Addendum No: 3

McMaster University
Department of Facility Services
Design and Construction
1280 Main Street West
Hamilton, ON
L8S 4M3
Tel: 905 525 9140
Fax: 905 572 6990

Project: **RFQ-1202-2025**
Project Name: University Hall HVAC Upgrade
Project Number: 20020136
Date: August 27, 2025

This addendum forms a part of the RFQ documents and will be incorporated into the Contract Documents, as applicable. This addendum changes and shall govern over the referenced sections of the original RFQ documents or any previously issued addenda. Acknowledge receipt of this addendum on the quotation form. Failure to acknowledge receipt of addenda on the quotation form shall result in disqualification.

Question 1:

1. Please advise if an extension can be provided for this tender.

2. The new installed ductwork on M2.0, the duct shows 100x50, which would make the duct 4"x2". Is this a typo? CFSD will not come smaller than 150x150/ 6"x6”

3. For ERV-1, are the Supply & Exhaust Fan VFD’s provided by the Manufacturer?

4. For ERV-1, are the Outdoor Air & Exhaust Air Dampers provided by the Manufacturer? If these dampers are provided, are they provided with Actuators?

5. For ERV-1, Are the Return Air & Supply Air Airflow Stations provided by the Manufacturer?

6. Relating to ERV-2A/B, these ERV’s appear to be small, packaged units with self contained controls and we want to confirm the BAS/Control Points required as indicated on M0.3 Detail-4?

7. For ERV-2A/B, I believe that we should provide these units with a Start/Stop Command, Monitor the Status of the Fans & Filters. Please confirm.

8. For ERV-2A/B, are the Outdoor Air & Exhaust Air Dampers provided by the Manufacturer in these ERV’s?

9. For ERV-2A/B, are isolation Dampers required on the Outdoor Air & Exhaust Air at the Perimeter Wall?

10. Specification section 01 14 00 – Work Restrictions notes all work within the tenants work areas to be completed after hours. Please advise which areas can be completed during regular working hours.

11. No scale is provided for any mechanical drawings. Please provide scale for all the mechanical drawings.

12. Please advise if pipe freezing is required for isolating the hydronic pipes in each level or there is existing isolation valves which can hold.

13. Please confirm if pipe freezing is required, it can be done during regular working hours.

14. No pipe size is provided for the existing pipes where new CD, CHWS/R, HWS/R, LPS & LPC pipes are connecting in the basement, Level 1, Level 2 and Level 3. Please provide the pipe sizes of the existing pipes.

15. Please confirm the access to the attic space for equipment and structural steel is to be through a hole in the roof as there does not appear to be any other means of material access.

16. Please advise if there is any limitation in size of the access hole in the roof.

Answer 1:

1. Refer to Addendum #2 for revised tender schedule.

2. Ducts sizes have been revised. No new ducts should be smaller than 6x4, and where fire dampers are required, ducts are at a minimum 6x6. Refer to enclosed MCW Addendum 01.

3. VFD's are to be supplied by manufacturer and installed inside the fan sections and energy wheel sections.

4. No, supply and exhaust dampers are not provided. These are to be provided separately within their respective plenums. Refer to enclosed MCW Addendum 01.

5. No. All of the controls, including the sensor and other end devices to be by BAS (temperature sensors, CO2, humidity etc., air flow stations, dirty filter switches, sensors on the energy wheel together with the defrost logic, control/operation logic, PLCs etc.). This is to eliminate the need for additional controls panels and to avoid possible communication conflicts with the BAS.

6. These units should have start/stop/status monitoring only. Coil temperature sensors, supply air sensors, and return air sensors, should be provided within the ductwork mains entering and leaving the pair of units, as appropriate with respect to the coil locations. Valves on the coils will need to control to these sensors to maintain air quality.

7. Start/Stop/Status should be provided. Filter status monitoring is not required for these units.

8. No, supply and exhaust dampers are not provided. These are to be installed in the respective plenums. Refer to enclosed MCW Addendum 01.

9. Motorized dampers have been added to the plenums at the wall for these units. Refer to enclosed MCW Addendum 01.

10. Regular working hours at the University Hall building are considered to be from 7:00a.m. to 10:00p.m. Classrooms and Offices are expected to be occupied between 7:00a.m. and 3:00p.m. during the week. Work can be undertaken from 3:00p.m. until 10:00p.m. in Classrooms and Offices provided areas are cleaned and prepared for the next day's occupation at the end of each shift.

Solid colored blocks on the previously issued Planning Schedule indicate weeks when specific rooms are fully available. The Classroom and Registrar areas are the most restrictive in availability. As indicated in the schedule, the facility will be fully available the week of October 13th, the weeks of December 8th thru January 5th inclusive, the week of February 16th, and the weeks of April 6th to May 11th inclusive.

11. Drawings have been prepared at ~1:96 scale, however, all drawings are for diagrammatic purposes only and should not be scaled. Final sizes and locations of all equipment with respect to building features and one another are the responsibility of the installing contractor.

12. Assume that the valves will not hold and include for pipe freezing in the pipes at each level. Size for pipes have been added to the drawings. Refer to enclosed MCW Addendum 01.

13. Work which is non-obtrusive to surrounding occupants within adjacent spaces and to the general occupancy of the building may take place during regular working hours.

14. Pipe sizes have been added to the drawings for the existing piping where appropriate. Refer to enclosed MCW Addendum 01.

15. Correct, access to the attic area for equipment will be through the new temporary roof opening. There is a fixed ladder access from the third floor for personnel.

16. New access opening(s) will be limited in dimension due to the existing interior framing of the roof structure. Regular spacing of the existing framing members will govern the size of any individual roof deck openings.

Question: 2

1. Multiple Mechanical and Electrical sub trades are requesting a scheduled sub trade walk through prior to the submission deadline to gain more info for their pricing.

2. Is there a preferred fire alarm contractor?

3. Will an ESA safe inspection be needed for altering electrical panel ESP?

4. We have received multiple requests by sub trades for an extension of the tender close deadline. Can the deadline be extended by one week to provide more accurate pricing.

5.Is there a preferred fire alarm contractor?

6.Can you please provide a panel schedule for ESP-A?

7.Can we use EMT conduit rather than wire mold?.

Answer: 2

1. Trades Walk through was granted on Tuesday Sept 26th at 10:30am, notice was sent to bidders through bonfire on Aug 22.

2. Work to be performed by one McMaster's approved fire alarm contractors. Refer to list provided by McMaster.

Tyco Integrated Fire & Security Canada Inc. D/B/A Johnson Controls 40, Hempstead Drive, Hamilton, ON – L8W 2E7 Ph: 905-577-4077 Fax: 905-577-0091 Contact: Dave Cook + Troy Paterson Email: dave.cook@jci.com + troy.paterson@jci.com	PLC Fire Safety Solutions 3413, Wolfedale Road, Unit 7 Mississauga, ON – L5C 1V8 Tel: 905-949-2755 Fax: 905 – 949 – 1752 Contact: Rudy Cronk Email: rcronk@plcfire.com
Richardson Fire Systems Inc. 13 Old Mill Road Cambridge, ON – N3H 4R8 Tel: 519-650-8057 Fax: 519-650-0343 Contact: Jean M. Howitt Email: jean.howitt@richardsonfire.com	Troy Life & Fire Safety Ltd. 4697, Christie Drive, Beamsville, ON – L0R 1B4 Tel: 905-563-4889 Fax: 905-563-8477 Contact: Glen Zimmerman Email: glen.zimmerman@troylfs.com
Vipond Fire Protection, A division of Vipond Inc. 807 South Service Road Hamilton, ON – L8E 5Z2 Tel: 905-643-6006 Fax: 905-643-7671 Contact: Julien Van Overloop + Jason Lucas Email: julien.vanoverloop@vipond.ca + jason.lucas@vipond.ca	

3. Application and clearance to ESA is the responsibility of the electrical contractor.

4. Refer to Addendum #2 for revised tender schedule.

5. Work to be performed by one McMaster's approved fire alarm contractors. Refer to list provided by McMaster.

6. As specified on the drawings that the new panel "shall be rated for 100A, 120/208V, 3ph and come complete with twelve (12) 15A-1P breakers".

7. EMT conduit is acceptable.

Question: 3

1. No scale is provided for any mechanical drawings. Please provide scale for all the mechanical drawings.

2. Please confirm all the work can be performed during regular working hours.

3. Please advise if pipe freezing is required for isolating the hydronic pipes in each level or there is existing isolation valves which can hold.

4. Please confirm if pipe freezing is required, it can be done during regular working hours.

5. No pipe size is provided for the existing pipes where new CD, CHWS/R, HWS/R, LPS & LPC pipes are connecting in the basement, Level 1, Level 2 and Level 3. Please provide the pipe sizes of the existing pipes.

Answer: 3

1. Drawings have been prepared at ~1:96 scale, however, all drawings are for diagrammatic purposes only and should not be scaled. Final sizes and locations of all equipment with respect to building features and one another are the responsibility of the installing contractor.

2. Regular working hours at the University Hall building are considered to be from 7:00a.m. to 10:00p.m. Classrooms and Offices are expected to be occupied between 7:00a.m. and 3:00p.m. Bearing in mind that this building will be in operation during the renovations some consideration and coordination will be required on behalf of the contractor to work cooperatively with University staff. Not all rooms will be accessible at all times. Refer to the previously provided schedule indicating localized restrictions for specific areas of work. Schedule also indicates open blocks of time when full access to the building will be available.

3. Assume that the valves will not hold and include for pipe freezing in the pipes at each level. Size for pipes have been added to the drawings. Refer to enclosed MCW Addendum 01.

4. Work which is non-obtrusive to surrounding occupants within adjacent spaces and to the general occupancy of the building may take place during regular working hours.

5. Pipe sizes have been added to the drawings for the existing piping where appropriate. Refer to enclosed MCW Addendum 01.

