Twickenham Riverside

Kitchen Extract Odour Assessment

LONDON BOROUGH OF RICHMOND UPON THAMES

July 2021

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Kitchen Extract Odour Assessment Report

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1 Introduction

This report has been produced to set out the proposals for kitchen extract systems on the Twickenham Riverside development, in support of a full planning application for the site.

The Twickenham Riverside site lies in an architecturally sensitive area in the heart of Twickenham town centre and is prominent on the north bank of the River Thames, adjacent to the footbridge leading to Eel Pie Island. The proposals for the site have been developed to create a new public square and public amenity space for the town centre of Twickenham on the site of the existing Diamond Jubilee Gardens. Hereafter referred to as the Proposed Development, the description of development is as follows:

Demolition of existing buildings and structures and redevelopment of the site comprising residential (Use Class C3), ground floor commercial/retail/cafe (Use Class E), and public house (Sui Generis), boathouse locker storage and floating pontoon with associated landscaping, restoration of Diamond Jubilee Gardens and other relevant works.

The Proposed Development shall be constructed speculatively and no incoming tenants have been identified for either unit at the time of writing. It is proposed that the tenants shall be responsible for the fitting out of the units, including all kitchen equipment and any extract systems necessary.

This report has been produced following the framework set out within the EMAQ document 'Control of odour and noise from commercial kitchen exhaust systems.

A number of documents are available for guidance on best practice for the design and installation of commercial kitchen ventilation systems. Some of the more pertinent documents to the design of kitchen extraction systems are given below:

Title	Publisher	Date
Ventilation in catering kitchens Catering Information Sheet No 10	Health and Safety Executive (HSE)	2017
DW/172 Specification for kitchen ventilation systems	Building Engineering Services Association(BESA)	2018 (incorporates addendum April 2020)
Control of odour and noise from commercial kitchen exhaust systems	EMAQ (updated version of DEFRA document '*Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems' (2005))*	2018

2 Kitchen odour assessment – Wharf Lane

The Wharf Lane building of the Proposed Development shall include a commercial unit designated as a food and beverage (F&B) unit, intended for use as a public house. The unit occupies a space on the southern end of the Wharf Lane building adjacent to the embankment of the River Thames, covering a gross internal area of approximately 350m^2, notionally comprising approximately 249m^2 front of house area and 100m^2 kitchen and back of house area. Refer to Figure 1 below.

The unit will be fitted out to a 'shell-only' category as part of the Proposed Development works, and the incoming tenant shall be responsible for the full fitout including installation of kitchen and extraction equipment.

