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MEP
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Document Reference

C3-MEP-G525-RP-XX-001

Revision

P02

Title

CROWN STREET PHASE 2

C3 SCHOOL

VENTILATION STRATEGY STATEMENT

DOCUMENT HISTORY

Revision	Date	Purpose	Author	Approved
P01	09/02/2022	Issued for Comment / Approval	S.R.R.	B.W.J.
P02	31/03/2022	Updated to Incorporate Comments	B.W.J.	B.W.J.

CONTENTS

1. INTRODUCTION4

2. VENTILATION STRATEGY4

APPENDIX A – VENTILATION SERVICES DRAWINGS.....

APPENDIX B – EMQA+ ODOUR CONTROL RISK ASSESSMENT

1. INTRODUCTION

This Ventilation Strategy Statement details the proposed method of providing supply and extract ventilation for the proposed early years and primary school (building C3) at the Crown Street Phase 2 development, on behalf of Renaker Build Limited, to assist with their Reserved Matters application to Manchester City Council.

The proposals for classroom, teaching space and hall areas are based around Monodraught products as they offer a zero embodied carbon, low energy hybrid ventilation with heat recovery system, which is suited for this building type including thermal modelling of single sided ventilation, integrated wall dampers, acoustic attenuation, NOx filtration, controls etc.

These ventilation proposals will take due account of acoustic and air quality considerations during design stage. Acoustic attenuation in accordance with Building Bulletin 93 “Acoustic design of schools: performance standards” (BB93) can be incorporated into all systems described within this report. Filtration and air purification methods are understood to be required to be introduced to supply air entering this building to comply with sections 4.5, 4.6 and 6.5.2 of Building Bulletin 101 “Guidelines on ventilation, thermal comfort and indoor air quality in schools” (BB101).

There are likely to be no opening windows provided within this building due to the proximity to the Mancunian Way and the A56. Therefore all ventilation shall be filtered and provided by mechanical means.

2. VENTILATION STRATEGY

2.1 SUPPLY AND EXTRACT SYSTEMS

Supply and extract ventilation is required to be provided in accordance with BB101 and Part F of the Building Regulations, (which states, “There shall be adequate means of ventilation provided for people in the building.”) Rooms requiring supply and extract provision are anticipated to be:

- Nursery
- Reception
- Teaching spaces/areas
- SEN
- Therapy
- Offices
- Sick bay
- Group room
- Staff room
- Hygiene
- Library

The proposed solution for ventilating rooms without direct access to a roof that are adjacent to an external façade of this building is to provide hybrid or mixed mode ventilation systems to all occupied rooms with direct access to façades, including all teaching spaces and the Multi-Purpose Hall.

Where rooms requiring supply and extract ventilation are not adjacent a roof or external wall then traditional ducted mechanical ventilation systems will be required.

2.2 HYBRID SYSTEMS

Hybrid ventilation, also known as mixed-mode ventilation, describes a ventilation system which is neither entirely natural nor entirely mechanical. The system combines both natural and mechanical ventilation solutions to meet the ventilation requirements of the space. A hybrid ventilation strategy means that mechanical fans are only used to help ventilate a space when natural ventilation is not sufficient. This minimises the energy consumption of the ventilation system whilst ensuring sufficient ventilation capacity under a wide range of conditions.

The basic philosophy is to maintain a satisfactory indoor environment by alternating between and combining natural and mechanical systems to avoid the cost, the energy penalty and the consequentially environmental effects of full year-round air conditioning.

2.3 SINGLE SIDED NATURAL VENTILATION WITH HEAT RECYCLING

The method of achieving hybrid ventilation that is proposed for this building is the Monodraught HVR Zero X+ unit which is a façade based mixed ventilation unit. Each room will have the required number of HVR Zero X+ units installed to suit the heating and ventilation requirements of the space. This unit is installed within ceiling voids or at high level and is connected to a damper within the external façade, which will require acoustic attenuation and air filtration. These units offer a single sided ventilation solution with seasonal operation and are designed to meet thermal comfort and air quality criteria of Building Bulletin 101 (BB101) "Guidelines on ventilation, thermal comfort and indoor air quality in schools" (2018).

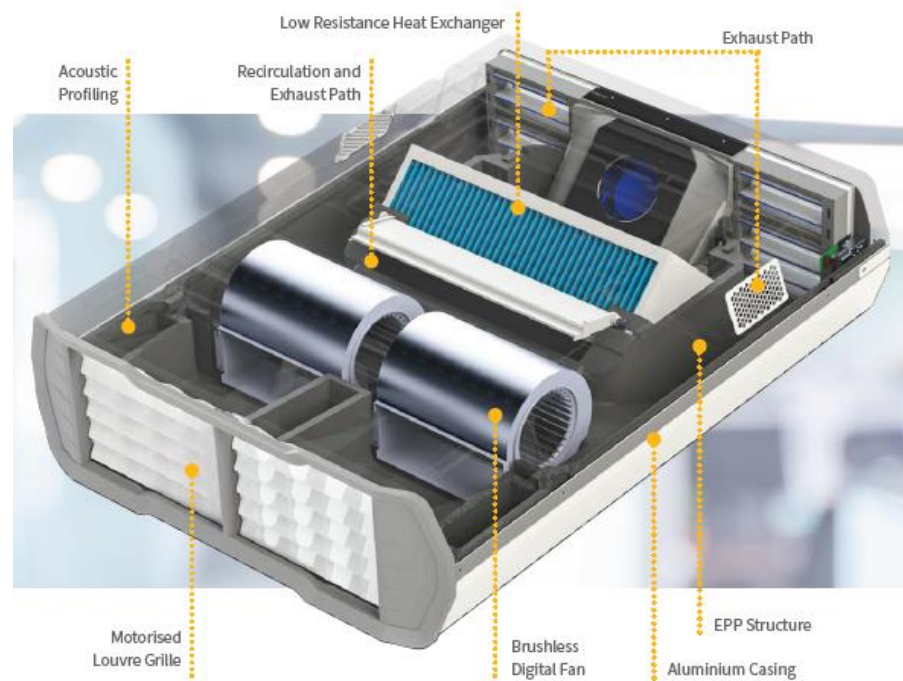
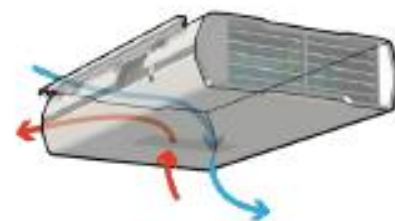