Amendment No.1 – MCW Addendum No. 01

Index of Mechanical and Electrical drawings
2025-08-22-MCMASTER UNIVERSITY HALL – MDWG – ISSUED FOR ADD-01
2025-08-22-MCMASTER UNIVERSITY HALL – EDWG – ISSUED FOR ADD-01

Amendment No.2 - +VG detail revisions

SK-02 – Third Floor Shaft and Ceiling Details

End of Addendum 3

Addendum

Queen's Quay Terminal
207 Queen's Quay West, Suite 615
Toronto, Ontario M5J 1A7
Phone 416-598-2920 Fax 416-598-5394
www.mcw.com

Date: August 22, 2025

Project Name: McMaster University – University Hall Ventilation Upgrade
Client: McMaster University — Project #: 22227B
To: +VG Architects — ADD #: 01
Attention: Ed Shuck — eschuck@plusvg.com — Page #: 1 of 2
From: Tareq Nassar — tnassar@mcw.com — + Attachment
Distribution: David MacKeracher – MCW — DMacKeracher@mcw.com
Peera Butrsingkorn – MCW — Peera@mcw.com
Kevin Church – +VG — KChurch@plusvg.com

In accordance with the drawings and specifications, provide in the tender all costs required to complete the work including items as listed below.

Title: Mech/Elec Addendum 01
Reason for Change: Revisions to capture addendum questions and permit comments

Specifications:

Section #	Revisions
N/A	• N/A

Mechanical Drawings:

Drawing #	Revisions
M0.1	• Revised energy/heat recovery ventilator/wheel schedule with details on sound power levels, as well as additional details on unit construction. • Revised air handling unit schedule with additional details on construction and installation.
M0.3	• Revised ERV-1 riser diagram and match with revisions to floor plan.
M1.0	• Added existing pipe sizes.
M1.1	• Added existing pipe sizes.
M1.2	• Added existing pipe sizes.
M1.3	• Added existing pipe sizes.
M2.0	• Revised exhaust and supply duct sizes. • Added existing pipe sizes.
M2.1	• Revised exhaust and supply duct sizes. • Added existing pipe sizes. • Added motorized dampers to the F/A and E/A ducts within room 122
M2.2	• Revised exhaust and supply duct sizes. • Added existing pipe sizes.
M2.3	• Added combination fire smoke dampers. • Added existing pipe sizes.

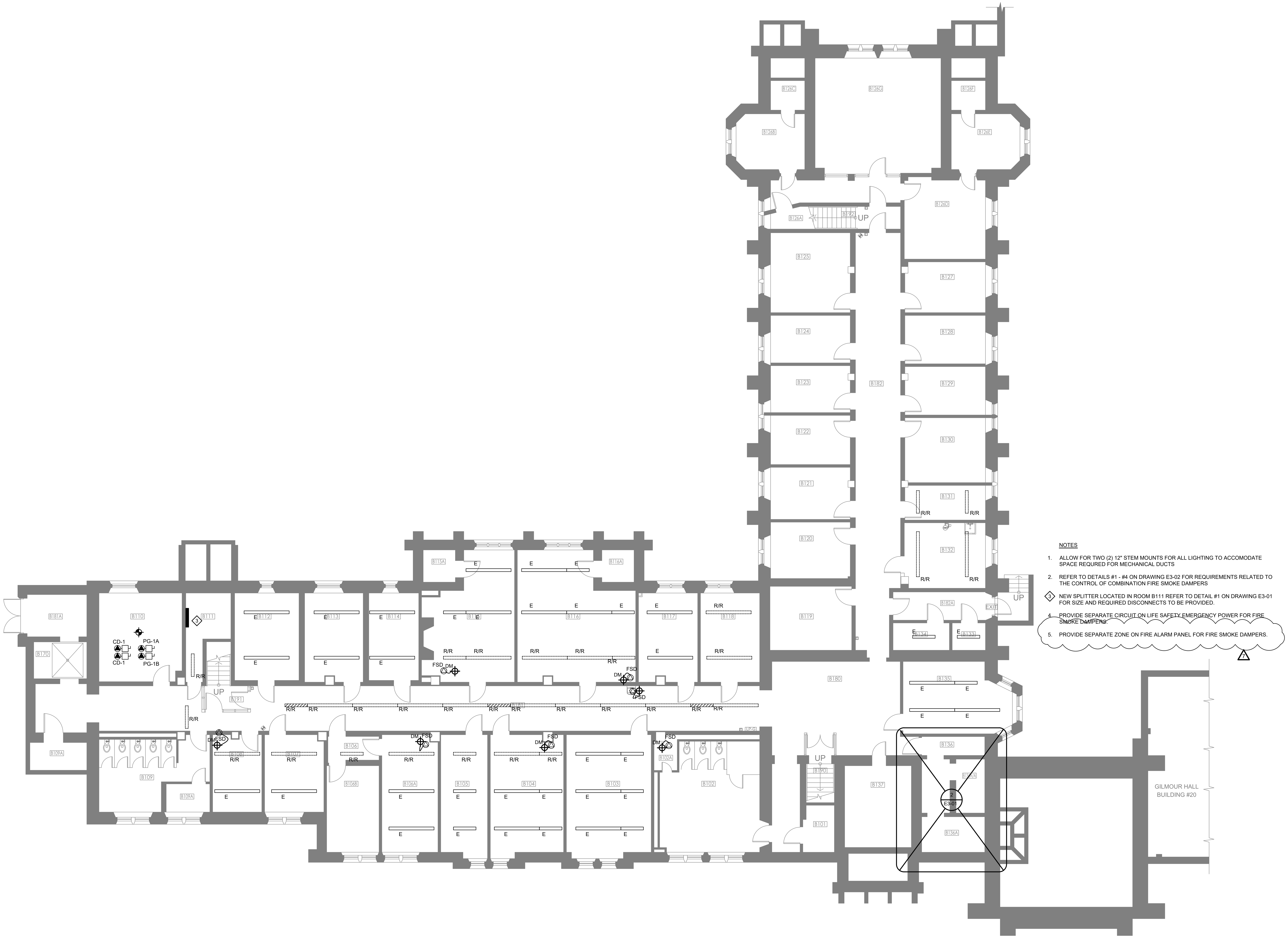
Mechanical Drawings:

Drawing #	Revisions
M2.4	• Added combination fire smoke dampers. • Added motorized dampers to the F/A and E/A plenums before they penetrate the roof.

Electrical Drawings:

Drawing #	Revisions
E2-01	• Added note. 5.
E2-02	• Added note. 5.
E2-03	• Added note. 5.
E2-04	• Added note. 5.
E2-05	• Added note. 2 & 3. • Added scope for combination fire smoke dampers.

End of ADD # 01



NOTES

1. ALLOW FOR TWO (2) 12" STEM MOUNTS FOR ALL LIGHTING TO ACCOMODATE SPACE REQURED FOR MECHANICAL DUCTS
2. REFER TO DETAILS #1 - #4 ON DRAWING E3-02 FOR REQUIREMENTS RELATED TO THE CONTROL OF COMBINATION FIRE SMOKE DAMPERS
3. NEW SPLITTER LOCATED IN ROOM B111 REFER TO DETAIL #1 ON DRAWING E3-01 FOR SIZE AND REQUIRED DISCONNECTS TO BE PROVIDED.
4. ~~PROVIDE SEPARATE CIRCUIT ON LIFE SAFETY EMERGENCY POWER FOR FIRE SMOKE DAMPERS.~~
5. PROVIDE SEPARATE ZONE ON FIRE ALARM PANEL FOR FIRE SMOKE DAMPERS.

7

REVISIONS

NO.	DATE	PARTICULAR
1	23.01.25	ISSUED FOR COORDINATION REVIEW
2	23.03.08	ISSUED FOR 50% DD REVIEW
3	23.04.24	ISSUED FOR 90% DD REVIEW
4	24.04.10	ISSUED FOR PRE-TENDER REVIEW
5	25.07.04	ISSUED FOR PERMIT
6	25.08.05	ISSUED FOR TENDER
7	25.08.22	ISSUED FOR ADDENDUM 01

NOTES:

KEY PLAN:

CLIENT:
McMASTER UNIVERSITY
HAMILTON, ONTARIO

Project No. 22227B

PROJECT:
22227B

UNIVERSITY HALL VENTILATION UPGRADE

McMaster University Campus
1280 MAIN ST. W.
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Plot Date: Aug 22, 2025 - 11:39am By: pjani

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BASEMENT - ELECTRICAL SCOPE OF WORK

