# Ventilation Concept Report

Leamington Spa

P1177-ONE-ZZ-XX-RP-J-0001 (P01)

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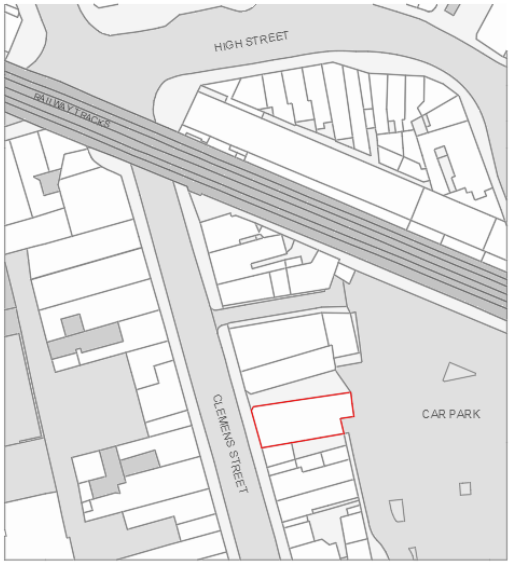
## 1. Introduction

One Creative Environments Ltd have been commissioned by AT Architects to carry out a ventilation concept report on the proposed conversion into residential units in Clemens Street, Leamington Spa.

The proposed project consists of alterations to the ground floor to provide three retail units, change of use from retail storage to residential flats (2No. 1 bedroom and 1No. 2 bedroom) with the addition of a second floor and external alterations.

The building is situated between two restaurant/take away food establishments that house kitchens producing cooking smells to the side and rear of the property, this report looks at how the likelihood of odour smells entering the apartments is minimised to ensure the occupants are not affected once living in the dwelling.

**Address –**
15-17 Clemens Street,
Leamington Spa,
CV31 2DW



Location Plan

Block Plan

## 2. Planning

Warwick District Council outline in Policy BE3 of the Warwick District Local Plan 2011-2029 that development will not be permitted that does not provide acceptable standards of amenity for future users and occupiers of the development.

*Based on the combined potential nuisances of noise, air quality and odours, it is likely that the future occupiers of the development would need to keep their windows closed the majority of the time.*

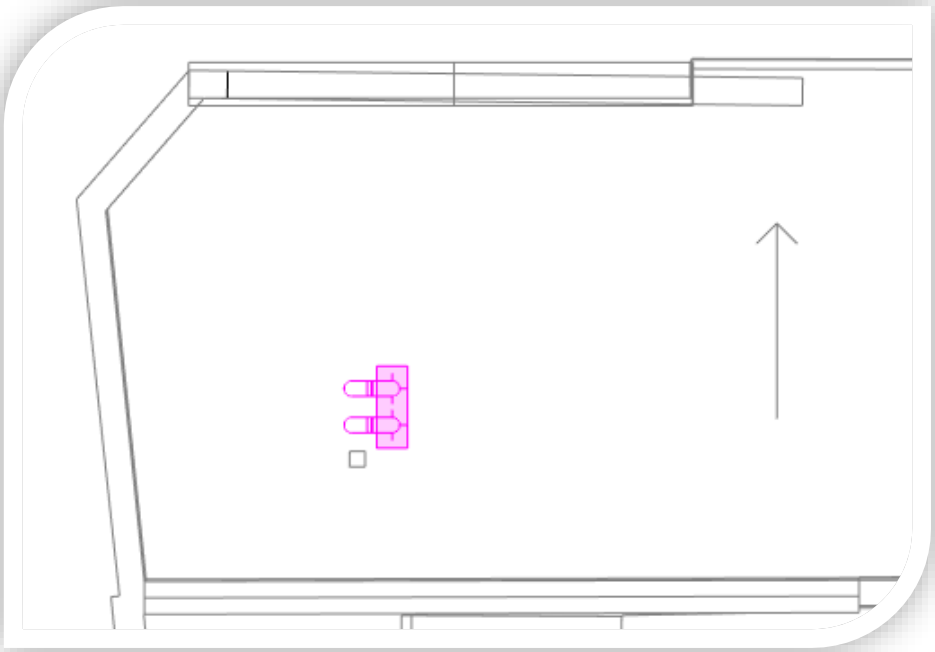
*Officers do not consider that this would provide a satisfactory living environment for future residential occupiers. The elevated noise levels at the site mean that residents would be forced to choose between natural ventilation and exposure to elevated noise levels. If residents decided to open their windows, they would be faced with either traffic emissions from Clemens Street or cooking odours from the nearby takeaway premises.*

