DZLM Ltd

49 Willow Walk, London, NW3 1TS

Odour Appraisal

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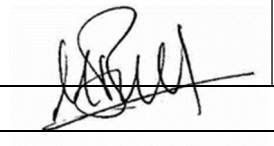
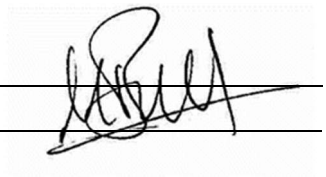
		Signature			
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1 Introduction

Ove Arup and Partners Ltd (Arup) has been commissioned by DZLM Ltd to undertake an odour appraisal for a proposed change of use at 49 Willow Walk, from the existing use as pottery studio (Class use: sui-generis) to a children's theatre at basement level, and a bookshop, café and workshop at ground floor level (Class use: sui-generis).

The proposal includes the addition of a café at ground floor level and the planning authority (London Borough of Camden) has requested that an odour appraisal be undertaken to determine the likely risk of odour at nearby residential properties.

This report provides background detail on odours, the assessment of odours from commercial kitchens and provides the results of the odour appraisal that follows guidance from the Department of Environment, Food and Rural Affairs (Defra) and the Institute of Air Quality Management (IAQM). The appraisal results in recommendations for the level of odour mitigation required and how this can be achieved.

2 Odour – Background and Guidance

2.1 Guidance

The Department of Environment, Food and Rural Affairs (Defra) produced guidance on the Control on Odour and Noise from Commercial Kitchen Exhaust Systems in January 2005[1]. The guidance was withdrawn in September 2017 but it provides useful background information and an odour risk assessment method that is still frequently applied at planning.

The Defra guidance notes that odour is the response of our brains to chemicals in the atmosphere that we breathe. The human nose is very sensitive to odour and can detect the presence of some chemicals at very low concentrations that would be difficult for instruments to measure. The environment is rarely "odour free" even in places that are perceived to be clean such as rural areas or by the sea. Our response to odours depends on four interlinked (sensory) characteristics:

- Hedonic tone: this is a judgement of the relative pleasantness or unpleasantness of an odour made by assessors in an odour panel;
- Quality/Characteristics: this is a qualitative attribute which is expressed in terms of "descriptors", e.g. "fruity", "almond", "fishy". This can be of use when establishing an odour source from complainants' descriptions;
- Concentration: the "amount" of odour present in a sample of air. It can be expressed in terms of parts per million, parts per billion or in mg/m^3 of air for a single odorous compound. More usually a mixture of compounds is present and the concentration of the mixture can be expressed in odour units per cubic metre (ou_E/m^3) (see definition below); and
- Intensity: is the magnitude (strength) of perception of an odour (from faint to strong). Intensity increases as concentration increases but the relationship is logarithmic. Increases or decreases in concentration of an odour do not always produce a corresponding proportional change in the odour strength as perceived by the human nose.

The most commonly used attribute is the concentration of odours; this is measured in European odour units (ou_E/m^3). This is measured by using a device known as an olfactometer which presents a sample of odour at different dilutions to a trained panel. The panel is asked whether they are able to detect the odour at various concentrations. Once only 50% of the panel can detect the odour it is considered to be at its "Detection Threshold". The odour concentration at the Detection Threshold is defined to be 1 ou_E/m^3. For instance, if an odour sample has been diluted in an olfactometer by a factor of 10,000 to reach the detection threshold, then the concentration of the original sample is 10,000 ou_E/m^3.

Defra notes in its general Odour Guidance for Local Authorities[2] (also withdrawn) that 5 ou_E/m^3 would be a 'faint' odour whilst 10 ou_E/m^3 would be considered a

[1] Defra, Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems, January 2005.
[2] Defra, Odour Guidance for Local Authorities, March 2010.

'distinct' odour. Generally, an average person would be able to recognise the source of an odour at about 3 ou_E/m^3 although this can depend on the relative offensiveness of the odour. Background odour levels can be some 5-60 ou_E/m^3 or more[2].