E2-01

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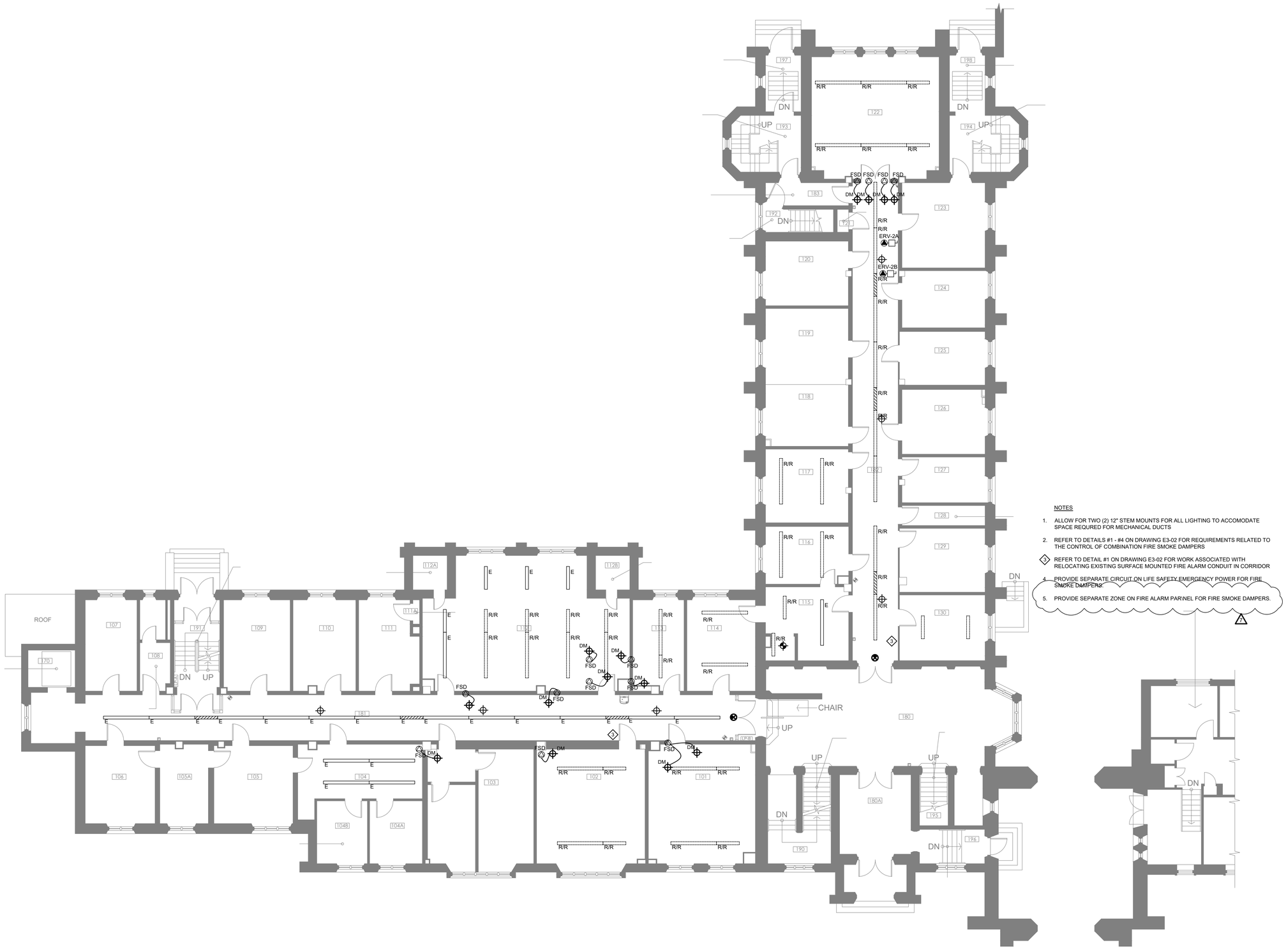

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LEVLE 1 - ELECTRICAL SCOPE OF WORK

E2-02

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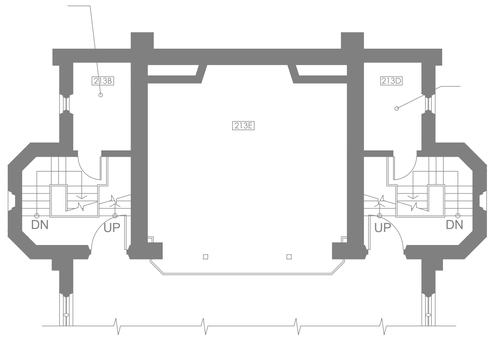

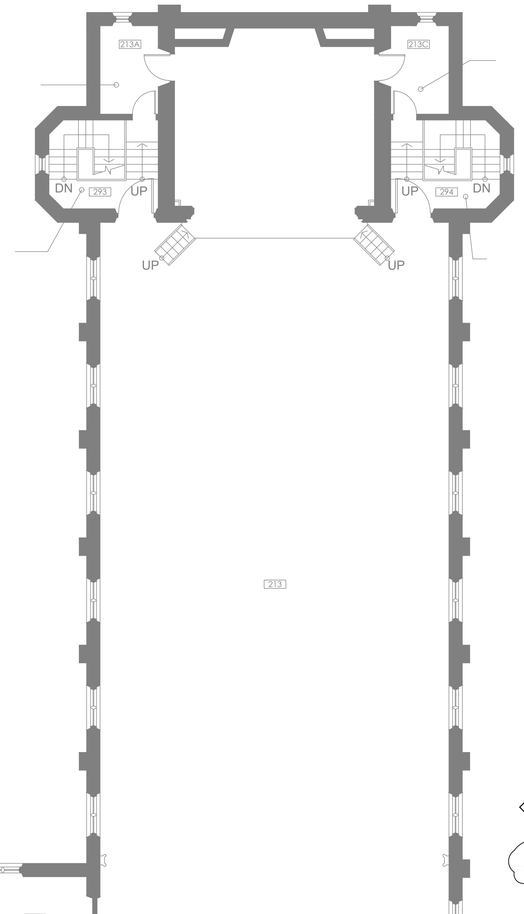

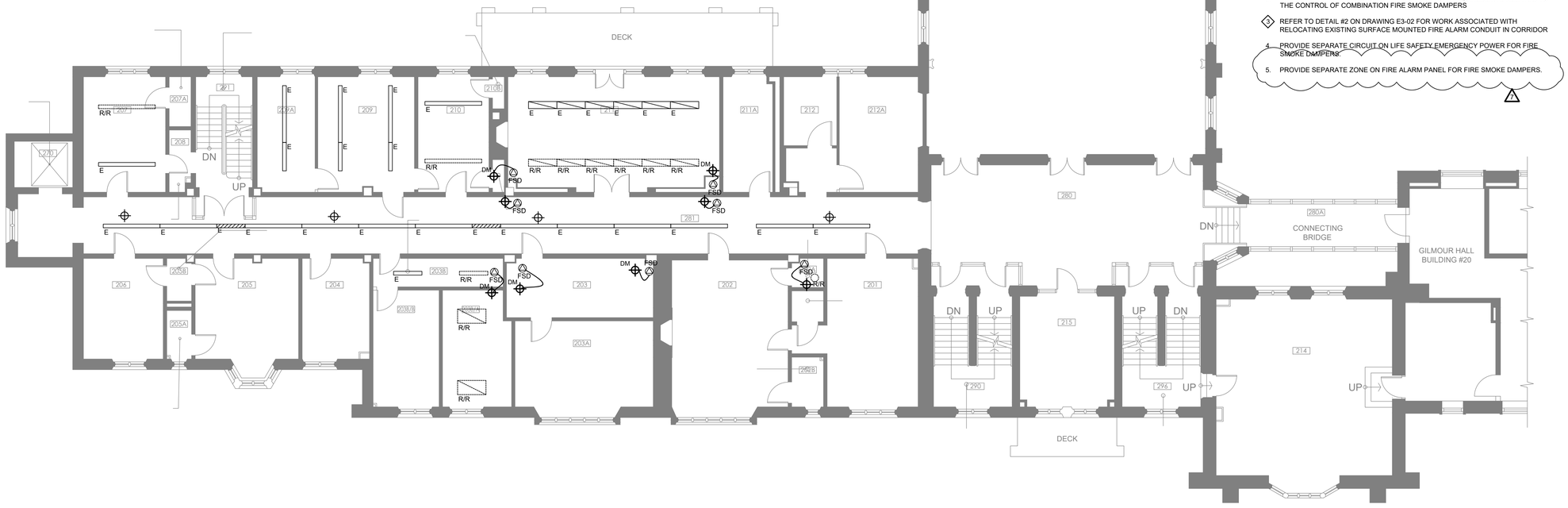

NOTES

1. ALLOW FOR TWO (2) 12" STEM MOUNTS FOR ALL LIGHTING TO ACCOMODATE SPACE REQURED FOR MECHANICAL DUCTS
2. REFER TO DETAILS #1 - #4 ON DRAWING E3-02 FOR REQUIREMENTS RELATED TO THE CONTROL OF COMBINATION FIRE SMOKE DAMPERS
3. REFER TO DETAIL #2 ON DRAWING E3-02 FOR WORK ASSOCIATED WITH RELOCATING EXISTING SURFACE MOUNTED FIRE ALARM CONDUIT IN CORRIDOR
4. PROVIDE SEPARATE CIRCUIT ON LIFE SAFETY EMERGENCY POWER FOR FIRE SMOKE DAMPERS.
5. PROVIDE SEPARATE ZONE ON FIRE ALARM PANEL FOR FIRE SMOKE DAMPERS.

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6	25.08.05	ISSUED FOR TENDER
7	25.08.22	ISSUED FOR ADDENDUM 01

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LEVLE 2 - ELECTRICAL SCOPE OF WORK

E2-03

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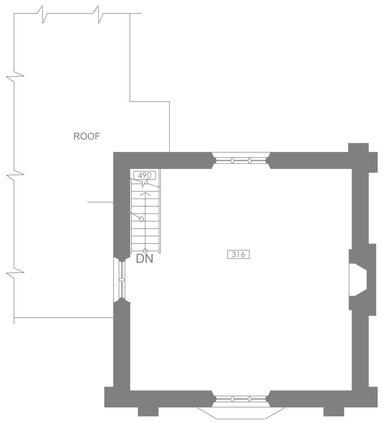

