

MEP REFURBISHMENT RATIONALE

THE EXISTING

The scheme at AQA Manchester is the complete refurbishment of two main blocks, known as the Annexe and The Octagon.

The Annexe is a four storey property, comprising a ground floor area of an Entrance, Reception and Meeting Rooms. The first, second and third floors are to be generally used as office space and comprise a combination of open plan and cellular meeting spaces. WC facilities are present on each floor.

The Octagon is a three storey building shaped, not unsurprisingly, as an octagon with a large central atrium opening out to the ground and first floors. A “basement”, or rather “semi-basement” also forms part of the accommodation. The basement area is to become a social-based space, with open meeting areas, showers, WC’s, gym and some areas of storage. It will also house the main electrical distribution room, mechanical plant room and server room.

The extent of the refurbishment in both buildings is considerable, with the wholesale replacement of building services with modern, more efficient systems. VRF-type air conditioning is also being provided alongside necessary consequential improvements to building fabric.

The mechanical building services within the Annexe were installed typical of the late 1960’s and 1970’s, being perimeter LTHW heating with openable, single glazed windows for mechanical ventilation. WC ventilation provision was a mix of mechanical ventilation via window fans and purge ventilation via openable windows.

Below are some examples of the original treatment to the annex that have been included since the original build to help with the air flow in the space.

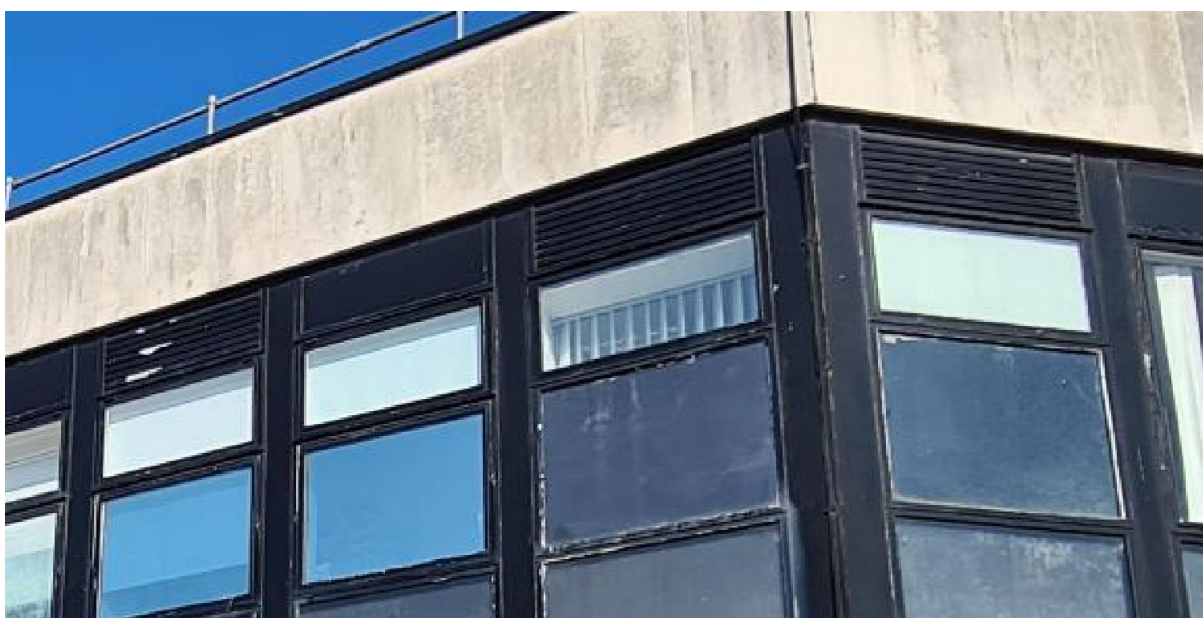
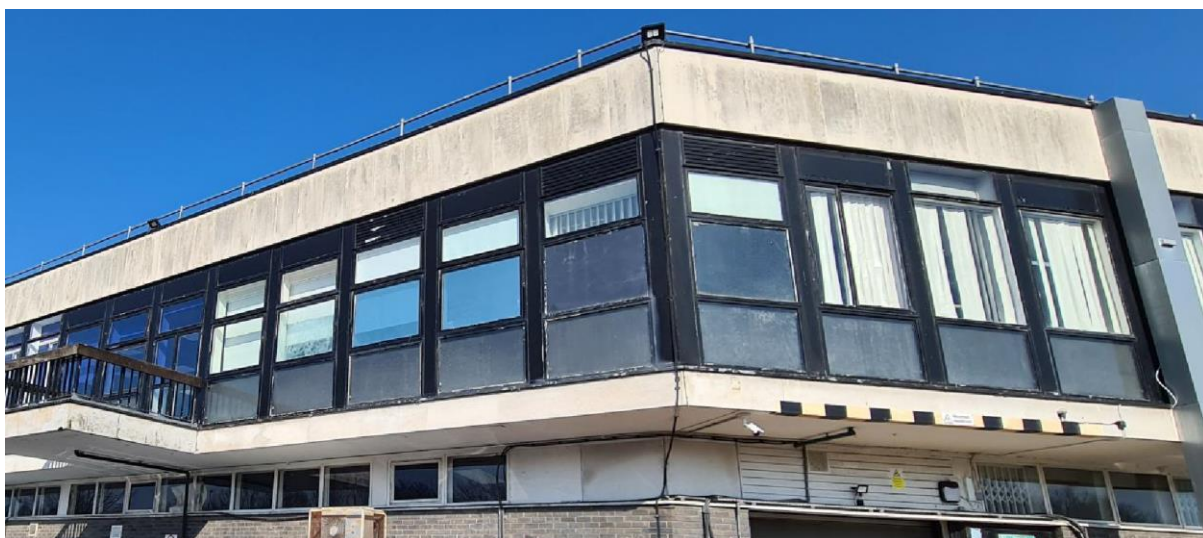