The Local Authority guidance notes that the main issue with odour is its ability to result in an effect that is "objectionable". The guidance notes that an offensive odour can occur at concentrations of compounds that are far below the level that would result in an effect on the physical health of humans.

The Defra kitchen guidance notes that there are three factors that influence the production of odour from a commercial kitchen:

- Size of the facility – This influences the volume of ventilation air handled and the intensity of the odour;
- Type of food prepared – This affects the chemical constituents in the ventilation air; and
- Type of cooking appliances used – This dictates the level of fat, water and the temperature of the ventilation air.

In general, the amount of odour released depends on the amount of oil/grease in the vented air and the quantities of spices used in the cooking. Hence deep fat frying and open grills and the cooking of more highly spiced food result in the highest odour releases.

The guidance notes that existing premises should have systems designed to comply with the principles of Best Practical Means and these should be achieved with an adequate level of odour control and stack dispersion. It notes that the discharge stack should ideally be located at least 1m above the roof ridge or not less than 1m above the roof eaves (in the latter case, additional odour control measures may be required). Where this cannot be achieved, then odours need to be reduced by control equipment and the guidance details how different levels of mitigation can be achieved to allow a low level ventilation system to work successfully.

Annex C of the guidance provides a risk assessment framework for odour (see Table 1 below). This examines four factors - the location of the exhaust vent, the proximity of sensitive receptors, the size of the kitchen and the type of food cooked and allocates a score to give an overall risk rating from three possible levels Low to Medium, High and Very High.

Table 1: DEFRA Guidance Risk Assessment Framework

Criteria	Score	Score	Details
Dispersion	Very poor	20	Low level discharge, 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 less than 20m from kitchen discharge
	Medium	5	Closest sensitive receptor between 20 and 100m from kitchen discharge
	Far	1	Closest sensitive receptor more than 100m from kitchen discharge
Size of Kitchen	Large	5	More than 100 covers or large take away
	Medium	3	Between 30-100 covers or medium takeaway
	Small	1	Less than 30 covers or small take away
Cooking type (odour and grease loading)	Very high	10	Pub (with high level of fried food), fried chicken, burgers or fish and chips
	High	7	Kebab, Vietnamese, Thai or Indian
	Medium	4	Cantonese, Japanese or Chinese
	Low	1	Most pubs, Italian, French, Pizza or Steakhouse

Each of the four factors is scored according to the criteria above and a total "significance score" obtained. This score is used to assess the level of odour control required for the particular situation as shown in Table 2.

Table 2: Risk Assessment Framework Significance

Impact Risk	Odour Control Requirement	Significance Score
Low to Medium	Low Level Odour Control	Less than 20
High	High Level Odour Control	20-35
Very High	Very High Level Odour Control	More than 35

The guidance on odour for Local Authorities issued by Defra[2] also contains information on odour assessment but, whilst this contains useful background information and guidance, it refers back to the Kitchen Ventilation guidance[1] in the case of restaurant odour.

2.1.1 IAQM Guidance

The Institute of Air Quality Management (IAQM) produced guidance in 2014[3] (updated in 2018) with the specific intention to provide advice for "assessing odour impacts for planning purposes". It recommends various assessment techniques including the use of a Source, Pathway, Receptor (SPR) model. The risk of an adverse odour impact is determined by examining the source characteristics, how effectively the odours can travel from the Source to a Receptor (i.e. the Pathway) and examining the sensitivity of the Receptor. Example risk factors presented in the guidance are shown in Table 3.

Table 3: IAQM Source Pathway Receptor Approach

Source Odour Potential	**Pathway Effectiveness**	**Receptor**
Factors affecting the source odour potential include: • The magnitude of the odour release • How inherently odorous the compounds are • The unpleasantness of the odour	Factors affecting the odour flux to the receptor are: • Distance from source to receptor • The frequency of winds from source to receptor • The effectiveness of any mitigation in reducing flux to the receptor • The effectiveness of dispersion/dilution in reducing the odour flux to the receptor • Topography and terrain	Use professional judgement based on the expectation of the users at the receptor location

[3] Bull M, IAQM, Guidance on the assessment of odour for planning, 2018.

