD

PK

28/06/2024

Rev.	Description	Author	Checked	Date
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Client SPLENDID HEALTHCARE				
Project HORNCastle EAST GRINSTEAD				
Title ROOF PLAN				CAP no. A
Scale 1 : 100	author SR	CHKD MD	date 28/06/2024	sheet size A0
project 1034	org. CA	zone 01	level type A	num. 13
status P3				rev. P3

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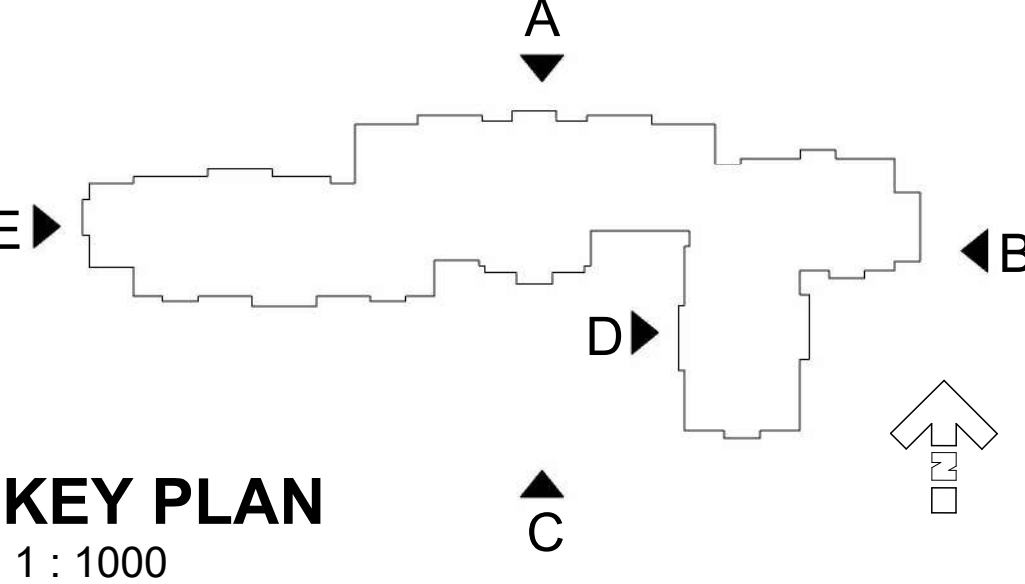
A. NORTH ELEVATION - PARTIAL
1 : 100



A. NORTH ELEVATION - PARTIAL
1 : 100



A. NORTH ELEVATION
1 : 200



P2

ISSUED FOR COORDINATION

P1

DESIGN REVIEW PANEL

MD

VK

03/04/2025

Rev.

Description

Author

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Date

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Project

HORNCastle
EAST GRINSTEAD

Title

ELEVATIONS - SHEET 1-3

CAP no.

A

scale

As indicated

author

SR

chk'd

MD

date

21/02/2024

sheet size

A1

project.

1034

org.

CA

zone.

01

level.

type.

role.

A

class.

num.

30

status.

rev.