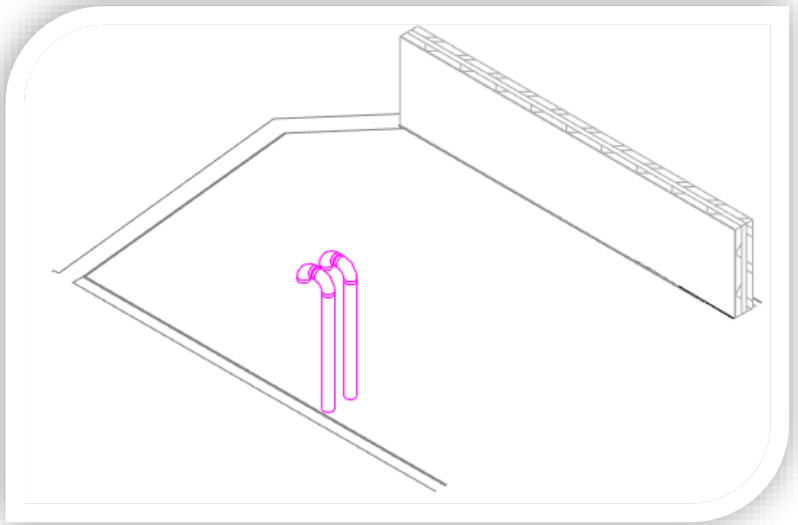
*The noise assessment identifies that noise levels are elevated for the majority of the day and night time and that there are only limited periods of time during the very early hours where windows could be opened for natural ventilation without noise disturbance. The limited opportunities to open windows can have a psychological impact on individuals as it removes their connection with the outside world.*

*With a reliance on a filtered air and closed windows this would create a constrictive living environment and the feeling of living in a sealed unit. On this basis Officers consider that a poor living environment would be provided for future occupiers.*

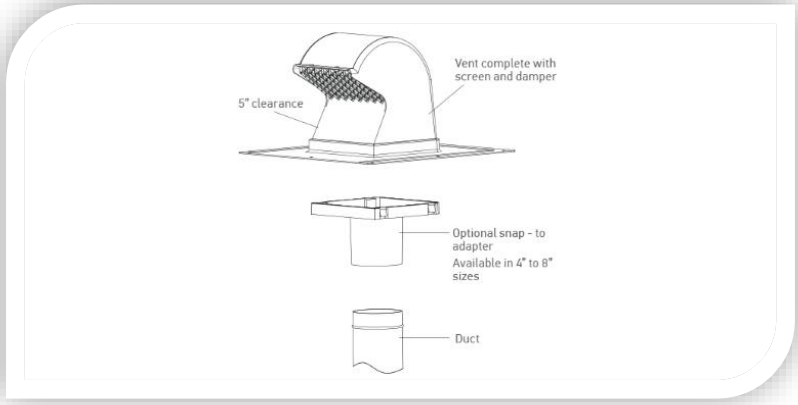

The kitchen exhaust outlet to the proposed location of the supply intakes is circa 7.5m in distance (point to point – not accounting for parapet wall in-between), the kitchen exhaust outlet is positioned lower than the proposed air intake.

The flue is also fitted with a pointed mushroom type cowl which directs the exhaust downwards into the adjacent alleyway.





By positioning the supply intakes in a 'swan-neck' or 'goose-neck' configuration shall further minimise the likelihood of odour entering the system; in addition to turning the intakes away from the restaurants direction.



## 3. Building Regulations

To satisfy the requirement of planning, the use of a MVHR system is essential to meet Building Regulations and also satisfy planning requirements. The Building Regulations Approved Document : Part F – Ventilation provides methods on how to comply with legislation requirements and regulations.

The following requirements are outlined in Table 5.2d System 4 – Continuous mechanical supply and extract with heat recovery (MVHR).

**Design of MVHR systems**

System 4 has been sized for the winter period. Additional ventilation may be required during warmer months and it has been assumed that the provisions for ***purge ventilation*** (e.g. openable windows) could be used.