Figure 1 - Monodraught HVR Zero Hybrid ventilation unit

The HVR Zero X+ units operate in 7 different operation modes to achieve the desired indoor air conditions. The operation modes are:

Natural Ventilation Mode



1. Natural Ventilation Mode

Dampers are opened, natural ventilation combined with openable windows expels stale air and ventilates the space with fresh external air.

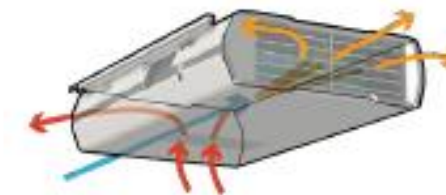
Boost Fan Mode



2. Boost Fan Mode

Dampers are opened and mechanical fan operates to bring fresh air into the room. Especially useful in summer months.

Mixed Recirculation Mode



3. Mixed Recirculation Mode

Dampers are opened, mechanical fan operates, stale indoor air is expelled, warm internal air is recirculated and tempers fresh external air via separate discharge pathways.

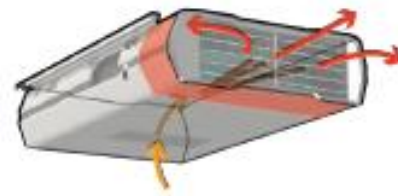
Heat Recovery Mode



4. Heat Recovery Mode

During winter periods, the cross flow heat exchanger increases the temperature of the intake outside air by harvesting heat from the indoor environment whilst expelling stale air.

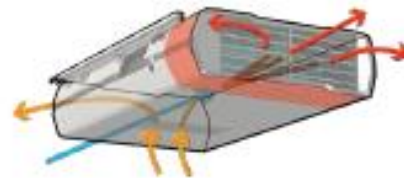
Pre-Heating Mode



5. Pre-Heating Mode

Recirculates indoor air across the heat exchanger coil to pre-heat the room before the start of the day.

Occupied Heating Mode



6. Occupied Heating Mode

When the room is too cool, the off coil temperature is limited, flow rate reduced, and room air is recirculated.

Night-time Cooling

Peak ventilation during summer nights removes warm air from the space ready for the next day.

2.4 MECHANICAL SUPPLY AND EXTRACT VENTILATION

Supply and extract systems shall be installed to provide fresh air for occupant consumption for all non-teaching occupied areas within the development which do not have the potential to install hybrid ventilation systems as they do not have direct access to the external façade.

Mechanical supply and extract ventilation shall be provided by ceiling void mounted heat recovery units to provide supply and extract air for occupancy via ceiling mounted grilles within these areas, in accordance with Approved Document Part F of the Building Regulations.

Incoming supply air will be filtered and tempered and distributed through galvanised ductwork to serve the areas.

Intake / discharge ductwork shall be provided through wall mounted louvres.

Vitiated air will be extracted directly out of the ceiling void plenum via bell-mouth ductwork connections and discharged to atmosphere louvres in the external façade.

The louvres shall be sufficiently spaced apart to minimise recirculation of exhausted air back into the building.

Louvres to be Water Penetration Class C in accordance with BS 13030 and certified to BSRIA.

Fire dampers shall be provided within the ventilation ductwork to maintain the integrity of fire compartmentation in accordance with the Fire Strategy and the requirements of Building Control.

Supply and extract ductwork shall be thermally insulated where it passes through spaces that are at different temperatures to that of the transferred air or where external to the building.

2.5 LOCAL EXTRACT SYSTEMS

Mechanical extract ventilation is to be provided to extract vitiated and contaminated air from toilet areas via independent extract systems with extract fans located within the ceiling voids near to the areas served.

Each toilet extract system shall incorporate a void mounted twin centrifugal extract fan complete with auto changeover (duty share) integral controls. The exhaust from these systems shall be discharged to atmosphere with due regard to adjacent air inlets to avoid foul smells recirculating.

The extract ductwork installation shall be contained within the false ceiling with extract grilles/valves provided over cubicles, showers and ranges of wash hand basins and urinal bowls.

Replacement air into all toilet and changing areas shall be provided from the adjacent lobby area via transfer ducts/ undercut doors.

In addition to the above, the following local extract systems will be provided as required.

- Laundry
- Plant rooms
- Kitchenettes
- Serveries
- Food Bay and Practical Resources rooms
- Server rooms

2.6 KITCHEN EXTRACT

The kitchen will have a dedicated extract system.

The system will be designed in accordance with CIBSE Guidance, DW172 and EMQA+ guidance.

The kitchen will be provided with negative air pressure to prevent foul smells exiting the kitchen into the general school areas. The kitchen shall have a supply air system designed to provide 85% of the supply air. The supply air shall be tempered so that it supplies are at room temperature.

The kitchen will have extract air via a suitable kitchen extract fan, the fan shall be bifurcated type or similar fan type designed to operate in kitchen conditions. The kitchen shall exhaust too above.