Original existing annex elevation prior to new refurbishment.

Shows extractor fans added to the original build to provide additional fresh air to the existing meeting rooms, and of course this does not meet current regulations and is a small inclusion to help with the existing provision of opening windows.



Below is an example of the original treatment to the octagon that has been included since the original build to help with the air flow in the space.



Original existing octagon elevation prior to new refurbishment

As you can see from the photo, louvers have been added to the top section of the windows for the same reason as stated in the below proposal.

THE DESIGN INTENT

Addendum 24/05/2023

As a part of the design process, several options were considered for the ventilation of the occupied spaces. These included:

1. Openable windows
2. Central AHU systems
3. Mechanical ventilation and heat recovery (MVHR) systems.

Within the Annexe building, the option of a roof mounted central AHU was discounted due to the lack of available space, the majority of the roof being covered with photo-voltaic panels as previously described.

The provision of an AHU at low level, within a ground floor parking bay, was considered. The unit would be located in area that would be visible from one of the two “main” entrances to the Annexe, detracting from the visual appearance.

The Annexe does not contain any large services risers within it. Therefore ductwork serving each floor would need to be routed via the outside of the building and cladded to shield it from view. Entry and exit points at each floor would be via the removal of windows at each level and this was considered to be detrimental to the natural light levels within the floors.

An MVHR solution was therefore proposed as the initial Stage 3 solution and the project tendered on that basis.

During the stage 4 design process as further review was undertaken and the proposed sequence of occupancy was assessed alongside the MVHR proposal, particularly given the visual impact that louvres would have on the visual aspect of the building at higher levels. The occupancy levels on floors two and three were noted to be cyclical as the floors would be in use predominantly during the exam marking period in June and July.

It was therefore felt that an MVHR solution and the visual impact that associated louvres would have could be omitted and a natural ventilation solution include on these floors. The floors are essentially open-plan in nature and therefore a natural ventilation solution will work successfully across the two-sided space.

The ground and first floor areas are to be permanently occupied by AQA staff. The spaces differ from those on the upper floors, having high levels of cellularisation for training and meeting rooms. On these floors a mechanical ventilation solution, in accordance with Part “F” of the Building Regulations

was considered the most appropriate route. A central AHU solution was not progressed due to the siting and natural daylight issues noted earlier. Therefore an MVHR solution, utilising louvres mounted within the window line, was considered to be the most appropriate scheme moving forward.

The design considerations for the Octagon followed a similar route. The Stage 3 tendered scheme included a central air handling unit at roof level which was to be used to serve the Atrium space. MVHR units were proposed for use generally and a large central AHU was to be located within an existing basement plantroom to serve the basement occupied zones.

The visual impact of the roof mounted AHU was reviewed and a solution was proposed where the fresh air volume proposed for the unit was included within a redesigned plantroom mounted air handling unit.

The proposed roof mounted AHU was therefore removed from the scheme.

The provision of a further air handling unit, located within the basement plant room was also considered. The fresh air volume for this unit was calculated as 6000l/s and the associated AHU dimensions would be approximately 6m (L) x 2.5m (W) x 4.0m (hgt). There is insufficient space for a unit of this size to be co-located within the plant room alongside the already proposed AHU.

The location of a unit of this size externally at ground level was discounted on the basis of the visual impact it would make and the size and routing of the ductwork that would be required external to the building.

It was therefore concluded that the most effective method of providing fresh air to the majority of the spaces within the Octagon, was by the provision of decentralised MVHR units and louvres located within the window lines to match the solution proposed within the Annexe.

Addendum 02/08/2023

The selection of louvre finish within the Annexe and Octagon areas is essentially led by the requirement for a robust and long lasting finish that would require minimum maintenance.

Glass finish louvres were considered inappropriate for the application as the final connections to ductwork require the fitting of an insulated galvanised steel plenum duct. Mating this unit to a clear glass louvre would result in an unsightly aesthetic appearance when viewed externally.

The remaining options for finishes that are readily available on the UK market are generally aluminium and steel units. These are usually powder coat finished to suit the exterior finish of the building.