**Step 1:** For any design ***air permeability***, determine the ***whole dwelling ventilation*** supply rate from Table 5.1b.

As an alternative where the designed ***air permeability*** is intended to be leakier than (>) 5 $m^3/(h.m^2)$ at 50 Pa, allow for infiltration for all dwelling types by subtracting from the ***whole dwelling ventilation*** supply rate from Table 5.1b: 0.04 $l/(s.m^3)$ x ***gross internal volume*** of the dwelling heated space ($m^3$), but see the cautionary advice in 5.10.

**Step 2:** Calculate the whole dwelling extract ventilation rate by summing the individual room rates for 'minimum high rate' from Table 5.1a.

(For ***sanitary accommodation*** only, as an alternative, the ***purge ventilation*** provisions given in Appendix B can be used where security is not an issue. In this case the 'minimum high extract rate' for ***sanitary accommodation*** should be omitted from the Step 2 calculation.)

**Step 3:** The required air flow rates are as follows:

- The maximum whole dwelling extract ventilation rate (i.e. the boost rate) should be at least the greater of Step 1 and Step 2. Note that the maximum individual room extract rates should be at least those given in Table 5.1a for 'minimum high rate'.
- The minimum whole dwelling supply ventilation rate should be at least the ***whole dwelling ventilation*** rate found in Step 1.

**Purge ventilation**

For each ***habitable room:***

- with external walls, see Appendix B for window or external door (including patio door) sizing;
- without external walls, see paragraphs 5.14 to 5.16.

There may be practical difficulties in achieving this (e.g. if unable to open a window due to excessive noise from outside). In such situations, seek expert advice.

For each ***wet room:***

- with external walls, install an openable window (no minimum size);
- without external walls, the normal extract provisions will suffice, although it will take longer to purge the room.

As an alternative to the provisions given above for ***habitable*** and ***wet rooms***, a mechanical fan extracting at 4 ach to outside could be used.

Devices used for ***purge ventilation*** should be manually controlled. The location of the purge devices is not critical for ventilation.

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**Location of ventilation devices**

- Extract should be from each ***wet room***. Air should normally be supplied to each ***habitable room***. The total supply air flow should usually be distributed in proportion to the ***habitable room*** volumes. Recirculation by the system of moist air from the ***wet rooms*** to the ***habitable rooms*** should be avoided.
- Cooker hoods should be 650 mm to 750 mm above the hob surface (or follow the manufacturer's instructions).
- Mechanical extract terminals and fans should be installed as high as is practical and preferably less than 400 mm below the ceiling.
- Mechanical supply terminals should be located and directed to avoid draughts.
- Where ducts etc. are provided in a dwelling with a protected stairway, precautions may be necessary to avoid the possibility of the system allowing smoke or fire to spread into the stairway. See Approved Document B.
- ***Background ventilators*** are not required with System 4.

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**Air transfer**

- To ensure good transfer of air throughout the dwelling, there should be an undercut of minimum area 7600 $mm^2$ in all internal doors above the floor finish. This is equivalent to an undercut of 10 mm for a standard 760 mm width door. This should be achieved by making an undercut of 10 mm above the floor finish if the floor finish is fitted, or by a 20 mm undercut above the floorboards, or other surface, if the finish has not been fitted.

## 4. Ventilation Strategy

Each apartment shall comprise of a dedicated Mechanical Ventilation Heat Recovery Unit (MVHR) to provide fresh supply air into the dwellings and take away the extracted stagnant air to outside.