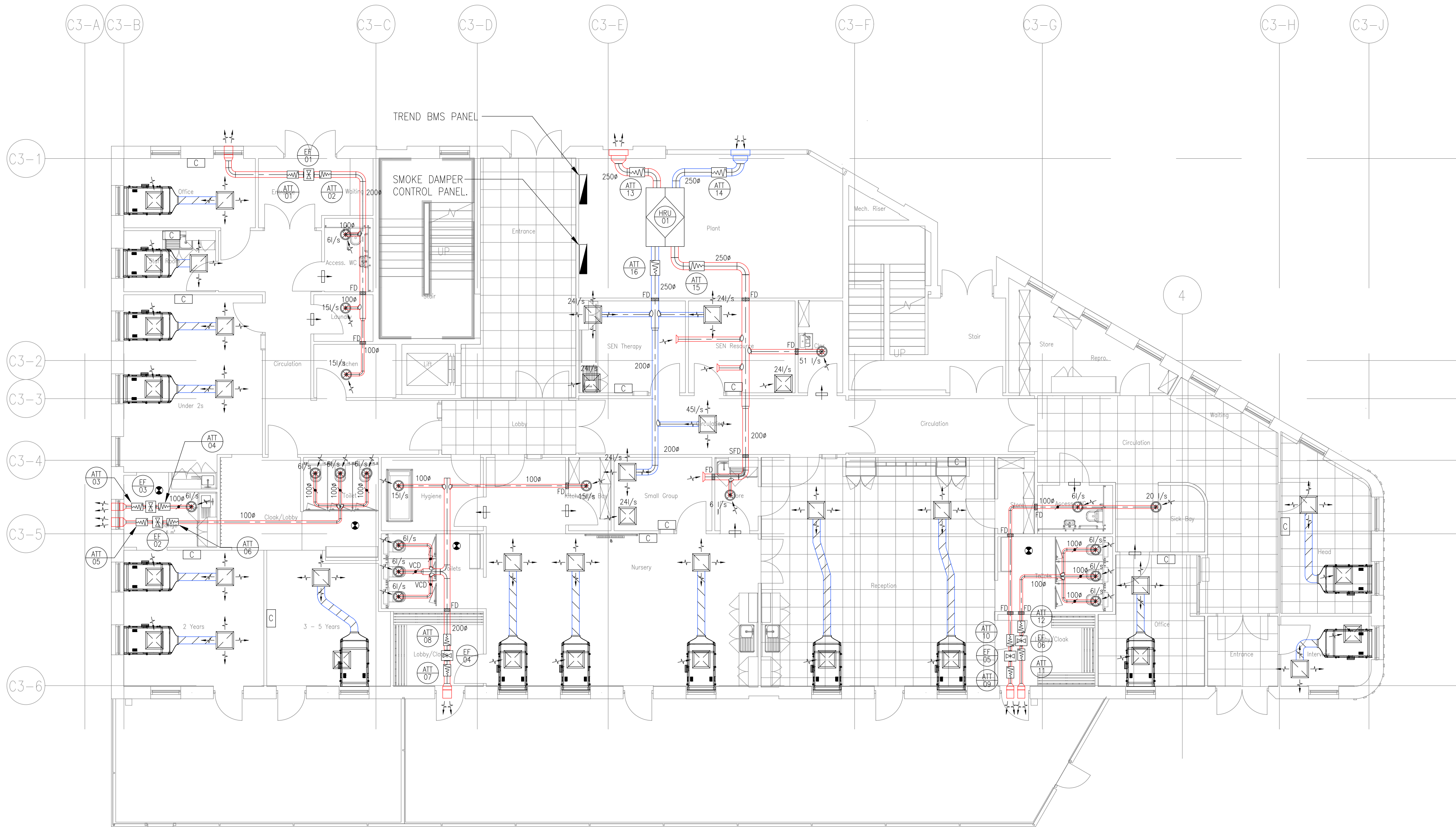
Odour control shall be provided in compliances with EMQA+ guidance. An EMQA+ risk assessment has been carried out based on the latest layout plans for the school. Based on the latest general arrangement drawings, the school kitchen system is defined as “high level odour control requirements”. An appropriate solution to meet the requirements of the EMQA+ document will be provided; an electrostatic precipitator and appropriate carbon filtration will be recommended at design stage.

2.7 NATURAL VENTILATION

If deemed to be required by either Building Control or the lift manufacturer, the contractor shall provide ventilation to the lift shaft based on 1% of the cross sectional area of the shaft or a minimum of 0.1 sq. metres whichever is the greater. If required, this associated ducting will be fire rated.

Plant rooms shall be ventilated by high and low level louvres within the plant room façade, if needed to meet combustion requirements.