The final selection of the louvre finish has been undertaken to match the finish of the windows within the project. The nature of the finish is such that the plenum box on the rear of the unit would not be visible from the exterior of the building.

THE PROPOSAL

The addition of VRF type air conditioning as an efficient replacement for the old LTHW system has been complimented wherever possible by the addition of MVHR type fresh air ventilation units to provide fresh air based upon 10l/s/person to comply with Building Regulations. Vitiated air is extracted via these units and is used to preheat incoming fresh air before being mixed with conditioned room air.

The building roof houses a large number of PV panels that have been installed at some point in the past to provide electricity generation and offset carbon across the estate. This has reduced the effective area of a suitable roof mounted air handling unit to zero and hence the choice to use MVHR units has been made. The MVHR units do require two louvres per unit, one to enable fresh air to be routed to the units and one for the expulsion of extract air. The louvres have been placed in-lieu of high level windows wherever possible to reduce their visual impact.

The Octagon has been similarly fitted with an MVHR system to the offices around the perimeter of the Atrium. The basement and Atrium areas are provided with fresh air via a new AHU, located within a basement plant room and using existing louvre provision.

The roof of the building, as the Annexe, is installed with a large number of PV panels and this has necessitated the application of MVHR units and associated louvres to the perimeter of the building for office areas. These have been limited to the replacement of high level windows wherever possible to reduce visual impact.

The MEP scheme overall represents part of a continual programme to reduce the carbon footprint of the estate, through the reduction of reliance on unsustainable fossil fuels for heating by utilising high efficiency VRF equipment and the maximisation of heat recovery of ventilation air by the application of MVHR units and high efficiency AHU's serving the basement and Atrium area.

Air source heat pumps have also been used to provide the heating source for hot water services to serve a new Kitchen area. The extract plant for the Kitchen and associated supply air equipment is located on the roof of the Octagon, in one of the few areas not taken by PV panels.

Below are the proposals for the louvers on the annex building, as mentioned above we have tried to strategically position these in the best location so not to have an impact of appearance of the building. We have done this by minimising the a amount of louvers to the main elevation facing the university side and place most the louvers on the elevation that overlooks the car park.

Its worth noting that our proposal for the positioning of the louvers is based on what was previously done on the original octagon building, which is to place them in the top section of the window.



Proposed annex elevation overlooking the university side.





Proposed annex elevation overlooking the car park side.

Below are the proposals for the louvers on the Octagon building, due to the size and shape of this building it was difficult to strategically position these louvers. But most of this face the car park side as well.



Proposed octagon elevation overlooking the car park side.



Proposed octagon elevation overlooking the car park side.



Proposed octagon elevation overlooking the car park side.

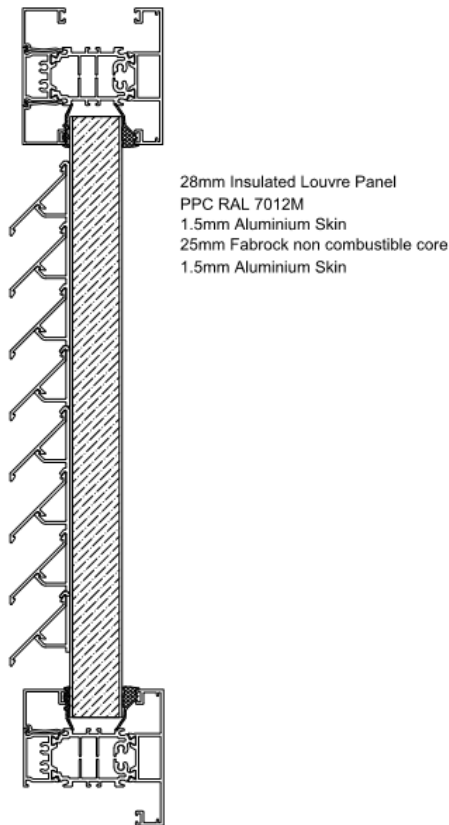


Proposed octagon elevation overlooking the car park side.



Proposed octagon elevation overlooking the university side.

Below is more detail on the on the louvers themselves. The louvers would be sprayed to the same RAL colour as the window frames.



CONCLUSION

AQA have extended the lease on both the Annex and Octagon to the year 2100, and with this have committed to modernise the building to bring the run down 1960's/70's building quality up to current trends and regulations with a full internal/external refurbishment, this will help AQA maintain staff retention and provide a safer and more energy efficient solution for their business moving forward and bring them in to the 20th century and beyond. To achieve this the fabric and internal services need to be refurbished and design to suit the current regulations and around the current restrictions of the existing building by introducing new double window units along with a new high efficiency VRF equipment and the maximisation of heat recovery of ventilation air by the application of MVHR units.

Due to the nature of the work AQA undertakes, there are several months in the year that personnel ramps up in these buildings and at any one time an additional 200/300 personnel could be working on the site on top of the regular 400/500 personnel, so all thought and considerations have been made to produce the right solution under the current building restraints mentioned in this document and long with achieving current regulations.