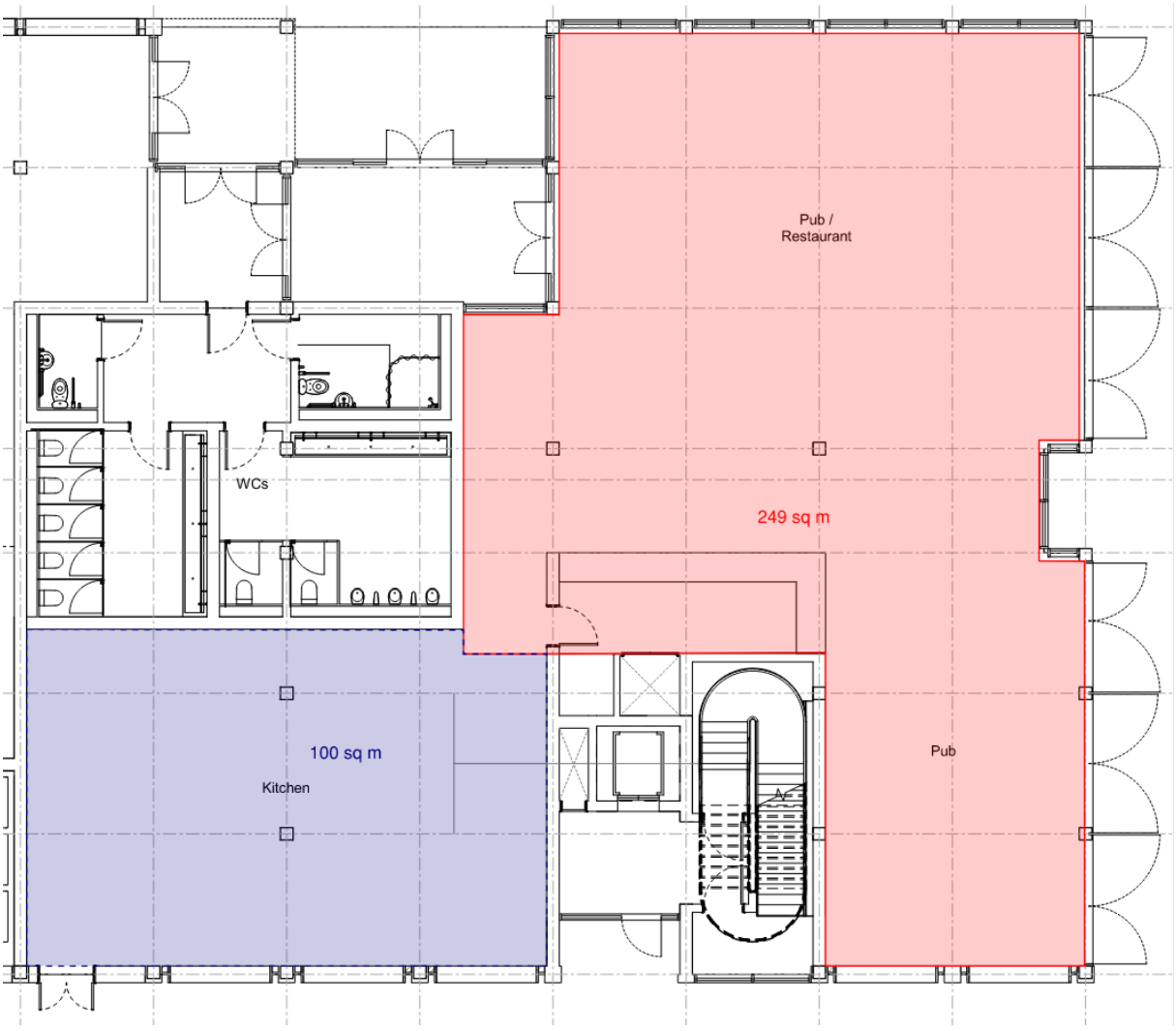

Figure 1: Wharf Lane pub commercial unit

The number of covers has been estimated based on a dining area of 190m^2 and a density of 1 diner per 2m^2, giving a total of 95 covers.

The F&B unit will be provided with a riser space of approximately 1.0m^2 within which kitchen exhaust ductwork and/or other necessary equipment may be installed. Refer to Figure 2 below.

The closest sensitive receptor would be a residential unit window on the same storey as the kitchen exhaust and located approximately 3m away. It should be noted that the final positioning of the kitchen exhaust is to be determined, and this is considered as a worst case scenario. This can be seen in the 3D image in Figure 3 below.