APPENDIX A – VENTILATION SERVICES DRAWINGS



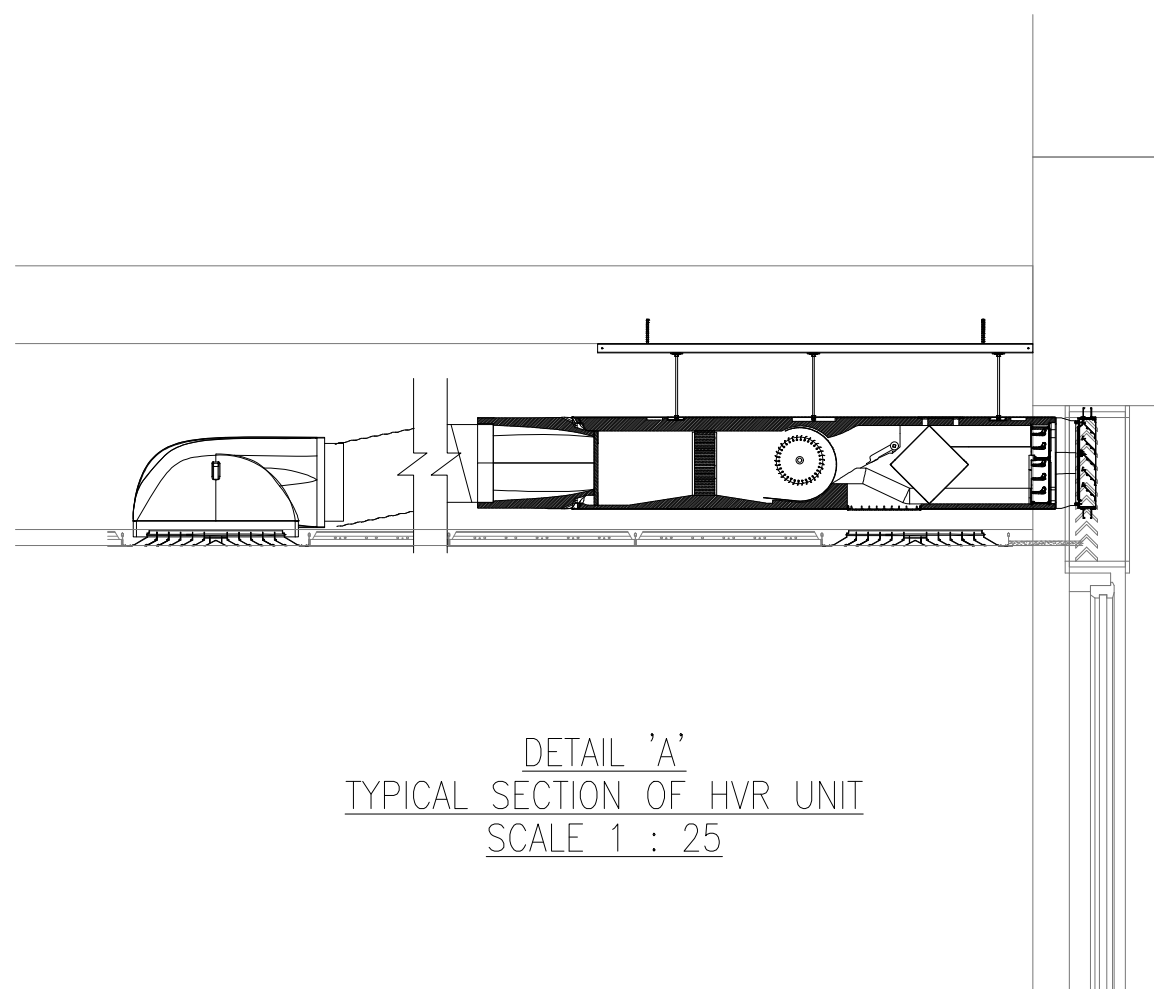
C3 - SCHOOL
LEVEL 00
BASED ON C3 Primary School Architectural Model_Ver2_P03-Floor Plan - 00 - Ground Floor

LEGEND

- EXTRACT DUCTWORK.
- SUPPLY DUCTWORK.
- 250mm $\varnothing$ SPIRAL FLEXIBLE DUCTWORK.
- MONODRAUGHT HVR ZERO SYSTEM IN C/V:
950mm(W) x 1858mm(D) x 290mm(h) &
FILTER MODULE 950mm(W) x 500mm(D) x 290mm(h) &
ACOUSTIC ATTENUATION MODULE 950mm(W) x 500mm(D) x 290mm(h).
SEE DETAIL 'A' FOR TYPICAL SECTION.
- CONTROLLER FOR UNDERFLOOR HEATING.
- CONTROLLER FOR HYBRID THERMAL MIXING SYSTEM
INCORPORATING CO2 SENSOR & BOOST FUNCTION.
THERE ARE TWO CONTROLLER OPTIONS:
- LCD DISPLAY.
- SIMPLISTIC MODEL.
- 600x600mm RECESSED IN LAY IN GRID SUSPENDED
CEILING 4 WAY SUPPLY AIR DIFFUSER C/W PLENUM.
- 600x600mm RECESSED IN LAY IN GRID SUSPENDED
CEILING 4 WAY EXTRACT AIR GRILLE C/W PLENUM.
- CEILING FIXED SUPPLY VALVE.
- CEILING FIXED EXTRACT VALVE.
- EXTRACT FAN.
- ATTENUATOR.
- CROSS TALK ATTENUATOR.
- VOLUME CONTROL DAMPER.
- PRESENCE DETECTOR.
- FIRE DAMPER.
- SMOKE FIRE DAMPER.
- FILTER BOX.
- LOCAL CONTROLLER.
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- INTUMESCENT FIRE RATED DOOR TRANSFER GRILLE.
- R.F.B. RISE FROM BELOW.
- R.T.A. RISE TO ABOVE.
- D.T. DROP TO.
- L/L LOW LEVEL.
- H/L HIGH LEVEL.
- C/V CEILING VOID.
- R/V ROOF VOID.