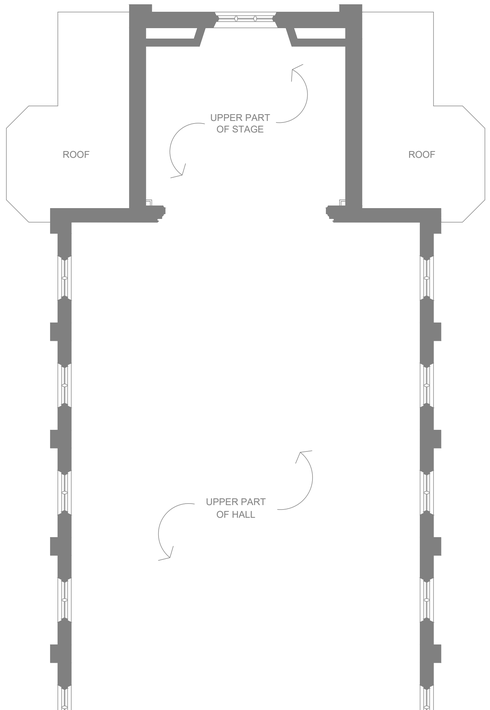

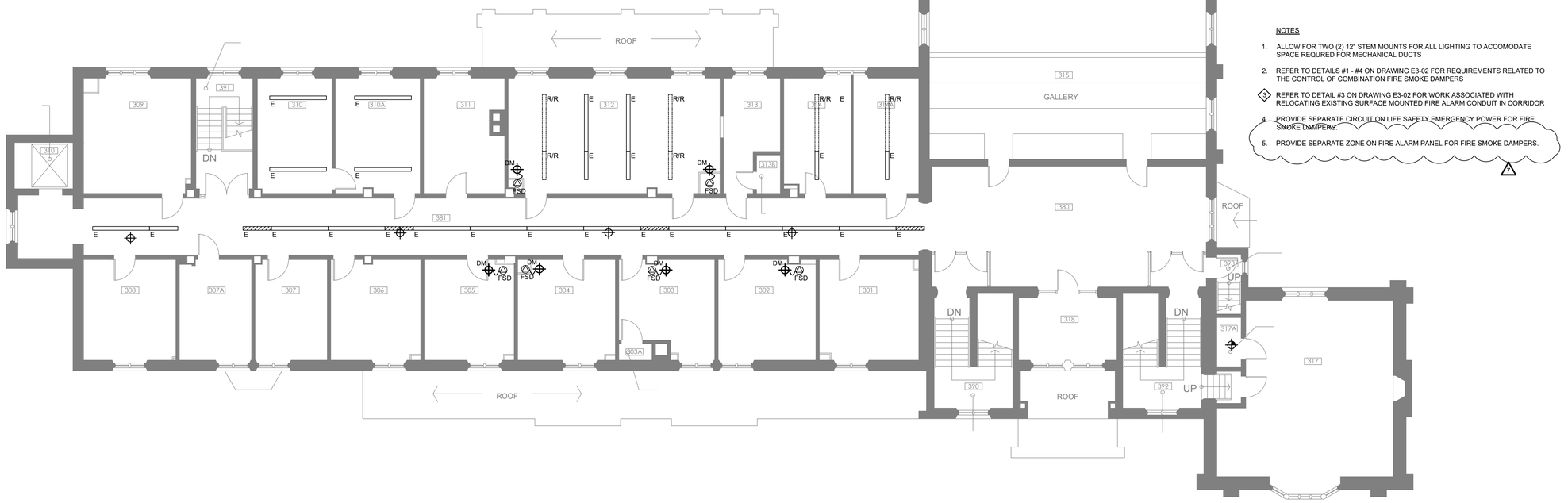

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3. REFER TO DETAIL #3 ON DRAWING E3-02 FOR WORK ASSOCIATED WITH RELOCATING EXISTING SURFACE MOUNTED FIRE ALARM CONDUIT IN CORRIDOR
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LEVLE 3 - ELECTRICAL SCOPE OF WORK

E2-04

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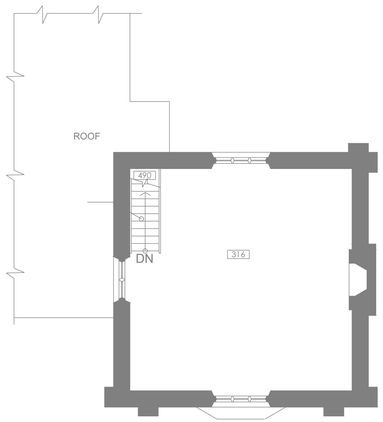

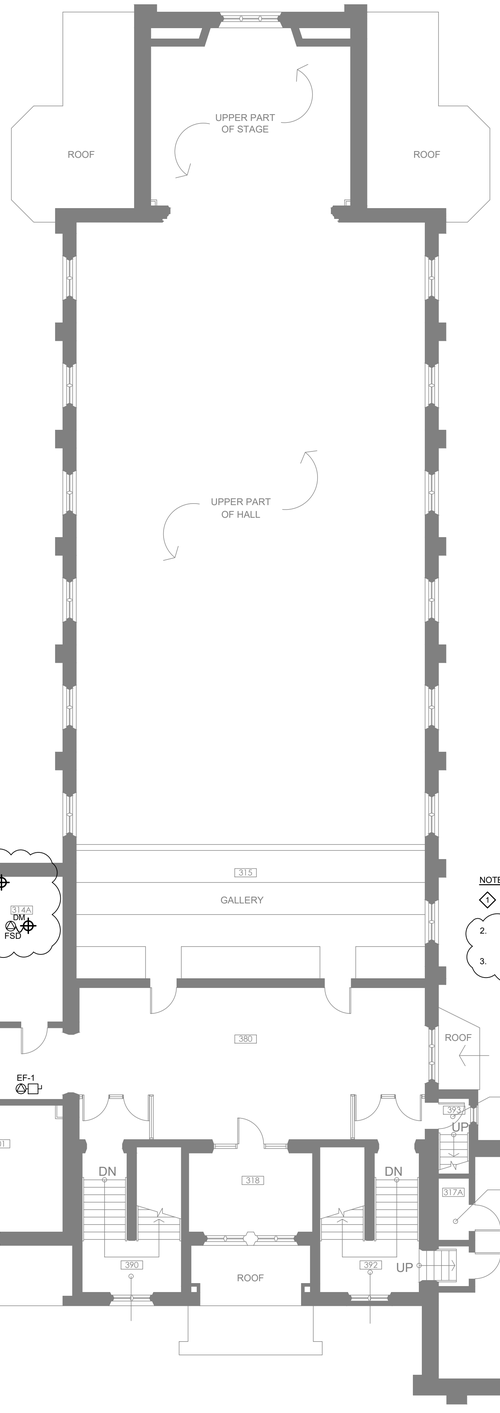

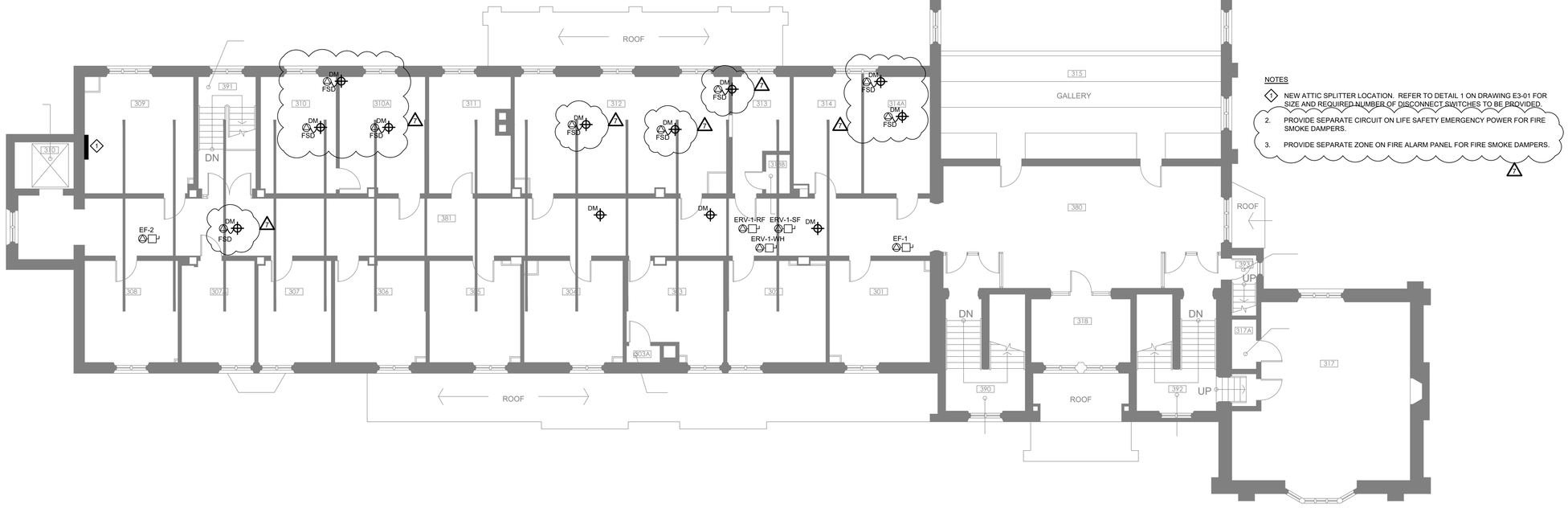

NOTES

1. NEW ATTIC SPLITTER LOCATION. REFER TO DETAIL 1 ON DRAWING E3-01 FOR SIZE AND REQUIRED NUMBER OF DISCONNECT SWITCHES TO BE PROVIDED
2. PROVIDE SEPARATE CIRCUIT ON LIFE SAFETY EMERGENCY POWER FOR FIRE SMOKE DAMPERS.
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ATTIC - ELECTRICAL NEW WORK

E2-05

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AIR HANDLING UNIT SCHEDULE

REF.	DESCRIPTION	LOCATION	SERVING	SUPPLY AIR (cfm)	MFG.	MODEL
ERV-1	CLASSROOM FRESH AIR	ATTIC	UNIVERSITY HALL	2600	VTS	AVS040_WCL_1

REF.	COOLING COIL													
	CAPACITY (MBH)		COIL DIMS.		EAT °F		LAT °F		EWT °F	LWT °F	PD (ft.wg.)	FLUID TYPE	FLUID FLOW RATE (GPM)
	TOTAL	SENS.	H (in)	W (in)	WB	DB	WB	DB					
ERV-1	41.8	30.9	27.5	46.75	78.5	66.6	68.0	61.6	44.0	54.0	1.083	WATER	8.33