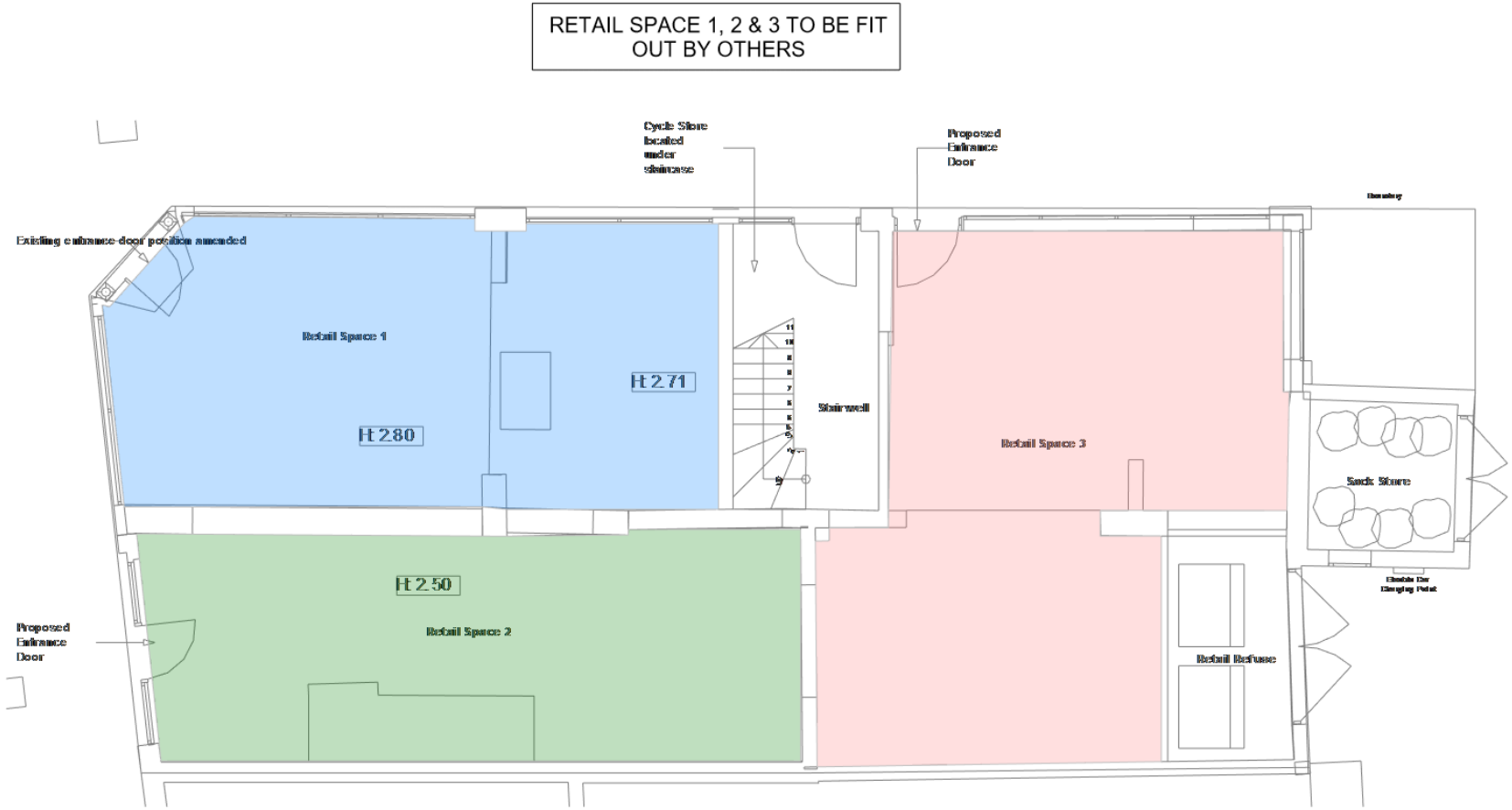
Each unit shall be located in dedicated storage cupboards, as per the Architects plan layouts, the intake/discharge ductwork can rise immediately into the roof void above which avoids combining adjoining apartment system. The supply air intakes as indicated on the sketch layouts shall route to a dedicated position at roof level – behind a parapet wall (away from the surrounding direction of restaurants as far as possible) and the exhaust air directed away from the supply intake to avoid cross flow contamination.

As per Item 3 Odour (3.1.1 – 3.1.6) on Air & Acoustic Consultants (AAC) technical note highlighting the requirement for additional filtration on the MVHR system to further reduce the chances of odours entering the apartments.

The most commonly used on MVHR units are G4 filters, G4 are considered regular filters for incoming air designed to capture pollen fog and coarse dust particles (≥10µm). Introduction of a F7 filter may be considered to filter finer dust particles and pollen etc. in conjunction with a NOX filter box which filters nitrous oxide from entering the system, this uses an active charcoal filter to filter out any potentially dangerous gases. Regular filter maintenance (cleaning or replacing) will be required and further improve the filter efficiency, keeping on top of the filter condition is paramount to ensure maximum efficiency is achieved.