2.2 Regulation

Generally, kitchen vents are not regulated under environmental legislation. At the planning stage the arrangements for ventilation will be examined to ensure compliance with building regulations. In addition, at planning, it is likely that the local environmental health officer would wish to be satisfied that a new vent would not give rise to a statutory nuisance under the Environmental Protection Act.

Kitchen ventilation systems are regulated under Health and Safety and Food Hygiene legislation and generally require that kitchens are provided with sufficient air to maintain a safe working environment. As a result, many kitchens have automatic systems that shut down the cooking appliances if the ventilation system fails.

3 Appraisal

3.1 Site location and surroundings

The site is at 49 Willow Walk, London NW3 1TS. The existing property is a pottery studio at ground level. Based on visual inspection the other properties in the area appear to have residential use.

The proposal includes a café with a limited menu, the cooked food menu is limited to pancakes and waffles. It is proposed that the extract from the cooking area will be vented using the existing chimney discharging above roof level. There is an existing flat on the fourth floor of 49 Willow Walk.

3.2 Defra Guidance Odour Risk Assessment

Following the Defra odour risk assessment framework, the proposed development scores as follows:

Dispersion	5	Good – discharging at high level above roof eaves;
Proximity of Receptors	10	Close – sensitive receptors less than 20m from kitchen discharge;
Size of Kitchen	1	Small – less than 30 Covers;
Cooking Type	1	Low – very limited cooked food menu not involving fat or spices.

The total score is 17 and therefore the proposal is considered to have a low to medium odour risk using the definitions in the Defra Guidance. The guidance does not provide any further information to differentiate between Low and Medium risk, however, this proposal involves a very limited menu selection which would not be expected to be highly odorous. The discharge is at high level through an existing chimney designed for effective dispersion of pollutants from combustion of fuels. It would therefore be reasonable to assume that the chimney location would provide good dispersion of any odours given that it is designed to disperse products of combustion from the fireplaces in the building. Therefore, the odour risk is considered to be Low.

3.3 IAQM SPR Assessment

One source, the high level exhaust, has been included in an odour risk assessment following the SPR approach detailed in the IAQM Odour Guidance[3]. The outcome of this assessment is shown in Table 4.

Table 4: Source Pathway Receptor Odour Assessment

Source	Source Odour Potential	Pathway Effectiveness	Receptor	Odour Risk and Justification
Chimney on roof	Very limited menu options of pancakes and waffles, low intensity of operation. Low levels of odours released.	Kitchen exhaust is at high level and close to some residential uses. However, chimney is at higher level and any residual odours should be carried above the nearby properties.	The area is residential	The odour risk is considered to be low. The cooking type proposed does not involve frying or cooking with spices or highly odorous foods. The kitchen extract discharge to atmosphere is at high level above the height of nearby properties.

As can be seen, the outcome of the Source Pathway Receptor Odour Assessment is that there is considered to be a low risk of adverse odour impacts from the current arrangements at the site.

4 Conclusions

An odour assessment has been carried out in accordance with the risk assessment methodology detailed in the appropriate Defra guidance. This takes into account the location of the extract vent, the distance to the nearest sensitive receptors, the size of the restaurant and the type of food being prepared. In addition, an SPR approach has been applied as detailed in the IAQM guidance

Following the Defra Odour Risk Assessment methodology shows that the potential odour risk for this proposed development is “Low to Medium”. Given the very limited menu options proposed for hot food and that no frying or use of spiced or highly odorous foods are proposed, it is considered that the outcome of the Defra assessment methodology is a Low risk of odour.

A SPR assessment method has also been undertaken as detailed in the IAQM guidance, this also concludes that the odour risk from this proposal is Low given the high level discharge and the very limited cooking proposed.

It is therefore concluded that the odour risk from the proposed café at 49 Willow Walk is Low and no further odour mitigation is required.