REF.	HEATING COIL												
	CAPACITY (MBH)	COIL DIMS.		EAT °F		LAT °F		EWT °F	LWT °F	PD (ft.wg.)	FLUID TYPE	FLUID FLOW RATE (GPM)
	TOTAL	H (in)	W (in)	WB	DB	WB	DB					
ERV-1	76.2	27.5	46.75	43.0	37.0	70.0	50.3	140.0	120.0	2.37	30% PG	7.86

REF.	DIMENSIONS (IN)				ESP (IN)	ELECTRICAL							
	L	W	H	WEIGHT (lb)		SUPPLY FAN				EXHAUST FAN			
						HP	MOP	MCA	FLA	HP	MOP	MCA	FLA
ERV-1	116.38	59.06	70.87	1704	2.5	5	15	6.6	5.3	3	15	4.1	3.3

REF.	ACOUSTIC POWER LEVEL [DB(A)] (OUTLET)								
	63	125	250	500	1000	2000	4000	8000	Lw
ERV-1	49.3	64.8	78.8	84.8	84.8	82.8	77.8	71.8	89.8

REF.	POWER SUPPLY					STARTER			CONTROLS			OTHER REQUIREMENTS:			REMARKS:
	VOLTS	PHASE	HZ	EM.	NORM.	SUPPLIED BY:	INSTALLED BY:	TYPE	MAN.	AUTO.	INTERLOCK BY:	DISC. AT MOTOR	W.P. DISC. AT MOTOR	F.A. SHUT	
ERV-1	575	3	60	N	Y	-	-	VSD	-	BAS	-	Y	N	Y	REFER TO NOTES LISTED AT BOTTOM OF THIS SCHEDULE.

NOTES: (1) UNIT TO BE PROVIDED WITH MERV8 PRE-FILTERS AND MERV13 FINAL FILTERS ON THE SUPPLY AIR, AND WITH MERV 13 FILTERS ON THE RETURN AIR.
(2) PANELS ARE DOUBLE WALL 2" POLYURETHANE FOAM INJECTED R13 PANELS, WITH THERMALLY BROKEN CONSTRUCTION.
(3) FANS ARE DIRECT DRIVEN PLENUM FANS, C/W VFD CONTROLLED TEFC MOTOR.
(4) ENTHALPY WHEEL IS SINGLE PIECE ALUMINUM CONSTRUCTION, WITH MINIMUM 83.4% SENSIBLE AND 86.3% LATENT EFFICIENCY.
(5) FAN DRIVES AND WHEEL REQUIRE INDEPENDENT POWER CONNECTIONS.
(6) CONTROLS BY BAS CONTRACTOR, REFER TO SEQUENCE FOR REQUIREMENTS.
(7) UNIT DIMENSIONS ARE CRITICAL FOR THIS PROJECT. UNIT TO BE COMPOSED OF TWO SEPARATE SECTIONS, SUCH THAT BOTH CAN BE LIFTED IN THROUGH THE OPENING THROUGH THE ROOF AND BETWEEN THE EXISTING STRUCTURAL MEMBERS WITHIN THE ATTIC. REFER TO STRUCTURAL / ARCHITECTURAL PLANS FOR OPENING DETAILS.

ENERGY / HEAT RECOVERY VENTILATOR / WHEEL SCHEDULE

REFERENCE	DESCRIPTION	LOCATION	SERVING	MFG.	MODEL
ERV-1	HEAT WHEEL FOR MAKE-UP AIR UNIT	ATTIC	CLASSROOMS	VTS	AVS040 TOT
ERV-2A	ROOM 122 FRESH AIR ERV	CORRIDOR 182	ROOM 122	SWEGON	R5
ERV-2B	ROOM 122 FRESH AIR ERV	CORRIDOR 182	ROOM 122	SWEGON	R5

REFERENCE	SUPPLY AIR SIDE								
	AIR FLOW (CFM)	EAT (OUTSIDE AIR)				LAT (SUPPLY AIR)			
		WINTER °F		SUMMER °F		WINTER °F		SUMMER °F	
		DB	WB	DB	WB	DB	WB	DB	WB
ERV-1	2600	-5	-5	90	75	57.50	46.10	78.5	66.60
ERV-2A	250	-4	-4.5	90	74.91	58.30	47.02	77.70	65.04
ERV-2B	250	-4	-4.5	90	74.91	58.30	47.02	77.70	65.04

REFERENCE	EXHAUST AIR SIDE									ESP SUPPLY (IN)	ESP RETURN (IN)
	AIR FLOW (CFM)	EAT (RETURN AIR)				LAT (EXHAUST AIR)					
		WINTER °F		SUMMER °F		WINTER °F		SUMMER °F			
		DB	WB	DB	WB	DB	WB	DB	WB		
ERV-1	2600	70	52.8	76	63.3	8.10	8.1	87.40	73.2	2.5	2.5
ERV-2A	250	72	54.39	75	62.55	9.70	9.33	87.30	72.99	0.60	0.60
ERV-2B	250	72	54.39	75	62.55	9.70	9.33	87.30	72.99	0.60	0.60

REFERENCE	ACOUSTIC POWER LEVEL [DB(A)] (OUTLET)									DIMENSIONS (mm)			
	63	125	250	500	1000	2000	4000	8000	Lw	LENGTH	WIDTH	HEIGHT	WEIGHT (LBS)
ERV-1	-	-	-	-	-	-	-	-	-	116	59	71	1718
ERV-2A	56	54	51	39	32	30	23	24	45	23.60	23.50	23.50	172
ERV-2B	56	54	51	39	32	30	23	24	45	23.60	23.50	23.50	172

REFERENCE	ELECTRICAL				POWER SUPPLY					STARTER			CONTROLS			REMARKS:
	WHEEL MOTOR SIZE															
	HP	MOP	MCA	FLA	VOLTS	PHASE	FED FROM	EM.	NORM.	SUPPLIED BY:	INSTALLED BY:	TYPE	MANUAL	AUTO.	INTERLOCK BY:	
ERV-1	0.5	15	0.82	0.66	575	3	-	N	Y	-	-	-	-	BAS	-	REFER TO NOTES LISTED AT BOTTOM OF THIS SCHEDULE.
ERV-2A	-	-	10	-	230	3	-	N	Y	-	-	-	-	BAS	-	REFER TO NOTES LISTED AT BOTTOM OF THIS SCHEDULE.
ERV-2B	-	-	10	-	230	3	-	N	Y	-	-	-	-	BAS	-	REFER TO NOTES LISTED AT BOTTOM OF THIS SCHEDULE.

NOTES: (1) ERV-1 ENTHALPY WHEEL IS SINGLE PIECE ALUMINUM CONSTRUCTION, WITH MINIMUM 83.4% SENSIBLE AND 86.3% LATENT EFFICIENCY.
(2) ERV-2 UNITS ARE PROVIDED WITH MERV 13 FILTERS ON SUPPLY AND RETURN SIDES.
(3) ERV-2 UNITS TO HAVE INTEGRATED CONTROLS WITH HUMIDITY CONTROL & DEFROST CYCLE.
(4) ENTHALPY WHEEL WITHIN ERV-2 UNITS TO BE SPEED CONTROLLED, WITH A MINIMUM 80.9% SENSIBLE AND 83.8% LATENT EFFICIENCY.
(5) ERV-2 UNITS TO HAVE EC MOTORS ON THE FANS.
(6) ERV-1 FAN DRIVES AND WHEEL REQUIRE INDEPENDENT POWER CONNECTIONS.
(7) CONTROLS BY BAS CONTRACTOR, REFER TO SEQUENCE FOR REQUIREMENTS.

HUMIDIFIER SCHEDULE

REFERENCE	DESCRIPTION	LOCATION	MOISTURE ADDITION LOAD	SUPPLY AIR	MANUFACTURER	STEAM GENERATOR				
			LBS / HR	CFM		MODEL	UNIT QUANTITY	UNIT CAPACITY (LBS/HR)	UNIT OPERATING WEIGHT (LB)	UNIT FLA (A)
HUM-1	ARRAY SERVING ROOM 122	CORRIDOR 182	5	500	STEAMOVAP	EXISTING	-	-	-	-
HUM-2	ARRAY SERVING CLASSROOMS	ATTIC	20	2600	STEAMOVAP	EXISTING	-	-	-	-

REFERENCE	STEAM DISPERSION					POWER SUPPLY				CONTROLS			REMARKS
	MODEL	UNIT QUANTITY	MAXIMUM CAPACITY (LBS/HR)	DUCT DIMENSIONS (W x H)	NON-WETTING DISTANCE (IN.)	VOLTS	PHASE	EM.	NORM.	MANUAL	AUTO	INTERLOCK BY:	
HUM-1	ILS-P1-14x13	1	10	14" x 14"	8	-	-	-	-	-	Y	DIV. 15	C/W HIGH-LIMIT HUMIDISTAT, ELECTRIC, MODULATING AIRFLOW PROVING SWITCH, ELECTRIC PRESSURE HUMIDITY TRANSMITTER, DISCONNECT SWITCH.
HUM-2	ILS-P1-24X13	1	35	24" x 14"	8	-	-	-	-	-	Y	DIV. 15	C/W HIGH-LIMIT HUMIDISTAT, ELECTRIC, MODULATING AIRFLOW PROVING SWITCH, ELECTRIC PRESSURE HUMIDITY TRANSMITTER, DISCONNECT SWITCH.