In addition to the MVHR system, as the apartments are treated as sealed, the requirement for mechanical purge ventilation is needed as natural means cannot be met. Purge ventilation is intermittent, rapid ventilation into habitable areas to maintain or restore a pleasant living environment, this means any stagnant pollutants or odours can be removed, and also aids in reducing summer overheating. Purge ventilation can be incorporated as part of the main MVHR system, although this results in a bigger ventilation unit and due to the large volume of air pulled through, would suggest a separate purge system would be more beneficial; as indicated in the sketches below.

Ground Floor Level



First Floor Level – Apartment 1 & 2

MVHR LOCATED IN STORE CUPBOARDS - ACCESS ZONE REQUIRED FOR MAINTENANCE (550mm DEPTH IN FRONT OF UNIT - SUBJECT TO MANUFACTURER)

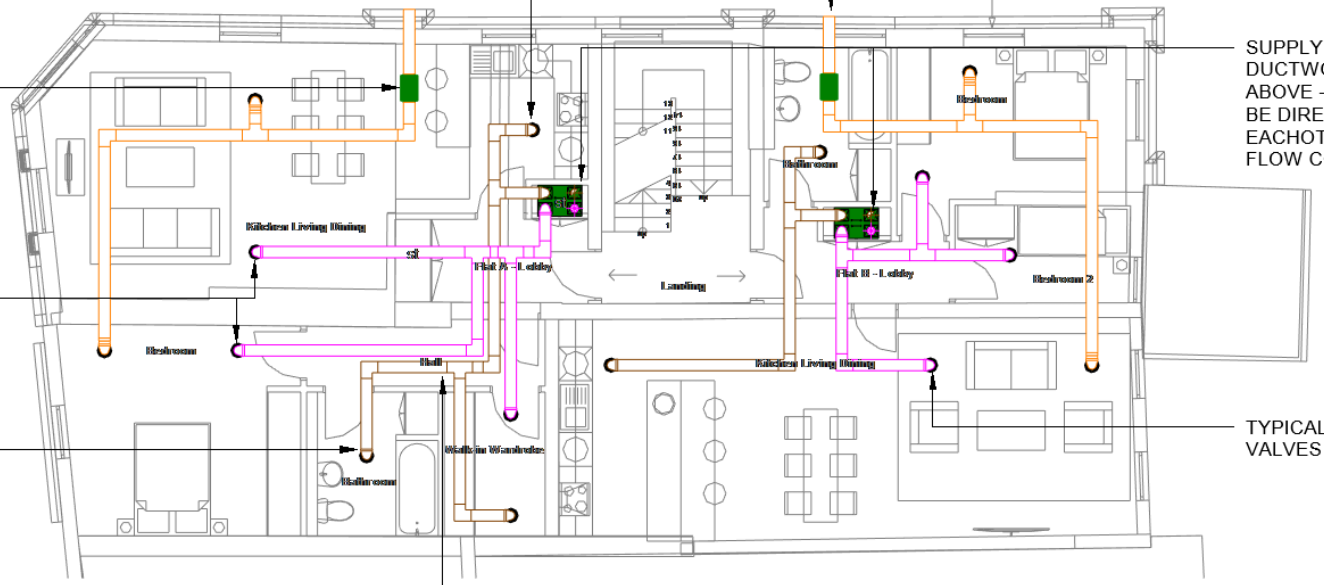
EXTRACT AIR TO KITCHEN AREA - COOKER HOOD EITHER DUCTED OR RECIRCULATING

PURGE EXTRACT FAN SERVING HABITABLE AREAS - CONTROLLED VIA TIMECLOCK/C02 SENSOR

SUPPLY AIR TO HABITABLE SPACES - LIVING ROOM/ BEDROOMS

EXTRACT AIR TO BATHROOM AREAS

FLAT DUCTWORK ALLOWING EASE OF INSTALLATION & COORDINATION WITH OTHER SERVICES

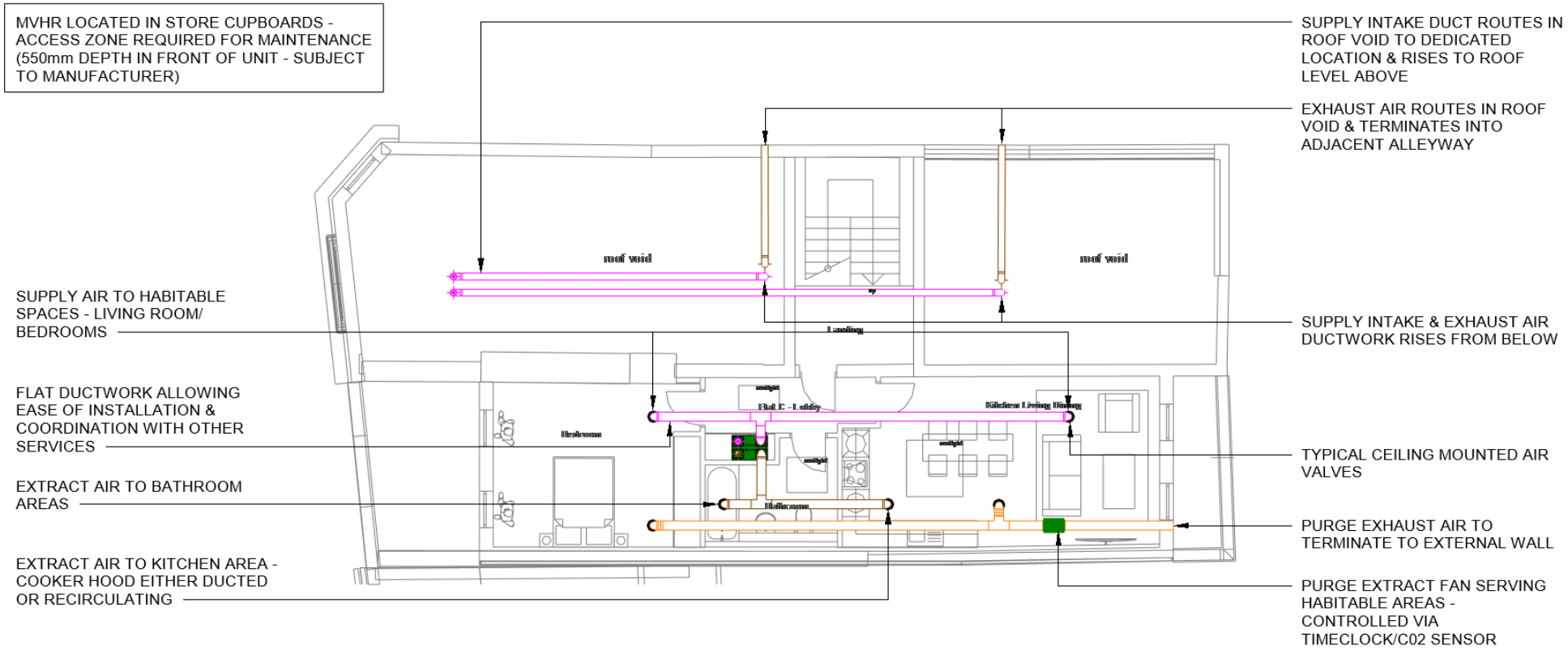



PURGE EXHAUST AIR TO TERMINATE TO EXTERNAL WALL

SUPPLY INTAKE & EXHAUST AIR DUCTWORK RISE TO ROOF LEVEL ABOVE - INTAKE & DISCHARGE TO BE DIRECTIONED AWAY FROM EACHOTHER TO AVOID CROSS FLOW CONTAMINATION

