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Detailed Ventilation Statement Report

57 Wood St., Earl Shilton, Leicester LE9 7NE - Classic Takeaway Use Change

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1.0 Introduction

4UsElectric Ltd has been commissioned to prepare this Ventilation Statement to support a planning application (Ref 230081/DPP) for the change of use from a furniture store to a classic takeaway at 57 Wood St., Earl Shilton, Leicester LE9 7NE. This report details the proposed ventilation arrangements for the kitchen area and covers the following:

- Approach to cooking activities.
- Design and equipment details of the kitchen ventilation system.

This report does not cover ventilation of other areas or requirements for an Environmental Noise Assessment, as these are outside its scope.

2.0 Site Location and Details

2.1 Location

The project is located at 57 Wood St., Earl Shilton, Leicester LE9 7NE. The new takeaway area will be directly accessible from Wood Street.

2.2 Proposed Use

- Menu and Equipment: The premises will operate as a classic takeaway, utilizing gas stove, fryer, pizza oven, and doner machine in the kitchen.

- Additional Information: Kitchen layout provided by the client are included in Appendix A.

2.3 Site Plan

The site plan is detailed in architectural drawings.

3.0 Ventilation System Design

3.1 Proposed Ventilation Systems

The ventilation system will comprise the following components:

- Fresh Air Intake: Due to the use of gas-powered equipment (gas stove, fryer, pizza oven, and doner machine), a mechanical ventilation system compliant with new regulations will be installed. Fresh air will be drawn into the kitchen area through a grill mounted on a window or wall.

- **Exhaust System:** A new canopy (hood) will be installed above the main cooking equipment (gas stove, fryer, pizza oven, and doner machine), with approximate dimensions of 3500 mm (length) x 1200 mm (depth) x 500-300 mm (height).
- The canopy will be equipped with grease baffle filters.
- An additional extractor branch will be incorporated specifically for the pizza oven, designed to absorb its heat and potential gas emissions effectively.
- The exhaust duct will be routed at a high level within the kitchen and rise through the roof for external discharge.
- An external exhaust fan and high-level discharge cowl will be used.
- **Control Mechanism:** The exhaust fan will be operated with an electronic speed controller to provide variable airflow, ensuring containment of cooking odors and grease vapors within the kitchen area.

3.2 Exhaust Rate Calculation

Calculations are based on the EMAQ 2018 “Control of Odour and Noise from Commercial Kitchen Exhaust Systems” document, which provides guidance on kitchen ventilation rates.

3.2.1 Kitchen Air Change Rate

- According to EMAQ Table 4.2.2, the recommended air change rate (ACH) for classic takeaway kitchens is 40 per hour. However, due to the intense vapor and grease production from gas stove, fryer, pizza oven, and doner machine, a higher rate may be required. The design will therefore be optimized to allow flexibility up to 50 ACH.

3.2.2 Air Change Rate Calculation

- **Recommended ACH:** 50 per hour (with a safety margin).
- **Room Dimensions:** 4 m (length) x 5 m (width) x 2.6 m (height) = 52.8 m³ (rounded to 53 m³).
- **Air Flow Rate:** ACH x Volume = 50 x 53 = 2650 m³/hour.

Alternative Calculation (Air Velocity Method):

- **Canopy Area:** 3.5 m x 1.2 m = 4.2 m².
- **Recommended Air Velocity:** 0.5 m/s (standard for intensive cooking equipment).
- **Air Flow Rate:** 4.2 m² x 0.5 m/s = 2.1 m³/s = 7560 m³/hour.
- **Result:** Selection of a fan with an air flow rate exceeding 7560 m³/hour will ensure both over 50 ACH and sufficient air velocity for the 3.5 m long commercial canopy, including the additional extractor branch for the pizza oven.

3.3 Equipment Details

3.3.1 Exhaust Canopy

- Wall-mounted, positioned above the gas stove, fryer, pizza oven, and doner machine, designed with a 1200 mm depth to effectively capture intense vapor and grease.
- **Material:** Stainless steel (for easy cleaning and grease resistance).
- **Technical Details:** Provided in Appendix E.

3.3.2 Grease Baffle Filters

- Integrated into the canopy, mandatory due to intense grease production.
- Prevents flame spread and enhances safety.
- **Features:** Stainless steel, removable, and washable.
- **Manufacturer:** Jasun Envirocare or equivalent.

3.3.3 Duct Design

- The exhaust duct will connect directly from the canopy to the external exhaust fan and then to the external discharge.
- Designed with minimal bends and section changes.
- Includes sufficient removable access panels for internal cleaning.
- **Air velocity:** 6-9 m/s (to prevent moisture, grease, and contaminant buildup).

- Reference: EMAQ Document, Section 4.3.