P2

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03/04/2025 15:11:13



C. SOUTH ELEVATION - PARTIAL

1 : 100



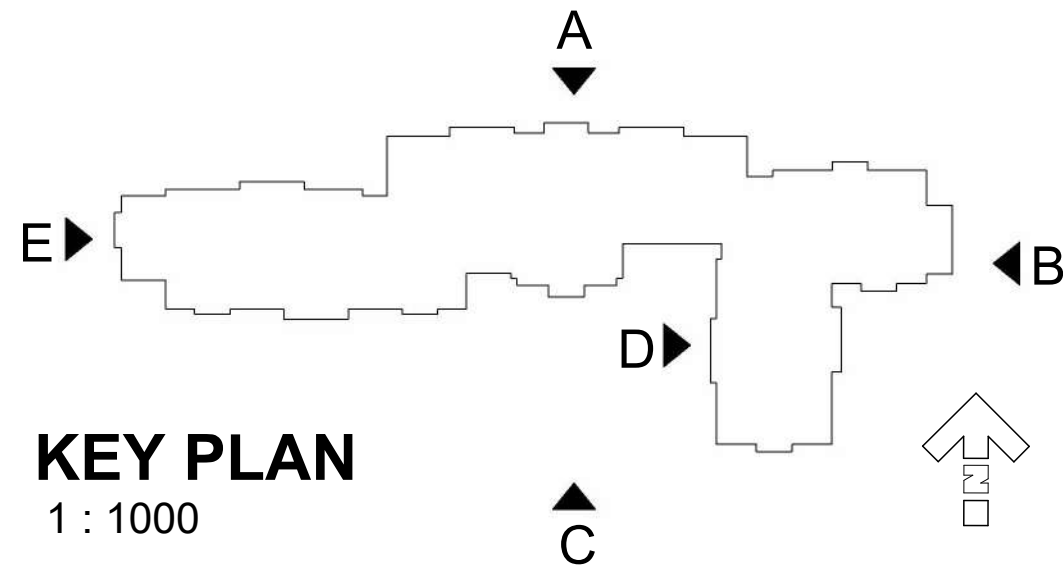
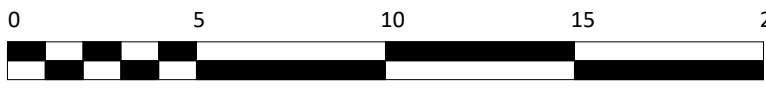
C. SOUTH ELEVATION - PARTIAL

1 : 100



C. SOUTH ELEVATION

1 : 200



KEY PLAN

1 : 1000

P2	ISSUED FOR COORDINATION	MD	VK	03/04/2025
P1	DESIGN REVIEW PANEL	MD	PK	12/12/2024
Rev.	Description	Author	Checked	Date

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Project	HORNCastle EAST GRINSTEAD
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Title	ELEVATIONS - SHEET 2-3	CAP no.	A
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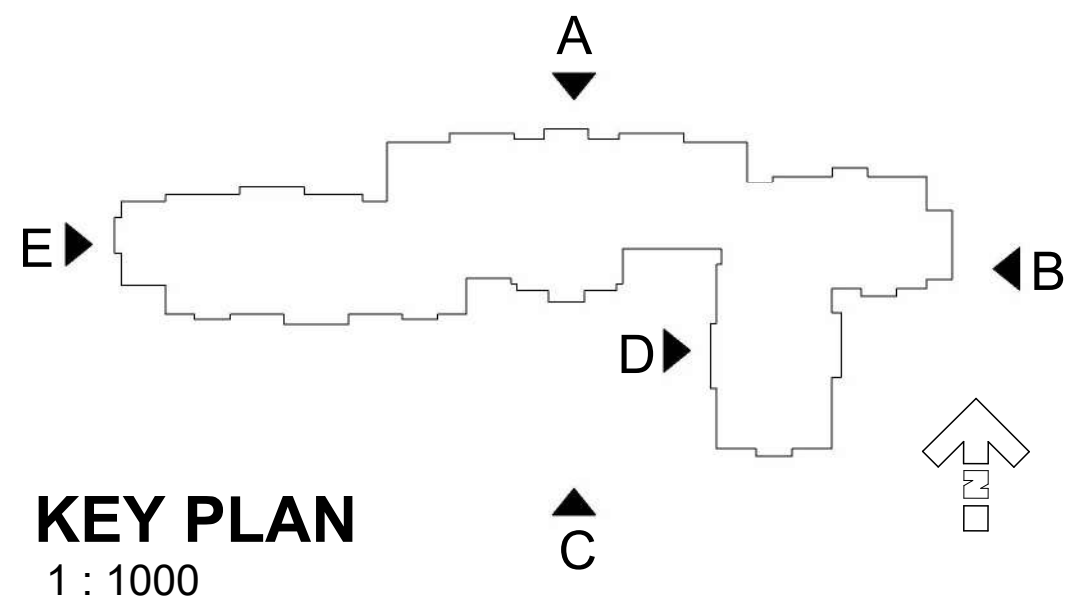
B. EAST ELEVATION
1 : 100