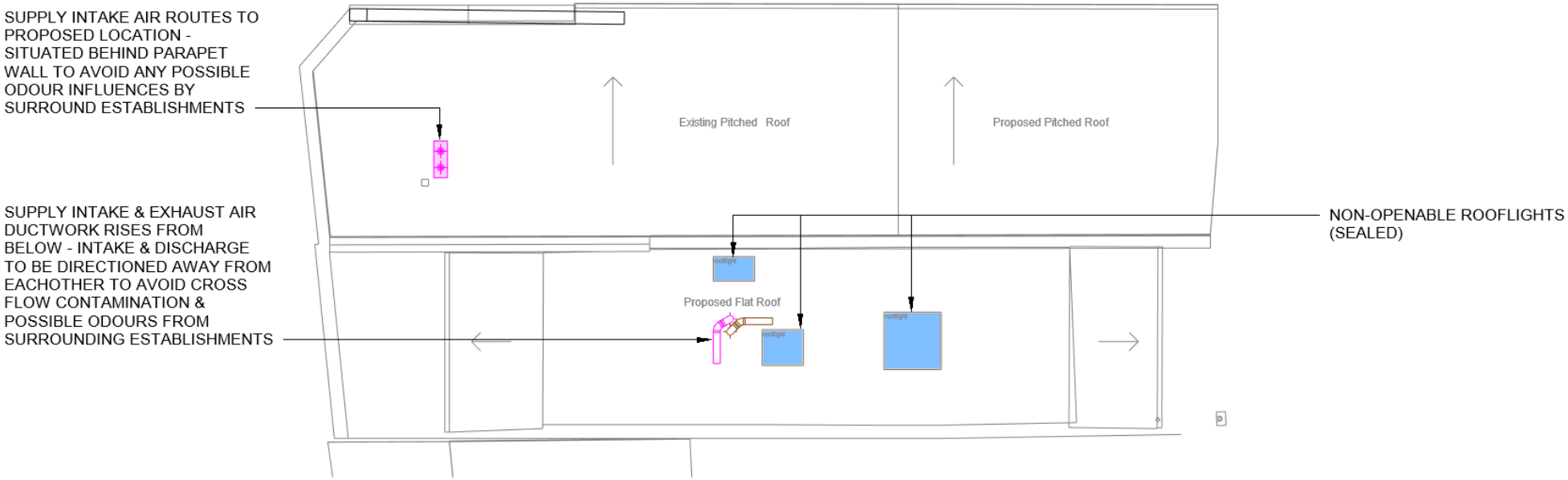
TYPICAL CEILING MOUNTED AIR VALVES

Second Floor Level – Apartment 3



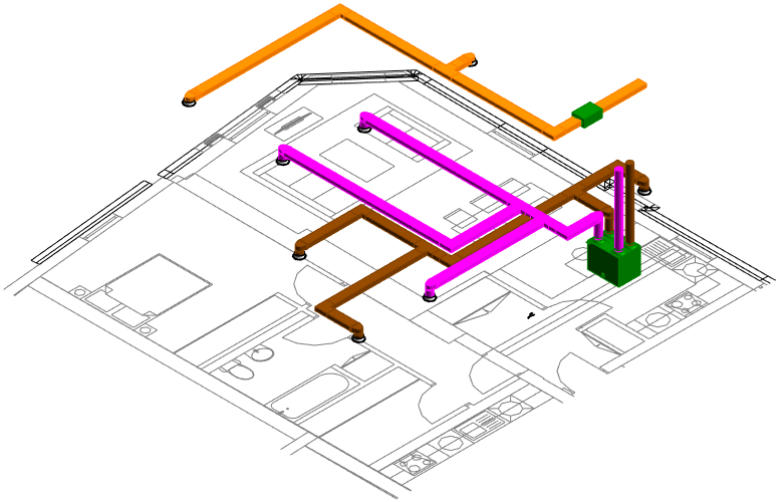

*Supply intake ductwork to be positioned away from the surrounding neighbouring restaurant exhaust flues to further minimise the potential of odours entering the apartment ventilation system