GENERAL NOTES

- THE DRAWING SHALL BE READ IN CONJUNCTION WITH THE SPECIFICATION & ALL OTHER RELEVANT DOCUMENTS & DRAWINGS PROVIDED BY MEP DESIGN.
 - THE DRAWING INDICATES THE DESIGN INTENT FOR THE WORKS.
 - COORDINATION WORKING DRAWINGS, INSTALLATION DRAWINGS & BUILDERS WORK DRAWINGS SHALL BE PREPARED BY THE CONTRACTOR.
 - DIMENSIONS SHALL NOT BE SCALED FROM THE DRAWING & THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL DIMENSIONS & LEVELS ON SITE FOR THE ACTUAL SETTING OUT OF THE WORKS.
- #### NOTES
- ALL GRILLES AND DIFFUSERS BRANCHES TO HAVE OPPOSED BLADE DAMPERS.
 - ALL DUCTWORK TO DW144/DW172 (WHERE APPLICABLE).
 - FLEX TO BE USED ONLY STRAIGHT-ALL BENDS TO BE RIGID.
 - FIRE DAMPERS TO BE LOCATED IN ACCORDANCE WITH FIRE STRATEGY DRAWING REQUIREMENTS.
 - ACCESS DOORS TO BE LOCATED ADJACENT TO FIRE DAMPERS AND EVERY 3M.
 - ALL BRANCH CONNECTIONS SHALL HAVE VCD'S.
 - ALL DIFFUSERS AND GRILLES TO BE SUPPORTED BY STRUCTURE.
 - IN POSITIONS OF RESTRICTED HEADROOM, DUCTS MAY BE SUPPORTED WITH FLAT BAR FORMED TO DUCT SHAPE WITH FIXINGS AT SIDES ON BENT LUGS.
 - ALL DUCTWORK BRACKETS TO HAVE AN ACOUSTIC SOFT RUBBER OR NEOPRENE INTERFACE LAYER TO THE DUCT.
 - ALL SUPPLY DUCTWORK, INCLUDING SUPPLY PLENUM BOXES TO BE THERMALLY INSULATED.
 - ALL REFERENCES TO SPECIFIC MANUFACTURERS ARE MADE FOR DESIGN SPECIFICATION PURPOSES, INSTALLED EQUIPMENT SHOULD BE OF EQUAL STANDARD AND APPROVED.
 - SMOKE FIRE DAMPERS SHALL BE INSTALLED WHERE DUCTWORK PASSES THROUGH AN ESCAPE ROUTE AND THESE SHALL BE CONTROLLED VIA A PROPRIETARY SMOKE DAMPER CONTROL SYSTEM. THE CONTROL PANEL FOR THIS SYSTEM SHALL BE INSTALLED ADJACENT THE FIRE ALARM PANEL AND EACH SMOKE FIRE DAMPER SHALL HAVE A 240V POWER SUPPLY PROVIDED ADJACENT TO POWER THE CONTROL ACTUATOR FOR THE DAMPER. EACH DAMPER SHALL BE POWER OPEN/FAIL CLOSE.
 - PRE-PLANNING ISSUE FOR VENTILATION STRATEGY & ROUTING ONLY. DESIGN TO BE DEVELOPED TO DETAIL FIRE DAMPERS, ATTENUATION, DUCTS SIZES & PLANT SELECTION AT STAGE 4.



DETAIL 'A'
TYPICAL SECTION OF HVR UNIT
SCALE 1 : 25

X02 - STAGE 4 DESIGN	MAR 22
X01 - PRE-PLANNING ISSUE	FEB 22
Revision Description	Date

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Client	Renaker
Project	CROWN ST PHASE 2 C3 - SCHOOL
Title	MECHANICAL SERVICES PROPOSED GROUND FLOOR VENTILATION INSTALLATION

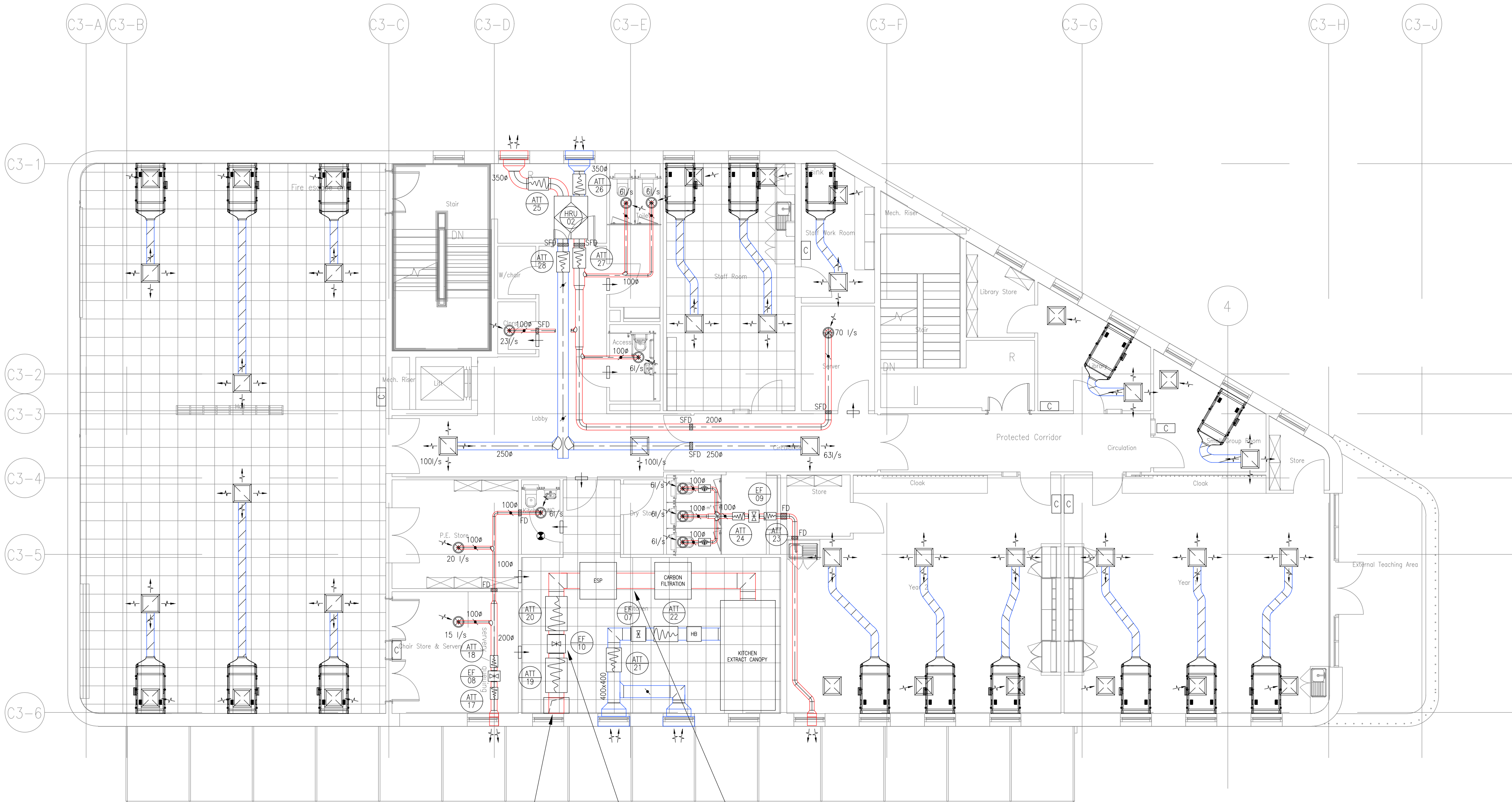
Scale	1 : 100 @A1			Drawn	W.H.		
Project No.	Zone	Originator	Uniclass	Type	Level	Code	Rev
22_001	C3	MEP	G525	PL	GRD	001	X02