D. WEST ELEVATION
1 : 100



E. WEST ELEVATION
1 : 100



KEY PLAN
1 : 1000



P2	ISSUED FOR COORDINATION	MD	VK	03/04/2025
P1	DESIGN REVIEW PANEL	MD	PK	12/12/2024

Rev.	Description	Author	Checked	Date

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Project

HORNCastle
EAST GRINSTEAD

Title

ELEVATIONS - SHEET 3-3

CAP no.

A

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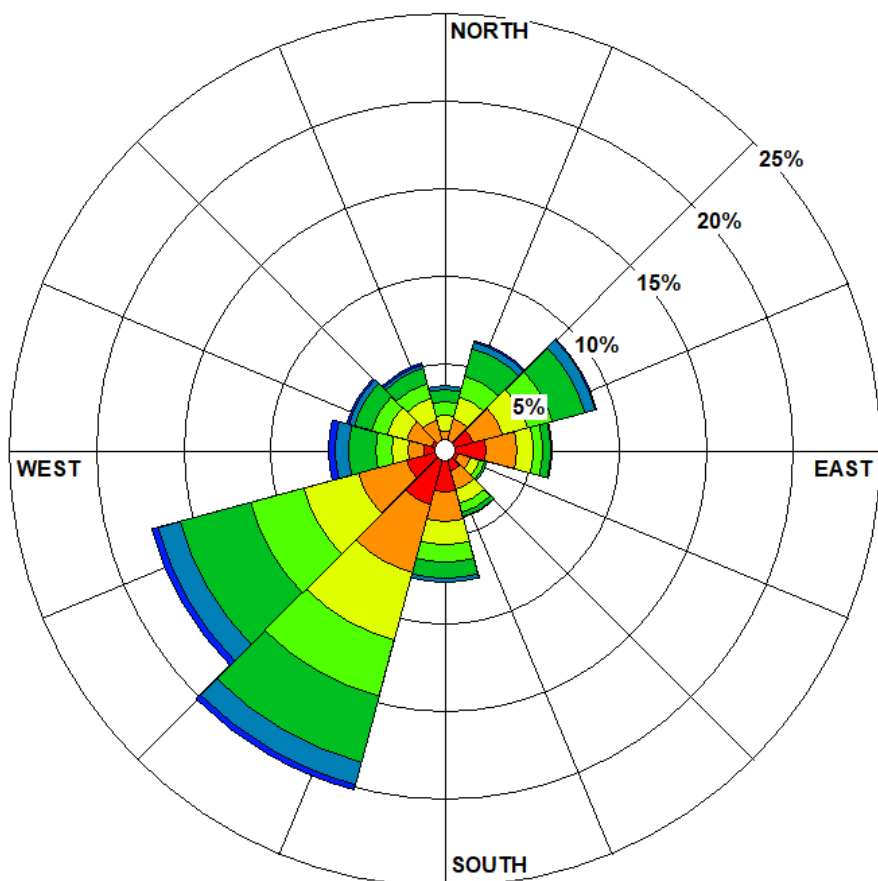


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APPENDICES

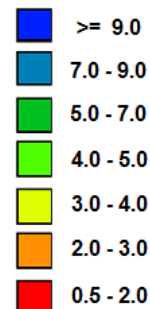


APPENDIX D



Gatwick, UK 2020-2024

Wind Speed
(m/s)