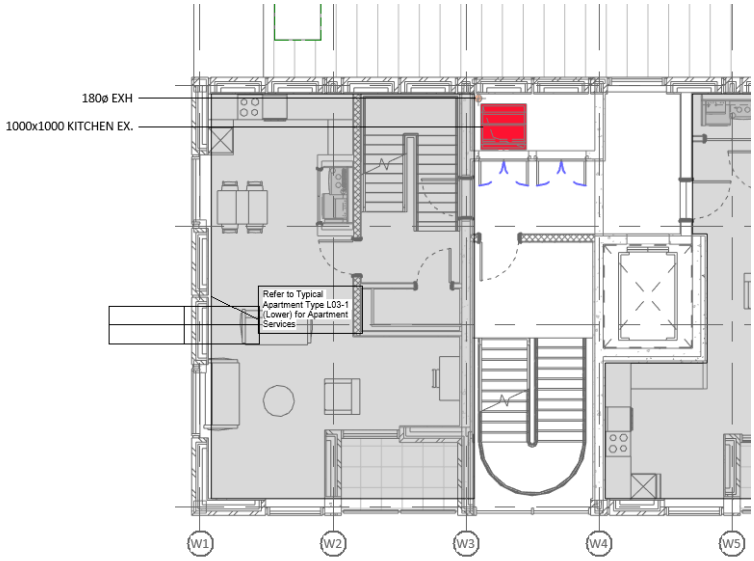

Figure 2: Riser space provision

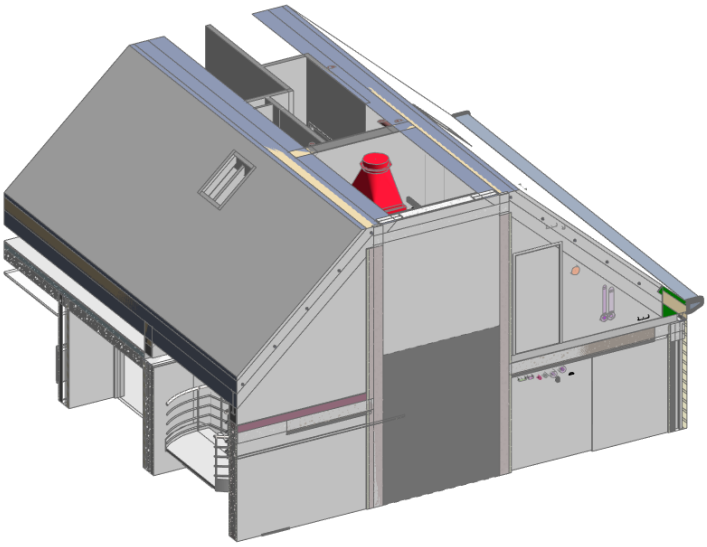

Figure 3: Proposed kitchen exhaust adjacency to closest sensitive receptor

2.1 Odour framework assessment

Table 1 below summarises the results odour assessment for the pub unit, conducted in accordance with the EMAQ+ guidance document.

Criterion	Rating	Risk assessment score	Details	Comments
Dispersion	Moderate	10	Discharge 1m above eaves at 10-15ms^{-1}	Discharge at the highest level of the pitched roof at a velocity greater than 10m/s (to be stipulated in tenant fitout requirements)
Proximity of receptors	Close	10	Closest sensitive receptor less than 20m from kitchen discharge	Closest receptor would be bedroom windows approximately
Size of kitchen	Medium	3	Between 30 and 100 covers or medium sized take away	Estimated 95 covers
Cooking type (odour and grease loading)	Very high	10	Pub (high level of fried food), fried chicken, burgers or fish and chips. Turkish, middle eastern or any premises cooking with solid fuel	Speculatively considered a worst case scenario, in the absence of an incoming tenant.
	Resultant score:	**33**	**High risk – high level odour control required**	

Table 1: Odour assessment for Wharf Lane pub

A risk assessment score of 33 puts this unit in a 'high' impact risk, necessitating 'high level odour control'. Figure 4 below states some typical requirements for a kitchen of this type.

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.

Figure 4: Extract from EMAQ guidance document specifying typical odour abatement required for kitchens with a high impact score.

2.3 Mitigation measures

Measures to mitigate the potential for nuisance to nearby sensitive receptors have been considered in the context of the architectural sensitivity of the building and are primarily twofold:

1. Exhausting at roof level to mitigate presence of odorous effluent at sensitive receptors, and
2. Provision of high level odour abatement equipment, in accordance with the EMAQ+ guidance document.

In order to ensure that odour abatement technology may be implemented by the incoming tenant, it is proposed to provide a dedicated plant room, demised to the F&B unit, in which to house air handling and odour abatement equipment. This plant room shall be immediately below the F&B outlet kitchen, on the lower ground floor and provides an area of approximately 45m^2. Figure 5 below shows this area, highlighted on a plan of the basement level.

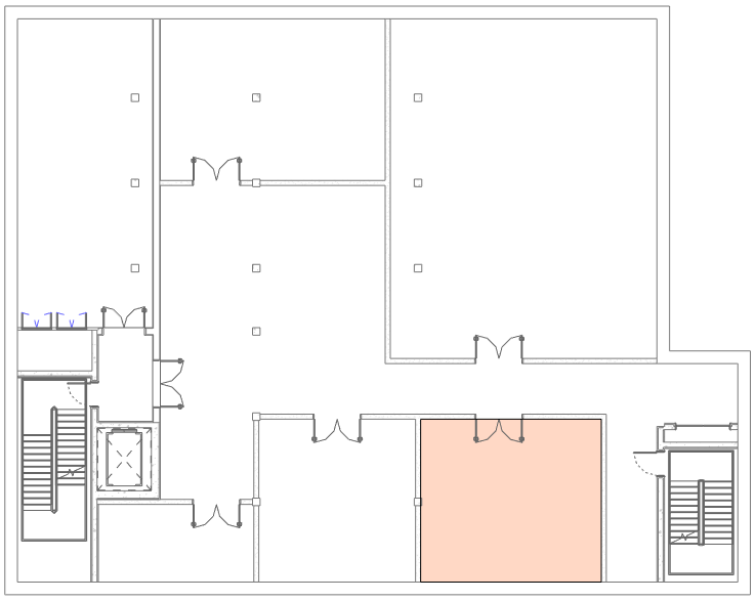

Figure 5: Designated plant room for air handling and odour abatement equipment

Requirements for odour abatement equipment to commercial kitchens shall be communicated to incoming tenants and shall be secured by condition within the lease agreement. Prospective tenants will be guided to best practice and asked to demonstrate compliance with relevant guidance documents, as referenced previously.