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- EXTRACT FAN.
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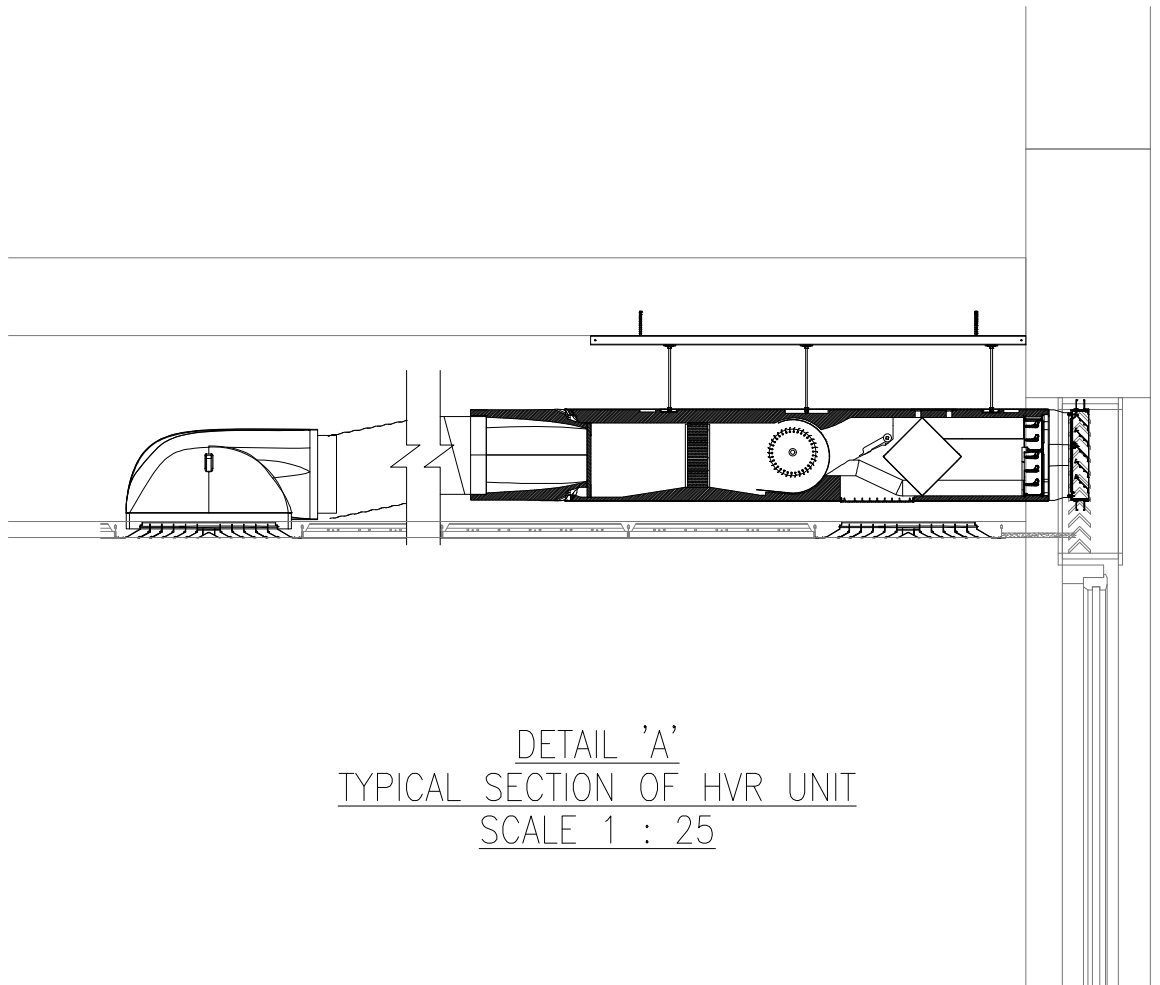


C3 - SCHOOL
LEVEL 01

BASED ON Crown Street C3 Primary School Architectural Model_Ver2_P03-Floor Plan - 01 - First Floor

FIRE RATED DUCTWORK RISE TO ROOF
LEVEL WITH 2m OVERRUN & COWL.
AUTOMATIC FIRE & SMOKE DAMPERS
REQUIRED AT EACH FLOOR LEVEL &
ASSOCIATED CONTROL & POWER SYSTEM.