Calms: 0.65%

Gatwick, UK winds 2020-2024.													
FREQUENCY TABLE	Wind direction (deg. True) (Note 1)												
	346	16	46	76	106	136	166	196	226	256	286	316	
	to	to	to	to	to	to	to	to	to	to	to	to	
Mean wind speed (m/s)	15	45	75	105	135	165	195	225	255	285	315	345	ALL OBS
0													286
0.5 TO 2	141	253	729	1058	383	549	1051	1427	1002	536	357	214	7700
2 TO 3	350	565	787	756	297	486	745	1746	1244	398	656	582	8612
3 TO 4	414	576	648	415	229	368	590	1765	1435	403	523	569	7935
4 TO 5	332	539	617	243	136	223	419	1456	1387	410	381	379	6522
5 TO 7	306	709	845	194	79	119	415	1697	1816	679	457	383	7699
7 TO 9	76	162	290	33	3	9	88	564	558	352	133	94	2362
>=9	11	49	36	2	0	0	24	166	170	156	48	38	700
Missing/Incomplete													2032
ALL OBS	1630	2853	3952	2701	1127	1754	3332	8821	7612	2934	2555	2259	43848
PERCENTAGE TABLE	Wind direction (deg. True)												
	346	16	46	76	106	136	166	196	226	256	286	316	
	to	to	to	to	to	to	to	to	to	to	to	to	
Mean wind speed (m/s)	15	45	75	105	135	165	195	225	255	285	315	345	ALL OBS
0													0.652%
0.5 TO 2	0.322%	0.577%	1.663%	2.413%	0.873%	1.252%	2.397%	3.254%	2.285%	1.222%	0.814%	0.488%	17.561%
2 TO 3	0.798%	1.289%	1.795%	1.724%	0.677%	1.108%	1.699%	3.982%	2.837%	0.908%	1.496%	1.327%	19.641%
3 TO 4	0.944%	1.314%	1.478%	0.946%	0.522%	0.839%	1.346%	4.025%	3.273%	0.919%	1.193%	1.298%	18.097%
4 TO 5	0.757%	1.229%	1.407%	0.554%	0.310%	0.509%	0.956%	3.321%	3.163%	0.935%	0.869%	0.864%	14.874%
5 TO 7	0.698%	1.617%	1.927%	0.442%	0.180%	0.271%	0.946%	3.870%	4.142%	1.549%	1.042%	0.873%	17.558%
7 TO 9	0.173%	0.369%	0.661%	0.075%	0.007%	0.021%	0.201%	1.286%	1.273%	0.803%	0.303%	0.214%	5.387%
>=9	0.025%	0.112%	0.082%	0.005%	0.000%	0.000%	0.055%	0.379%	0.388%	0.356%	0.109%	0.087%	1.596%
Missing/Incomplete													4.634%
ALL OBS	3.717%	6.507%	9.013%	6.160%	2.570%	4.000%	7.599%	20.117%	17.360%	6.691%	5.827%	5.152%	100.000%



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APPENDICES



APPENDIX E

Best Practice for Design and Operation of Commercial Kitchen Ventilation Systems: Performance Requirements

Minimum Ventilation Rates

- An internal ambient air temperature of 28°C maximum
- Maximum humidity levels of 70%
- Internal noise level should be between NR40 – NR50
- Dedicated make up air system to be approximately 85% of the extract flow rate
- Minimum air change rate of 40 per hour (bases on canopy and general room extraction)
- *Extract flow rates for a commercial kitchen should be calculated using the thermal convection method only, as this overcomes heat and odour variation between different types of cooking appliances. Other less reliable methods remain available.*

Minimum Requirements for Canopy

Velocity requirements:

- Light loading – 0.25 m/s (applies to steaming ovens, boiling pans, bain maries and stock pot stoves)
- Medium loading – 0.35 m/s (applies to deep fat fryers, bratt pans solid and open top ranges and griddles)
- Heavy loading – 0.5 m/s (applies to chargrills, mesquite and specialist broiler units)

Sizing:

- *Ideally, the plan dimensions of the canopy shall always exceed the plan dimensions of the catering equipment by a minimum of 250 mm on each free side*
- *This should be increased to 600 mm in front of combination steaming ovens to cope with the steam or fumes released when the doors of the appliance are opened. Solid fuel appliances must have an overhang of 300 mm from the door open position*

Materials:

- A material that would comply with the food hygiene requirement is stainless steel

Grease Separation:

- *The grease extracted by the separators shall be collected and removed so that it will not accumulate in either the canopy plenum or the ductwork system, or fall back onto the cooking surface*
- *The separator shall be constructed so that there are no sharp edges or projections and shall be easily removable for regular cleaning*
- *Primary filters that retain grease within the filtration matrix until cleaned, shall not be used (not to be confused with those designed with purpose made integral collection reservoirs)*

Minimum Requirements for Duct Work

- All duct work should be Low Pressure Class 'A' and constructed in accordance with BESA Specification DW/144 with a minimum thickness of 0.8 mm
- Duct velocities should be as follows:

	Supply (m/s)	Extract (m/s)
Main runs	6 – 8	6 – 9
Branch runs	4 – 6	5 – 7
Spigots	3 – 5	5 – 7

- All internal surfaces of the ductwork should be accessible for cleaning and inspection. Access panels should be installed at 2.0 m centres and should be grease tight using a heat proof gasket or sealant
- Duct work should not pass through fire barriers
- Where it is not possible to immediately discharge the captured air, fire rated duct work may be required

Minimum Requirements for Fans

Fans should be selected to handle the design resistance with an additional 10% airflow and 20% pressure margin allowed to suit possible extensions to the original kitchen plan.

Backward curved centrifugal, mixed flow or axial flow impellers are preferred as they are less prone to unbalance and are more easily maintained and cleaned due to their open construction. Fixed or adjustable metal impellers with a robust and open construction shall be used.

Care shall always be taken with the location of the supply and extract fans to ensure that there is sufficient space for regular cleaning and maintenance. Limited space shall not restrict selection of the correct fan.

Drain holes should be fitted.

For fans serving canopies above solid fuel burning appliances, the motor must be out of the airstream and impellers must have metal blades.

Minimum Requirements for Odour Control

Objectives

- for new premises or premises covered by planning conditions restricting the impact of odour the system shall be designed to prevent harm to the amenity.
- for existing premises not covered by planning conditions restricting the impact of odour, the system shall be designed to avoid statutory nuisance and shall comply with the principles of Best Practical Means.
- *The design of a control system should recognise that there are two phases of contamination in a kitchen exhaust; particulate (grease, smoke, hydrocarbons/VOC) and gaseous (odour). The particulate phase needs to be removed prior to dealing with the gaseous phase.*

To achieve these objectives the odour control system shall include an adequate level of:

1. *Particulate and odour control*; and
2. stack dispersion.

The overall performance of the odour abatement system will represent a balance of 1 and 2.

Discharge stack

The discharge stack shall:

1. Discharge the extracted air not less than 1 m above the roof ridge of any building within 15 m of the vent serving the commercial kitchen. *Additional odour control measures may still be required depending on the cooking type and frequency.*
2. If 1 cannot be complied with for planning reasons, then the extracted air shall be discharged not less than 1 m above the roof eaves or dormer window of the building housing the commercial kitchen. *A higher level of odour control measures than those required in part 1 may be required.*
3. If 1 or 2 cannot be complied with for planning reasons, then *higher level of odour control measures than those required in part 1 or 2 may be required.*

Odour arrestment plant performance

Low to medium level control may include:

1. Fine filtration or ESP followed by carbon filtration (carbon filters rated with a 0.1 second residence time).
2. Fine filtration followed by counteractant/neutralising system to achieve the same level of control as 1.

High level odour control may include:

1. Fine filtration or ESP followed by carbon filtration (carbon filters rated with a 0.2 - 0.4 second residence time).
2. Fine filtration or ESP followed by UV ozone system to achieve the same level of control as 1.