MISCELLANEOUS COILS

REFERENCE	DUCT MOUNTED	EQUIP. MOUNTED	CORRESPONDING EQUIPMENT DESIGNATION	SERVING	SUPPLY AIR (CFM)	CAPACITY (MBH)	PERFORMANCE								FINNED DIMENSIONS (IN)		OVERALL DIMENSIONS (IN)				FLOW (GPM)	WPD (ft.wg.)	REMARKS:
							FLUID TYPE	EAT °F		LAT °F		EWT °F	LWT °F	APD (ft.wg.)	HEIGHT	WIDTH	LENGTH	WIDTH	HEIGHT	DRY WEIGHT (lbs)			
								WB	DB	WB	DB												
COOLING COILS																							
CC-1	YES	NO	ERV-2A/B	ROOM 122	500		WATER	78.50	65.50	68	61.38	44	54	0.13	13.50	14.00	5.00	17.0	16.50	17	1.34	1.5	
HEATING COILS																							
HC-1	YES	NO	ERV-2A/B	ROOM 122	500		30% PG	43	-	70	-	140	120	0.07	13.50	14.00	5.00	17.00	16.50	17	1.54	1.84	

HEAT EXCHANGER SCHEDULE

REF.	DESCRIPTION	LOCATION	SERVICING	DIMENSIONS (in)				PRIMARY					
				LENGTH	WIDTH	HEIGHT	DRY WEIGHT (lb)	FLUID	FLOW (lb/hr)	OPERATING PRESSURE	EWT °C	LWT °C	PRESSURE RATING
HX-1	GLYCOL HEATING WATER	BASEMENT MECH ROOM	ATTIC ERV	27.875	7.25	7.25	60	STEAM	99.2	7 PSI	232	232	150 PSI

REF.	SECONDARY						FUNCTION	MANUFACTURER	TYPE	MODEL NUMBER	REMARKS:
	FLUID	FLOW (gpm)	P.D. (psi)	EWT °F	LWT °F	PRESSURE RATING					
HX-1	30% PROP. GLY.	9.9	-	120.0	140.0	150 PSI	ERV AND LOOSE COIL HEATING WATER	ARMSTRONG	SHELL & TUBE	WS-0402-400-1-CSSSSNN-20	

PUMP SCHEDULE

REF.	DESCRIPTION	LOCATION	SERVING	FLOW (gpm)	HEAD (ft)	RPM	MANUFACTURER	MODEL	TYPE / SIZE	MOTOR SIZE			POWER SUPPLY				
										kW	HP	BHP	VOLTS	PHASE	Hz	EM.	NORM.
PG-1A (DUTY)	GLYCOL HEATING WATER CIRCULATION	BASEMENT MECH ROOM	ATTIC AND RM. 122	10	55.0	-	ARMSTRONG	4380	1.5x1.5x8 - 4P	-	2.0	-	575	3	60	-	-
PG-1B (STANDBY)	GLYCOL HEATING WATER CIRCULATION	BASEMENT MECH ROOM	ATTIC AND RM. 122	10	55.0	-	ARMSTRONG	4380	1.5x1.5x8 - 4P	-	2.0	-	575	3	60	-	-

REF.	STARTER			CONTROLS			OTHER REQUIREMENTS			REMARKS:
	SUPPLIED BY:	INSTALLED BY:	TYPE	MAN.	AUTO.	INTERLOCK BY:	W.P. DISC. AT MOTOR	DISC. AT MOTOR	F.A. SHUT.	
PG-1A (DUTY)	-	-	VFD	-	Y	-	-	-	-	PUMPS TO ALTERNATE DUTY AND STANDBY TO EQUALIZE RUNTIME.
PG-1B (STANDBY)	-	-	VFD	-	Y	-	-	-	-	PUMPS TO ALTERNATE DUTY AND STANDBY TO EQUALIZE RUNTIME.

CONDENSATE RECEIVER SCHEDULE

REF.	DESCRIPTION	LOCATION	SERVING	CAPACITY (gal)	DIMENSIONS			NO. OF PUMPS	FLOW / PUMP (gpm)	HEAD (ft)	RPM	MANUFACTURER	MODEL	TYPE / SIZE	MOTOR SIZE		
					L (in)	W (in)	H (in)								kW	HP	BHP
CD-1	GLYCOL HX CONDENSATE RECEIVER	BASEMENT MECH ROOM	GLYCOL HX	15	16	16	13	2	6	115.0	-	SHIPCO	DS	45	-	1.5	-

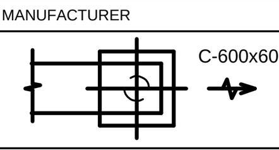
REF.	POWER SUPPLY					STARTER			CONTROLS			OTHER REQUIREMENTS			REMARKS:
	VOLTS	PHASE	Hz	EM.	NORM.	SUPPLIED BY:	INSTALLED BY:	TYPE	MAN.	AUTO.	INTERLOCK BY:	W.P. DISC. AT MOTOR	DISC. AT MOTOR	F.A. SHUT.	
CD-1	575	3	60	-	-	-	-	-	-	Y	-				SYSTEM TO HAVE DUPLEX PUMPING, WHICH WILL ALTERNATE IN OPERATION ON EACH CALL FOR PUMPING.

REGISTERS, GRILLES AND DIFFUSERS SCHEDULE

REFERENCE	FUNCTION	CONFIGURATION	MODEL NUMBER	CEILING TYPE	REMARKS
A	SUPPLY AIR	LOUVERED FACE GRILLE	DRYWALL / SIDEWALL	E.H. PRICE - /520D/F/L/A/B12	REFER TO PLANS FOR SIZE
B	RETURN / EXHAUST AIR	LOUVERED FACE GRILLE	DRYWALL / SIDEWALL	E.H. PRICE - /530D/F/L/A/B12	REFER TO PLANS FOR SIZE
C	SUPPLY AIR	SQUARE CONE DIFFUSER	DRYWALL / T-BAR	E.H. PRICE - /SCD/31/3C/B12	REFER TO PLANS FOR NECK SIZE
D	RETURN / EXHAUST AIR	EGGCRATE GRILLE	T-BAR (DRYWALL)/EXPOSED DUCT	E.H. PRICE - /80/TB/B12 (/80/A/B12) (-/80/ED/B12)	NON-DUCTED, COLOUR = APPLIANCE WHITE
E	SUPPLY AIR	ROUND CONE DIFFUSER	DRYWALL/ T-BAR	E.H. PRICE - /RCD/?/?/B12	

* FOR SUITE FAN AND R/A GRILLES REFER TO MANUFACTURER

SYMBOL CLARIFICATION



C - DIFFUSER/GRILLE TYPE
600x600 - GRILLE SIZE
500 - AIR QUANTITY L/S

BASED ON NAILOR INDUSTRIES

GENERAL NOTES:

1. PROVIDE COMPLETE WITH FACTORY ROOF CURB.
2. PROVIDE A BRD NOISE AND VIBRATION CONTROL "HUSH SCREEN", SUITABLE FOR EITHER MOUNT ON CURB OR UNIT. COORDINATE WITH MANUFACTURER FOR PREFERRED MOUNTING OPTION.
3. MECHANICAL CONTRACTORS SUPPLYING EQUIPMENT MUST COORDINATE LOCATIONS AND POWER REQUIREMENTS WITH ELECTRICAL CONTRACTOR PRIOR TO ANY EQUIPMENT ORDERED OR ELECTRICAL WIRING INSTALLED.
4. DIV.20 TO SUPPLY AND INSTALL VFD. DIV.26 TO PROVIDE LINE SIDE WIRING TO VFD (THROUGH HARMONIC FILTERS WHERE SPECIFIED). DIV.20 TO CARRY COST OF WIRING FROM VFD TO MOTOR LOAD. LOAD SIDE WIRING SHALL MEET ALL REQUIREMENTS SPECIFIED IN DIV.26 FOR SIMILAR WIRING.

REVISIONS

NO.	DATE	PARTICULAR
1	23.01.25	ISSUED FOR COORDINATION REVIEW
2	23.03.08	ISSUED FOR 50% DD REVIEW
3	23.04.24	ISSUED FOR 90% DD REVIEW
4	24.04.10	ISSUED FOR PRE-TENDER REVIEW
5	25.07.04	ISSUED FOR PERMIT
6	25.08.05	ISSUED FOR TENDER
7	25.08.22	ISSUED FOR ADDENDUM 01

NOTES:

KEY PLAN:

CLIENT:
McMASTER UNIVERSITY
HAMILTON, ONTARIO

Project No. 22227B

PROJECT:
22227B

UNIVERSITY HALL VENTILATION UPGRADE

McMaster University Campus
1280 MAIN ST. W.
HAMILTON, ON L8S 4K1

ORIGINAL PAGE SIZE ARCH D - 24" x 36"