KITCHEN EXTRACT FAN.



X02	STAGE 4 DESIGN	MAR 22
X01	PRE-PLANNING ISSUE	FEB 22
Revision	Description	Date

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Client **Renaker**

Project
CROWN ST PHASE 2
C3 - SCHOOL

Title
MECHANICAL SERVICES
PROPOSED FIRST FLOOR
VENTILATION INSTALLATION

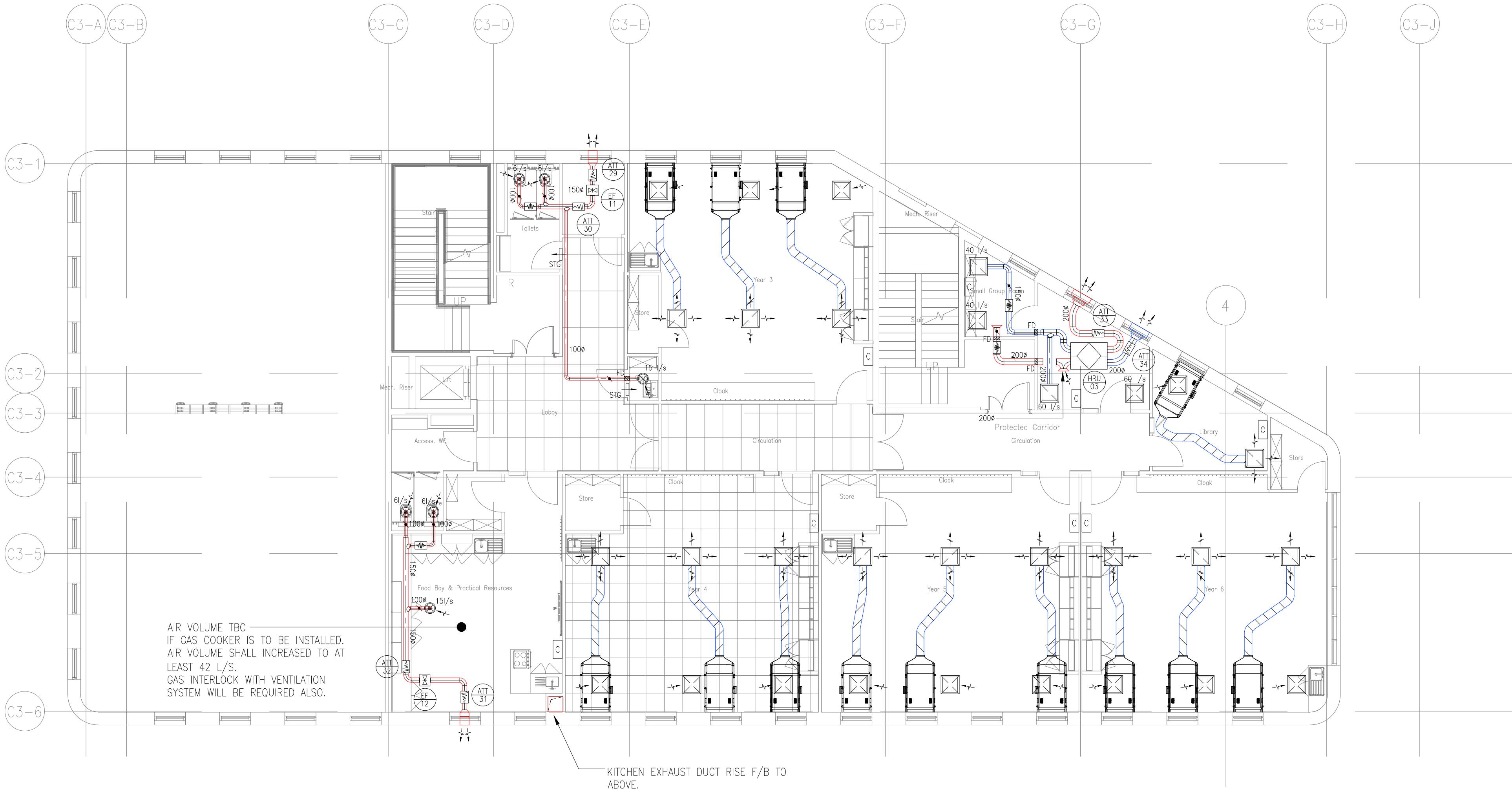
Scale	1 : 100 @A1			Drawn		W.H.	
Project No.	Zone	Originator	Uniclass	Type	Level	Code	Rev
22_001	C3	- MEP	- G525	- PL	- 01	- 001	- X02