3 Kitchen odour assessment – Water Lane

The Wharf Lane building of the Proposed Development shall include a commercial unit designated as a food and beverage (F&B) unit, intended for use as a café. The unit occupies a space on the southern end of the Water Lane building, facing onto the new public amenity space, covering a gross internal area of approximately 350m^2, notionally comprising approximately 246m^2 front of house area and 15m^2 kitchen area. Refer to Figure 6 below.

The unit will be fitted out to a 'shell-only' category as part of the Proposed Development works, and the incoming tenant shall be responsible for the full fitout including installation of kitchen and extraction equipment.

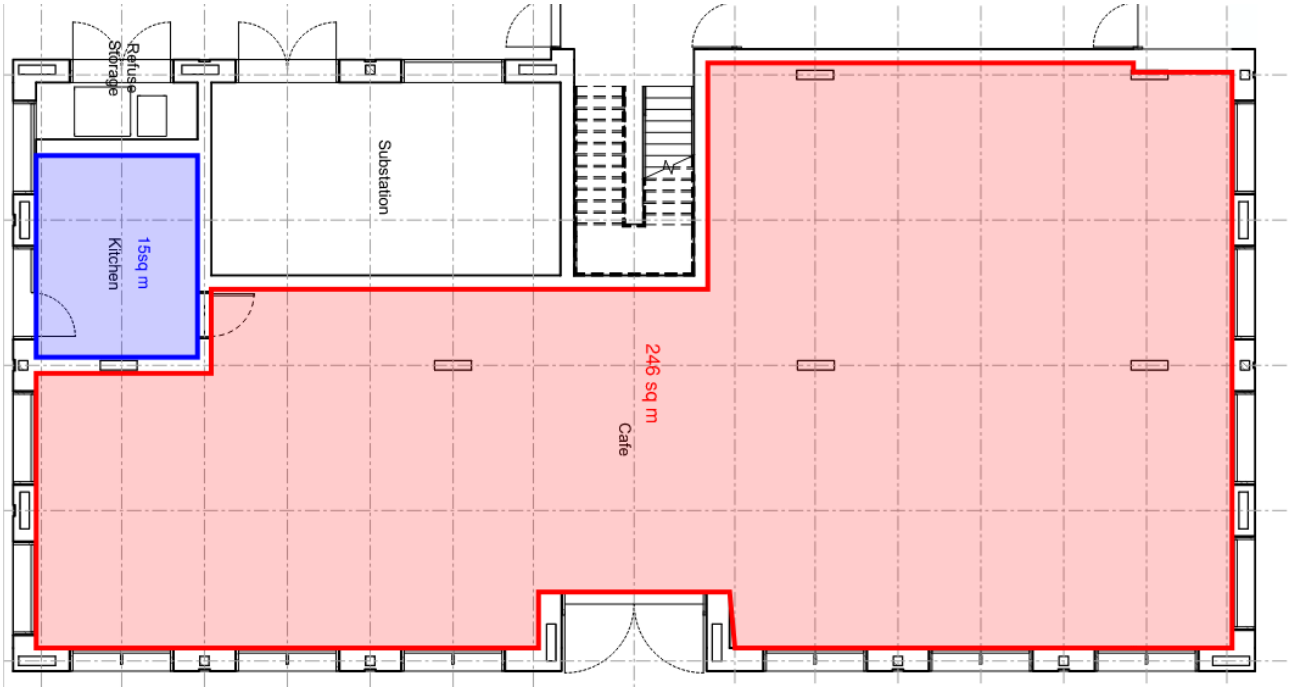

Figure 6: Water Lane café commercial unit

The number of covers has been estimated based on a dining area of 170m^2 and a density of 1 diner per 2m^2, giving a total of 85 covers.

The kitchen exhaust location is proposed to be at ground floor level, through a louvre within the refuse store designated for use by the café. The closest sensitive receptor would be a residential unit window on the storey above located approximately 4m above. This can be seen in the 3D image in Figure 7 below.