KEY TO DETAIL LOCATION:
A - DETAIL NO.
B - DETAIL NO. ORIGIN

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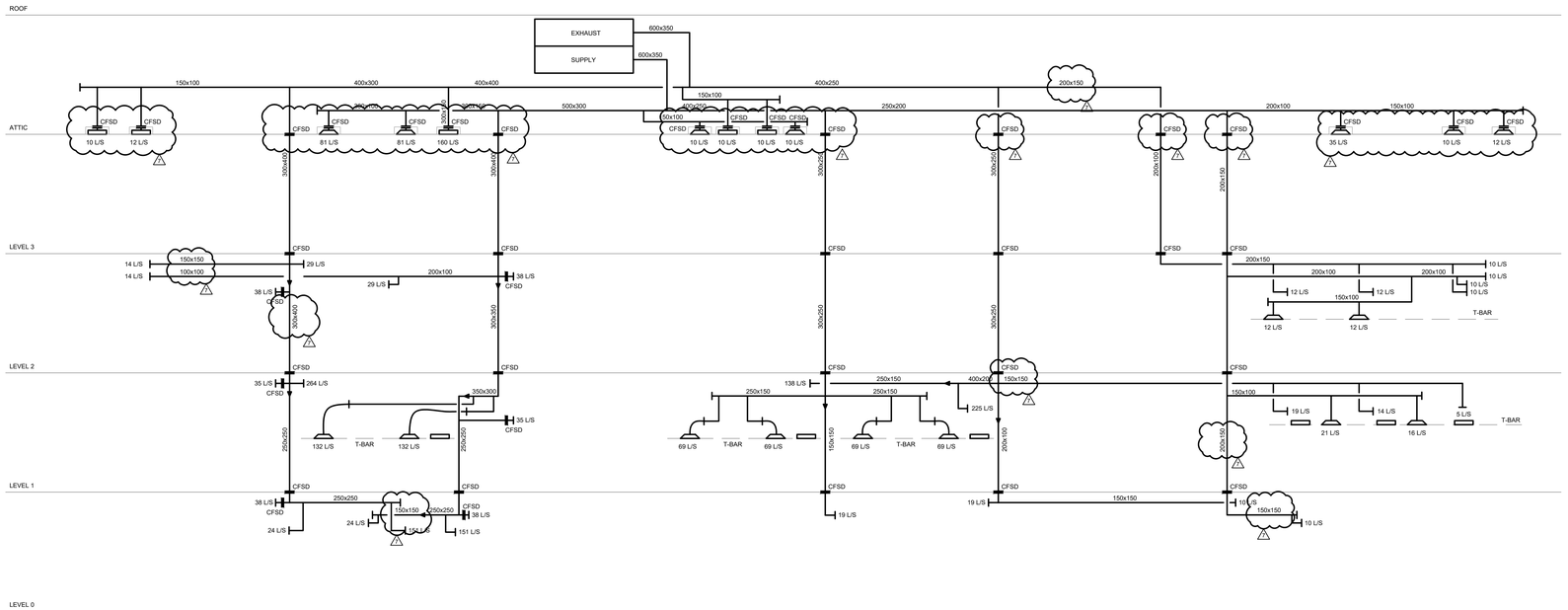
Plot Date: Aug 22, 2025 - 5:28pm By: TNassar

MCW Consultants Ltd.

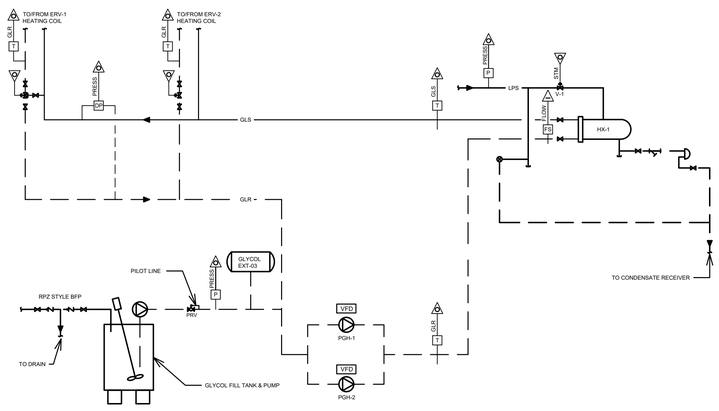
MECHANICAL SCHEDULES

M0.1

DRAWN BY : TN
CHECKED BY : TN



6 ERV-1 RISER DIAGRAM
M.02 NTS



SEQUENCE OF OPERATION:

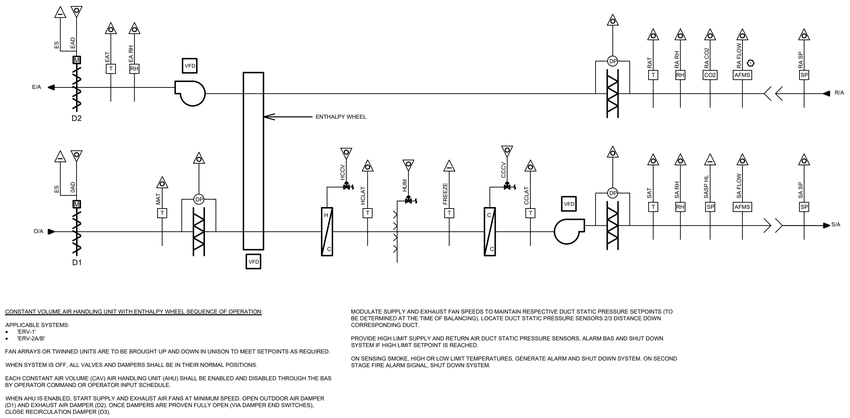
HEATING SYSTEM WILL BE ENABLED BASED ON BAS SCHEDULE, OPERATOR WORK STATION COMMAND, OR BAS DETECTION OF A DEMAND.

SENSE FLOW IN THE GLYCOL RETURN (GLR) LINES. ON SENSING FLOW MODULATE STEAM HEATING VALVES (V-1 & V-2) OPEN IN PARALLEL TO MAINTAIN GLYCOL SUPPLY (GLS) TEMPERATURE AT SETPOINT IN ACCORDANCE WITH THE FOLLOWING RESET SCHEDULE:

OAT = -20°C (-4°F)	GLS = 60°C (140°F)
OAT = 10°C (50°F)	GLS = 49°C (120°F)

ON SENSING NO FLOW IN THE GLYCOL CIRCUIT, CLOSE STEAM HEATING VALVES (V-1 & V-2).

5 STEAM TO HEATING GLYCOL HEAT EXCHANGER
M.03 NTS



CONSTANT VOLUME AIR HANDLING UNIT WITH ENTHALPY WHEEL SEQUENCE OF OPERATION:

APPLICABLE SYSTEMS:
- 'ERV-1'
- 'ERV-2A/B'

FAN ARRAYS OR TWINNED UNITS ARE TO BE BROUGHT UP AND DOWN IN UNISON TO MEET SETPOINTS AS REQUIRED.

WHEN SYSTEM IS OFF, ALL VALVES AND DAMPERS SHALL BE IN THEIR NORMAL POSITIONS.

EACH CONSTANT AIR VOLUME (CAV) AIR HANDLING UNIT (AHU) SHALL BE ENABLED AND DISABLED THROUGH THE BAS BY OPERATOR COMMAND OR OPERATOR INPUT SCHEDULE.

WHEN AHU IS ENABLED, START SUPPLY AND EXHAUST AIR FANS AT MINIMUM SPEED. OPEN OUTDOOR AIR DAMPER (D1) AND EXHAUST AIR DAMPER (D2). ONCE DAMPERS ARE PROVEN FULLY OPEN (VIA DAMPER END SWITCHES), CLOSE RECIRCULATION DAMPER (D3).

MODULATE ENTHALPY WHEEL SPEED AS FIRST STAGE OF AIR CONDITIONING TO MAINTAIN SUPPLY AIR TEMPERATURE (SAT) AT SETPOINT. MODULATE AND CONTROL TO MAINTAIN ENTHALPY WHEEL FROST-FREE.

IF A FAILURE OF THE ENTHALPY WHEEL IS SENSED, OR IF THE ENTHALPY WHEEL IS OPERATING AT 100% SPEED AND THE SAT SETPOINT IS STILL NOT ACHIEVED, MODULATE COOLING OR HEATING COIL CONTROL VALVE (AS APPLICABLE) TO MAINTAIN SAT AT SETPOINT. MAINTAIN SAT AS HIGH AS POSSIBLE IN COOLING MODE AND AS LOW AS POSSIBLE IN HEATING MODE TO SATISFY SPACE. RESET SAT TO MAINTAIN ASSOCIATED TERMINAL REHEAT COIL CONTROL VALVES AT 10% OPEN (ADJUSTABLE).

ENTHALPY WHEEL FROST CONTROL. IF FROSTING CONDITIONS ARE CALCULATED TO OCCUR, SLOW WHEEL. IF ENTHALPY WHEEL LEAVING EXHAUST AIR TEMPERATURE CANNOT BE MAINTAINED ABOVE SETPOINT FOR MORE THAN FIVE (5) MINUTES, DISABLE SUPPLY FAN AND CLOSE FRESH AIR DAMPER.

SENSE RETURN AIR RELATIVE HUMIDITY (RARH) IN RETURN DUCT AND MODULATE STEAM HUMIDIFICATION VALVE TO MAINTAIN THE FOLLOWING (ADJUSTABLE) SETPOINTS:
- OAT = 32°F TO 50°F AND ABOVE: 30% RH
- OAT = -10°F TO 32°F: SCHEDULE RARH SETPOINT FROM 20% RH TO 30% RH
- *LIMIT SUPPLY AIR RELATIVE HUMIDITY (SARH) TO 80% RH MAX. (ADJUSTABLE)

MODULATE SUPPLY AND EXHAUST FAN SPEEDS TO MAINTAIN RESPECTIVE DUCT STATIC PRESSURE SETPOINTS (TO BE DETERMINED AT THE TIME OF BALANCING). LOCATE DUCT STATIC PRESSURE SENSORS 2/3 DISTANCE DOWN CORRESPONDING DUCT.

PROVIDE HIGH LIMIT SUPPLY AND RETURN AIR DUCT STATIC PRESSURE SENSORS, ALARM BAS AND SHUT DOWN SYSTEM IF HIGH LIMIT SETPOINT IS REACHED.

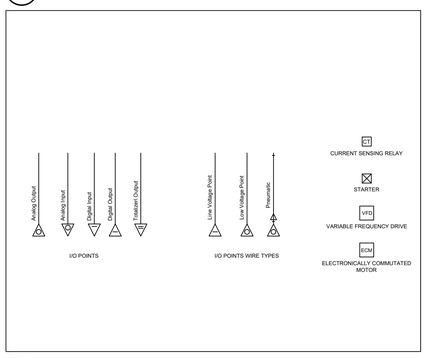
ON SENSING SMOKE, HIGH OR LOW LIMIT TEMPERATURES, GENERATE ALARM AND SHUT DOWN SYSTEM. ON SECOND STAGE FIRE ALARM SIGNAL, SHUT DOWN SYSTEM.