GENERAL NOTES

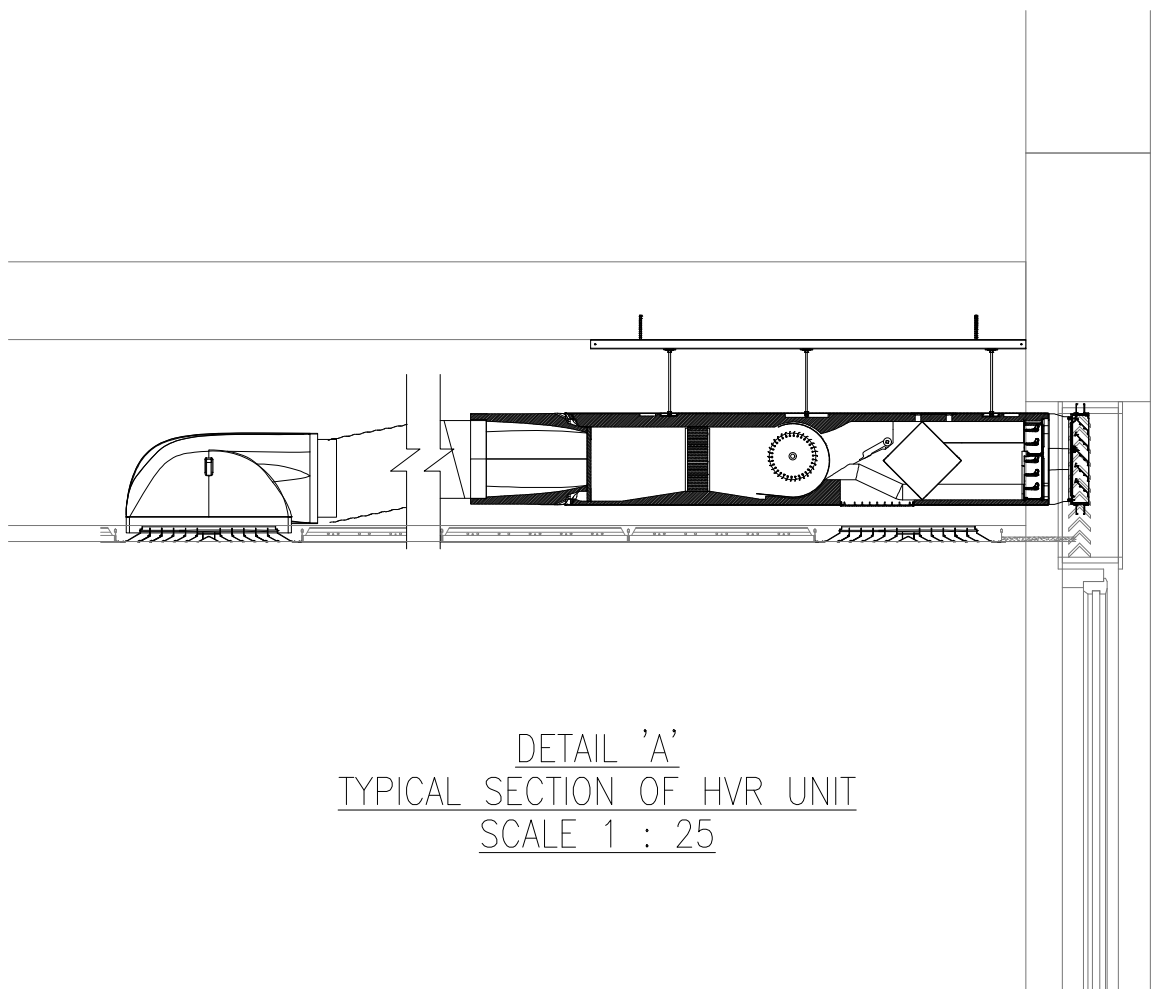
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- D.T. DROP TO.
- L/L. LOW LEVEL.
- H/L. HIGH LEVEL.
- C/V. CEILING VOID.
- R/V. ROOF VOID.



C3 - SCHOOL
LEVEL 02
BASED ON C3 Primary School Architectural Model_Ver2_P03-Floor Plan - 02 - Second Floor



X02	STAGE 4 DESIGN	MAR 22
X01	PRE-PLANNING ISSUE	FEB 22
Revision	Description	Date

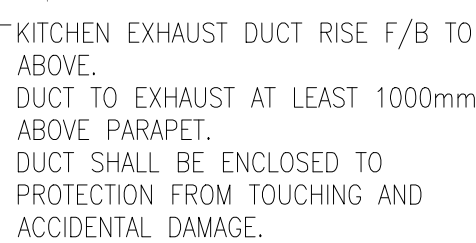
**MEP
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www.mepdesign.co.uk

Client	Renaker
Project	CROWN ST PHASE 2 C3 - SCHOOL
Title	MECHANICAL SERVICES PROPOSED SECOND FLOOR VENTILATION INSTALLATION

Scale	1 : 100 @A1			Drawn		W.H.	
Project No.	Zone	Originator	Uniclass	Type	Level	Code	Rev
22_001	C3	- MEP	- G525	- PL	- 02	- 001	- X02

R/V ROOF VUL

13.0 PRE-PLANNING ISSUE FOR VENTILATION STRATEGY & ROUTING ONLY. DESIGN TO BE DEVELOPED TO DETAIL FIRE DAMPERS, ATTENUATION, DUCTS SIZES & PLANT SELECTION AT STAGE 4.



Project No.	Zone	Originator	Uniclass	Type	Level	Code	Rev
22-001-	C3	- MEP	- G525	- PL	- 03	-001-	X02

APPENDIX B – EMQA+ ODOUR CONTROL RISK ASSESSMENT

EMQA+

Risk Assessment for Odour Control

Project Number:	22_001
Project Name:	C3, Crown Street School
Document Reference:	Appendix B

Criteria	Score	Score	Details
Dispersion	Very Poor	20	Low level discharge, discharge into courtyard on 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 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.
Cooking type (odour and grease loading)	Very High	10	Pub (high level of friend food), friend chicken, burgers or fish and 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 friend food, mainly reheating and sandwiches etc), Tea rooms.

Significance "Total" Score = 21

Impact Risk Result = High Risk

Odour Control Requirement = High Level Odour Control

Revision Summary		
Description	Revision	Date
Risk assessment based on stage 3 design package	P01	08/02/2021