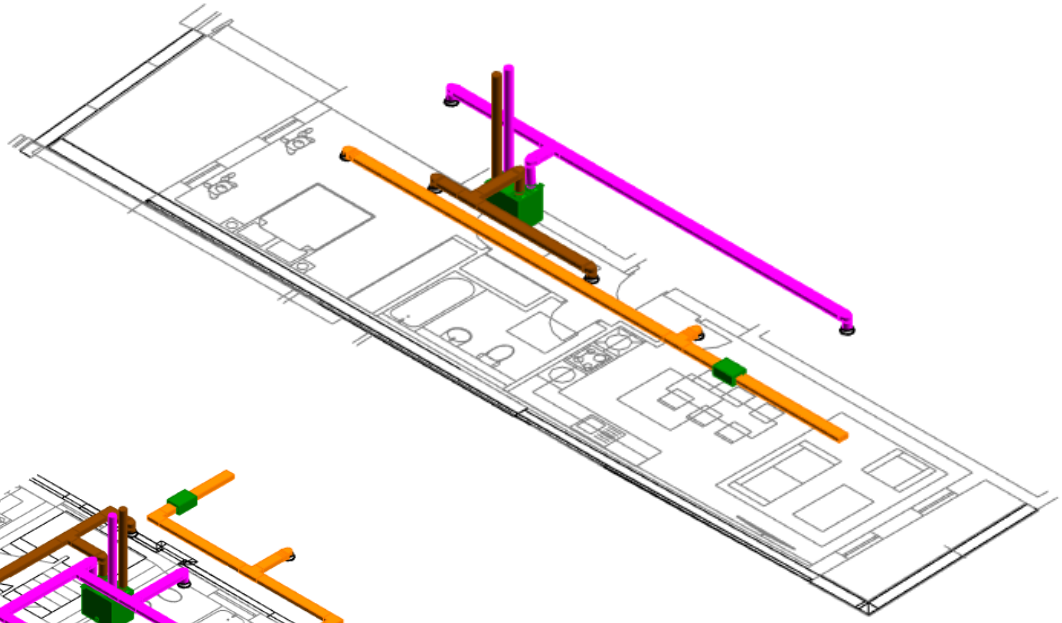
Roof Level

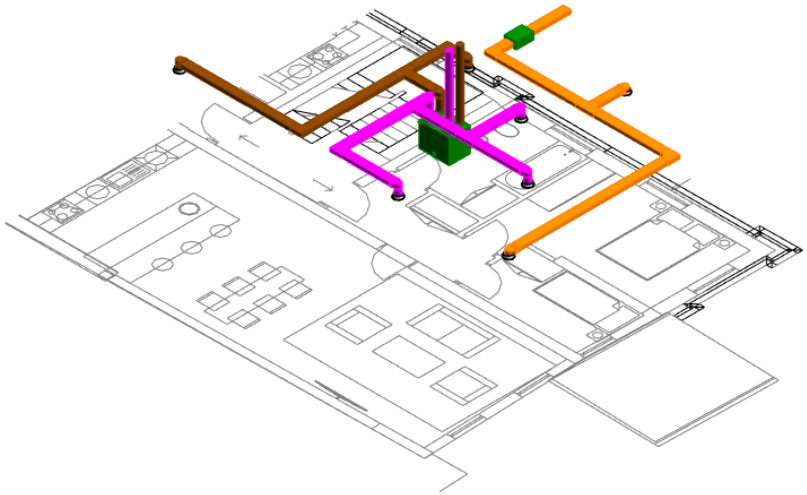



*Supply intake ductwork to be positioned away from the surrounding neighbouring restaurant exhaust flues to further minimise the potential of odours entering the apartment ventilation system

Apartment 1, 2 & 3 Ventilation Sketches – Typical MVHR & Purge System







## 5. Conclusions

In conclusion, given the evident site constraints and provisions proposed to reduce the likelihood of odours entering the apartments, the combination of a sealed façades and mechanical ventilation with appropriate filtration should satisfy planning requirements and ensure a good standard of amenity for future occupiers of the development.

The inclusion of a carbon filter within the ventilation system will further minimise the odour risks posed, including positioning the direction of the supply intake away from possible external influences. The presence of carbon filters, designed for the removal of NOx, also benefit from removing the air pollutants produced from traffic. Noting as mentioned, regular maintenance and cleaning of the fan filters is vital to ensure the system operates effectively and minimises any potential disruptions from external influences.

Lastly, as the apartments cannot purge naturally due to a sealed windows, the mechanical purge ventilation system provides additional means of removing air born pollutants when required through the day; thus providing a comfortable living environment for the occupier.

| Approval Record | | | |
|---|---|---|---|
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| **Ref** | **Description** | **By** | **Date** |
| (P01) | Initial Issue | BA | 04/03/2022 |
| **Quality Control** | | | |
| Prepared By: | Blake Addis | Mechanical Engineer | 18/02/2022 |
| Checked By: | Phil Webster | Associate Engineer | 04/03/2022 |
| Approved By: | Phil Webster | Associate Engineer | 04/03/2022 |

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