3.3.4 Exhaust Fan

- Capacity: 2.1 m³/s (7560 m³/hour, adjusted for the extractor branch).
- Type: Centrifugal, box-type fan (acoustically insulated).
- Features:
 - Aluminum frame with 25 mm fireproof fiberglass-insulated double-skin casing.
 - Operated via electronic speed controller with a local isolator.
 - Equipped with anti-vibration mountings and flexible connectors to minimize noise transmission.
- Model: S&P CVAB/4-9000/500ND (single-phase power supply) or equivalent (subject to capacity adjustment).
- Technical Details: Provided in Appendix B.

3.3.5 Discharge

- Extracted air will be exhausted to the atmosphere via a discharge cowl located above roof level.
- The cowl will include a bird mesh at the discharge opening.

3.3.6 Maintenance Regime

- Daily: Cleaning of canopy surfaces and grease filters.
- Weekly: Detailed cleaning of filters to prevent heavy grease buildup.
- Annual: Fan and duct cleaning.
- Note: Maintenance intervals should be reviewed and adjusted based on usage intensity and grease production.

3.3.7 Silencer

- A silencer will be used for in-duct noise reduction if required. Technical details are provided in Appendix C.

3.3.8 Carbon Filter

- An AirClean brand panel with 0.2-second reactive carbon filtration will be integrated for odor control. Technical details are provided in Appendix D.

3.4 Noise Levels

- Target: NR25 - NR30 noise level (in accordance with EMAQ and DW/172 guidelines).
- Measures:
 - Selection of a low-noise fan with electronic speed control.
 - In-duct attenuation with a silencer if required.
 - Fan location: Mounted in the loft area, using an acoustic box-type fan.
 - Anti-vibration mountings and appropriately sized ductwork to avoid excessive velocities causing turbulence and higher noise levels.

4.0 Conclusions

- A wall-mounted canopy, exhaust ducts with access panels for system maintenance, and a speed-controlled fan providing 50 ACH are recommended.
- The use of a box-type fan (box fan) enables sound insulation.
- The box fan's detachable cabinets allow for easy maintenance and cleaning.
- Due to the presence of gas-powered equipment (gas stove, fryer, pizza oven, and doner machine), odor control will be effectively managed using an AirClean brand panel with 0.2-second reactive carbon filtration.
- The user should perform regular maintenance (especially duct and filter cleaning) considering the intensive use and grease production.

Appendices

- **Appendix A: Kitchen Layout**

The kitchen layout is designed to ensure efficient operation of the gas stove, fryer, pizza oven, and doner machine. The equipment will be aligned beneath the wall-mounted exhaust canopy. The workspace is optimized with sufficient space to facilitate staff movement. The detailed layout plan, provided by the client, is designed to support the effectiveness of the ventilation system.

- **Appendix B: Fan Features**

- **Model:** S&P CVAB/4-9000/500ND or equivalent.
- **Capacity:** 2.1 m³/s (7560 m³/hour).
- **Type:** Centrifugal, box-type (acoustically insulated) fan.
- **Material:** Aluminum frame with 25 mm fireproof fiberglass-insulated double-skin casing.
- **Control:** Electronic speed controller with a local isolator.
- **Mounting:** Anti-vibration mountings and flexible connectors to minimize noise transmission.
- **Maintenance:** Detachable cabinets allow for easy maintenance and cleaning.

- **Appendix C: Silencer Features**

- **Purpose:** Reduce in-duct noise levels (target NR25-30).
- **Material:** Galvanized steel clad with acoustic insulation material.
- **Size:** Customizable to duct diameter (e.g., 400 mm diameter, 600 mm length).
- **Noise Reduction:** 15-20 dB(A) noise reduction.
- **Maintenance:** Requires periodic cleaning and inspection.

- **Appendix D: Carbon Filter Features**

- **Brand:** AirClean.
- **Type:** 0.2-second reactive carbon filtration panel.
- **Purpose:** Removal of up to 95% of odors and volatile organic compounds (VOCs).
- **Capacity:** Suitable for 7560 m³/hour airflow (adjusted for extractor branch).
- **Material:** High-density panel reinforced with active carbon granules.
- **Maintenance:** Recommended replacement every 6-12 months (depending on usage intensity).

- **Appendix E: Canopy Features**

- **Dimensions:** 3500 mm (length) x 1200 mm (depth) x 500-300 mm (height).
- **Material:** Stainless steel (for grease resistance and easy cleaning).
- **Mounting:** Wall-mounted, aligned above the gas stove, fryer, pizza oven, and doner machine.
- **Filter:** Grease baffle filter (Jasun Envirocare or equivalent), removable and washable.
- **Purpose:** Effectively capture intense vapor and grease vapors, with an additional extractor branch for the pizza oven.

This report, prepared as of June 06, 2025, provides a detailed foundation to address the ventilation requirements for the classic takeaway use and gas-powered equipment. For further information or additional analysis, please contact 4UsElectric Ltd.