Very high level of odour control may include:

1. Fine filtration or ESP followed by carbon filtration (carbon filters rated with a 0.4 – 0.8 second residence time).
2. Fine filtration or ESP followed by carbon filtration and by counteractant/neutralising system to achieve the same level of control as 1.
3. Fine filtration or ESP followed by UV ozone system to achieve the same level of control as 1.

In some instances where very high levels of control are required combinations or sacrificial levels of filtration may be employed.

Maintenance must be carried out to ensure these performance levels are always achieved.

Minimum Requirements for Noise Control

For new premises or premises covered by planning conditions restricting the impact of noise the system shall be designed to prevent an acoustic impact on the external environment and therefore harm to the amenity, as well as ensuring that noise exposure of kitchen staff does not constitute an occupational noise problem (see Control of Noise at Work Regulations 2005).

For existing premises not covered by planning conditions restricting the impact of noise, the system shall be designed to avoid statutory nuisance and shall comply with the principles of Best Practicable Means.

To achieve these objectives the noise control system shall include:

- control of noise at source to the greatest extent possible; and
- control of noise to the environment by taking acoustic considerations into account within duct, grille and termination design.

The control system should meet the requirements laid down in BS4142: 2014 "Method for Rating and assessing industrial and commercial sound" or local standards where they exist (whichever is more appropriate).

Where in-line attenuators are used they shall be constructed so that there is no grease impregnation into the acoustic media. A protective membrane shall be specified for this purpose or this will reduce the design performance of the attenuator. This should be taken into account when selection is made.

It may be necessary to apply additional acoustic controls such as in line silencer or splitter attenuator after grease removal stages. Care should be taken to ensure that all such elements are capable of being accessed for cleansing purposes.

Minimum Requirements for Fire Suppression

Proprietors of commercial kitchens are under a duty to ensure that the fire precautions meet the requirements of *The Regulatory Reform (Fire Safety) order 2005*.

Minimum Requirements for Wood Burning Appliances

When serving a canopy above a wood burning appliance, the complete extract ductwork system shall be:

- *Manufactured from stainless steel*
- *Constructed to DW/144 specification*
- *Have a minimum of 2-hour fire rating, tested and assessed to the latest version of BS476 part 24*

Surface temperatures can reach in excess of 250°C so in these instances, in accordance with Building Control, the ductwork should be insulated to avoid heat transfer to adjacent combustible materials.

Solid Fuel Appliances should be considered separately when designing a safe and effective ventilation/control system.

Maintenance

Proprietors of commercial kitchens have a duty to ensure that the ventilation system serving their kitchen are maintained and operated effectively. Good maintenance is a prerequisite for ensuring that a system complies with Best Practicable Means under statutory nuisance provision and will form a key element of any scheme designed to minimise harm to the amenity under planning regulation. Good maintenance is required by the food hygiene regulations and will also minimise the risk of fire *and minimise noise*. The recommended cleaning period for grease extract system ductwork is:

<u>Grease loading</u>		<u>Daily usages</u>	<u>Cleaning interval (months)</u>
Heavy use	Heavy/continuous grease production	6 – 12 hours	3-6 months
		12 -16 hours	2-3 months
Moderate use	Moderate grease production	6 – 12 hours	6-12 months
		12 -16 hours	3-4 months
Light use	No significant grease production	6 – 12 hours	12 months
		12 -16 hours	6 months

Recommendations for maintenance of odour control system include:

- System employing fine filtration and carbon filtration
 - Change fine filters every two weeks
 - Change carbon filters every 4 to 6 months
- Use a system employing ESP and other in line abatement, typically
 - *ESP systems cleaned, and sump emptied on a four weekly basis.*
 - *UV-C systems used in line, cleaned on a four weekly basis*
 - *Side Stream UV-C systems, cleaned every 3 to 6 months.*
 - *Carbon filters with ESP pre-treatment change carbon filter every 6 to 12 months.*

These time frames may increase or reduce for extreme or very light applications.