Figure 7: Kitchen exhaust location (shaded pink) and nearest sensitive receptor adjacency (shaded blue)

3.2 Odour framework assessment

Table 2 below summarises the results odour assessment for the pub unit, conducted in accordance with the EMAQ guidance document.

Criterion	Rating	Risk assessment score	Details	Comments
Dispersion	Very poor	20	Discharge 1m above eaves at 10-15ms^{-1}	Low level discharge, discharge into courtyard or restriction on stack.
Proximity of receptors	Close	10	Closest sensitive receptor less than 20m from kitchen discharge	Closest receptor would be bedroom windows above
Size of kitchen	Medium	3	Between 30 and 100 covers or medium sized take away	Estimated 85 covers
Cooking type (odour and grease loading)	Low	1	Pub (high level of fried food), fried chicken, burgers or fish and chips. Turkish, middle eastern or any premises cooking with solid fuel	Intended for use as a café with light cooking carried out including sandwiches and reheating
	Resultant score:	**34**	**High risk – high level odour control required**	

Table 2: Odour assessment for Wharf Lane pub

A risk assessment score of 34 puts this unit in a 'high' impact risk, necessitating 'high level odour control'. Figure 4 below states some typical requirements for a kitchen of this type. Owing to the type of cooking being largely café-style food with low odour and grease loading, however, it is not considered appropriate to implement odour abatement equipment in this case. It is therefore proposed to provide grease separation only at the canopy and secondary filtration within the ductwork.

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.

Figure 8: Extract from EMAQ guidance document specifying typical odour abatement required for kitchens with a high impact score.

Requirements for extract equipment to the commercial kitchen shall be communicated to incoming tenants and secured by condition within the lease agreement. Prospective tenants will be guided to best practice and requested to demonstrate compliance with relevant guidance documents, as referenced previously.

Appendix 1: EMAQ odour assessment - Wharf Lane

3: Risk Assessment for Odour

Odour control must be designed to prevent odour nuisance in a given situation. The following score methodology is suggested as a means of determining odour control requirements using a simple risk assessment approach. The odour control requirements considered here are consistent with the performance requirements listed in this report.

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

* based on the sum of contributions from dispersion, proximity of receptors, size of kitchen and cooking type:

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[1].
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	Less than 30 covers or small take away[1].
Cooking type (odour and grease loading)	Very high	10	Pub (high level of fried food), fried chicken, burgers or fish & chips. *Turkish, Middle Eastern or any premises cooking with solid fuel*
	High	7	Vietnamese, Thai, Indian, *Japanese, Chinese, steakhouse*
	Medium	4	Cantonese, *Italian, French, Pizza (gas fired),*
	Low	1	Most pubs (*no fried food, mainly reheating and sandwiches etc*), *Tea rooms*[1]

Note 1: A planner may take a pragmatic view when assessing whether certain low risk kitchens require any odour abatement to be fitted. In reaching this decision the Planner may consider the nature of the food being cooked and/or the size of kitchen and/or its location.

Total score = 10+10+3+10 = **33**

High level odour control required

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.

Appendix 2: Odour assessment - Water Lane

3: Risk Assessment for Odour

Odour control must be designed to prevent odour nuisance in a given situation. The following score methodology is suggested as a means of determining odour control requirements using a simple risk assessment approach. The odour control requirements considered here are consistent with the performance requirements listed in this report.

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Low to Medium	Low level odour control	Less than 20
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Very high	Very high level odour control	more than 35

* based on the sum of contributions from dispersion, proximity of receptors, size of kitchen and cooking type:

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[1].
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	Less than 30 covers or small take away[1].
Cooking type (odour and grease loading)	Very high	10	Pub (high level of fried food), fried chicken, burgers or fish & chips. *Turkish, Middle Eastern or any premises cooking with solid fuel*
	High	7	Vietnamese, Thai, Indian, *Japanese, Chinese, steakhouse*
	Medium	4	Cantonese, *Italian, French, Pizza (gas fired),*
	Low	1	Most pubs (*no fried food, mainly reheating and sandwiches etc*), *Tea rooms*[1]

Note 1: A planner may take a pragmatic view when assessing whether certain low risk kitchens require any odour abatement to be fitted. In reaching this decision the Planner may consider the nature of the food being cooked and/or the size of kitchen and/or its location.

Total score = 20+10+1+1 = 32

High level of odour abatement required

It is proposed that the cafe is not required to be provided with odour abatement equipment, due to the type of cooking being anticipated to be low, i.e. toasted sandwiches, reheat.

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.*

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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.

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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.

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- 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.