4 ENERGY RECOVERY VENTILATORS 'ERV-1' & 'ERV-2A/B'
M0.3 NTS

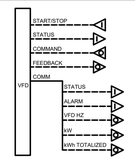
CONTROL LEGEND

POINT NAME	DESCRIPTION
AFMS	AIRFLOW MEASURING STATION
BAD	BYPASS AIR DAMPER
BH	BASIN HEATER
CCCV	COOLING COIL CONTROL VALVE
CCEWT	COOLING COIL ENTERING WATER TEMPERATURE
CCLAT	COOLING COIL LEAVING AIR TEMPERATURE, AVERAGING TYPE
CCLWT	COOLING COIL LEAVING WATER TEMPERATURE
CH	CHILLER
CHWR	CHILLED WATER PLANT RETURN
CHWS	CHILLED WATER PLANT SUPPLY
CL	COOLING TOWER
CO	CARBON MONOXIDE SENSOR
CO2	CARBON DIOXIDE SENSOR
CRCV	CONDENSER WATER RETURN CONTROL VALVE
CSCV	CONDENSER WATER SUPPLY CONTROL VALVE
CT	CURRENT SENSING RELAY
CV	CONTROL VALVE
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
DP	DIFFERENTIAL PRESSURE TRANSMITTER
EAD	EXHAUST AIR DAMPER
EARH	EXHAUST AIR RELATIVE HUMIDITY
EASP	EXHAUST AIR STATIC PRESSURE TRANSMITTER
EASP HL	EXHAUST AIR STATIC PRESSURE TRANSMITTER HIGH LIMIT
EAT	EXHAUST AIR TEMPERATURE SENSOR, DUCT MOUNTED
ES	DAMPER END SWITCH
EWLAT	ENTHALPY WHEEL LEAVING AIR TEMPERATURE, AVERAGING TYPE
FM	FLOW METER
FM-E	FLOW METER, ELECTROMAGNETIC TYPE
FM-T	FLOW METER, TURBINE TYPE
FM-U	FLOW METER, ULTRASONIC TYPE
FREEZE	TEMPERATURE SWITCH, LOW LIMIT
FS	FLOW SWITCH
GLR	GLYCOL RETURN
GLS	GLYCOL SUPPLY
HCV	HEATING COIL CONTROL VALVE
HCEWT	HEATING COIL ENTERING WATER TEMPERATURE
HCLAT	HEATING COIL LEAVING AIR TEMPERATURE, AVERAGING TYPE
HCLWT	HEATING COIL LEAVING WATER TEMPERATURE
HPS	HIGH PRESSURE STEAM
HUM	HUMIDIFIER CONTROL VALVE
HWR	HEATING WATER RETURN
HWS	HEATING WATER SUPPLY
LPC	LOW PRESSURE STEAM CONDENSATE
LPS	LOW PRESSURE STEAM
LVL	LEVEL SENSOR
MAD	MIXED AIR DAMPER
MAT	MIXED AIR TEMPERATURE SENSOR, AVERAGING TYPE
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OAD	OUTSIDE AIR DAMPER
OADP	OUTSIDE AIR DEWPOINT TEMPERATURE
OARH	OUTSIDE AIR RELATIVE HUMIDITY
OAT	OUTSIDE AIR TEMPERATURE SENSOR, SHIELDED
P	PRESSURE
PCCV	PRE-COIL CONTROL VALVE
PCEWT	PRE-COIL ENTERING WATER TEMPERATURE
PCLAT	PRE-COIL LEAVING AIR TEMPERATURE, AVERAGING TYPE
PCLWT	PRE-COIL LEAVING WATER TEMPERATURE
PRESS	PRESSURE TRANSMITTER
RAD	RETURN AIR DAMPER
RARH	RETURN AIR RELATIVE HUMIDITY
RASP	RETURN AIR STATIC PRESSURE TRANSMITTER
RASP HL	RETURN AIR STATIC PRESSURE TRANSMITTER HIGH LIMIT
RAT	RETURN AIR TEMPERATURE SENSOR, DUCT MOUNTED
RH	RELATIVE HUMIDITY
S/S	START/STOP
S/S/S	START/STOP/STATUS
SAD	SUPPLY AIR DAMPER
SARH	SUPPLY AIR RELATIVE HUMIDITY
SASP	SUPPLY AIR STATIC PRESSURE TRANSMITTER
SASP HL	SUPPLY AIR STATIC PRESSURE TRANSMITTER HIGH LIMIT
SAT	SUPPLY AIR TEMPERATURE SENSOR, DUCT MOUNTED
SMOKE	SMOKE DETECTOR, DUCT MOUNTED
SP	STATIC PRESSURE
STM	STEAM
T	TEMPERATURE

3 CONTROL LEGEND
M0.3 NTS



2 CONTROL SYMBOLS
M0.3 NTS



VFD CONNECTIONS:
- PROVIDE HARD WIRED CONNECTIONS FROM ALL VFD'S TO APPLICABLE SENSOR(S) FOR SPEED CONTROL FEEDBACK AND STATUS.
- PROVIDE COMMUNICATION PROTOCOL (AS SPECIFIED) TO ALL VFD'S FOR BAS COMMUNICATION OF OTHER POINTS AS SHOWN.
- PROVIDE REMOTE RESET CAPABILITY.

1 VFD CONTROL POINTS
M0.3 NTS

REVISIONS

NO.	DATE	PARTICULAR
1	23.01.25	ISSUED FOR COORDINATION REVIEW
2	23.03.08	ISSUED FOR 50% DD REVIEW
3	23.04.24	ISSUED FOR 90% DD REVIEW
4	24.04.10	ISSUED FOR PRE-TENDER REVIEW
5	25.07.04	ISSUED FOR PERMIT
6	25.08.05	ISSUED FOR TENDER
7	25.08.22	ISSUED FOR ADDENDUM 01

NOTES:

KEY PLAN:

CLIENT:
McMASTER UNIVERSITY
HAMILTON, ONTARIO

Project No. 22227B

PROJECT:
22227B

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MECHANICAL CONTROLS AND RISER DIAGRAMS

M0.3

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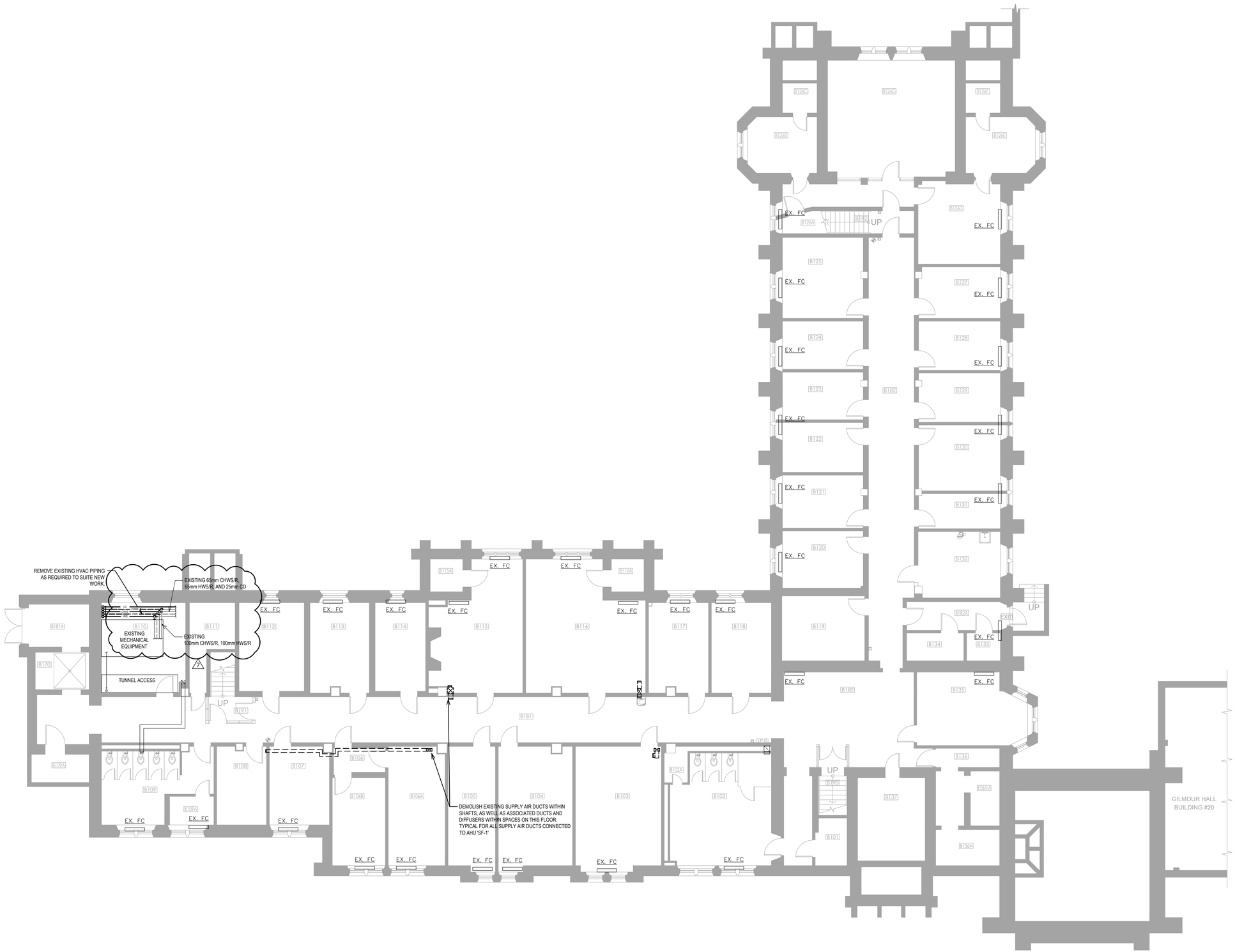

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BASEMENT - MECHANICAL DEMOLITION

M1.0

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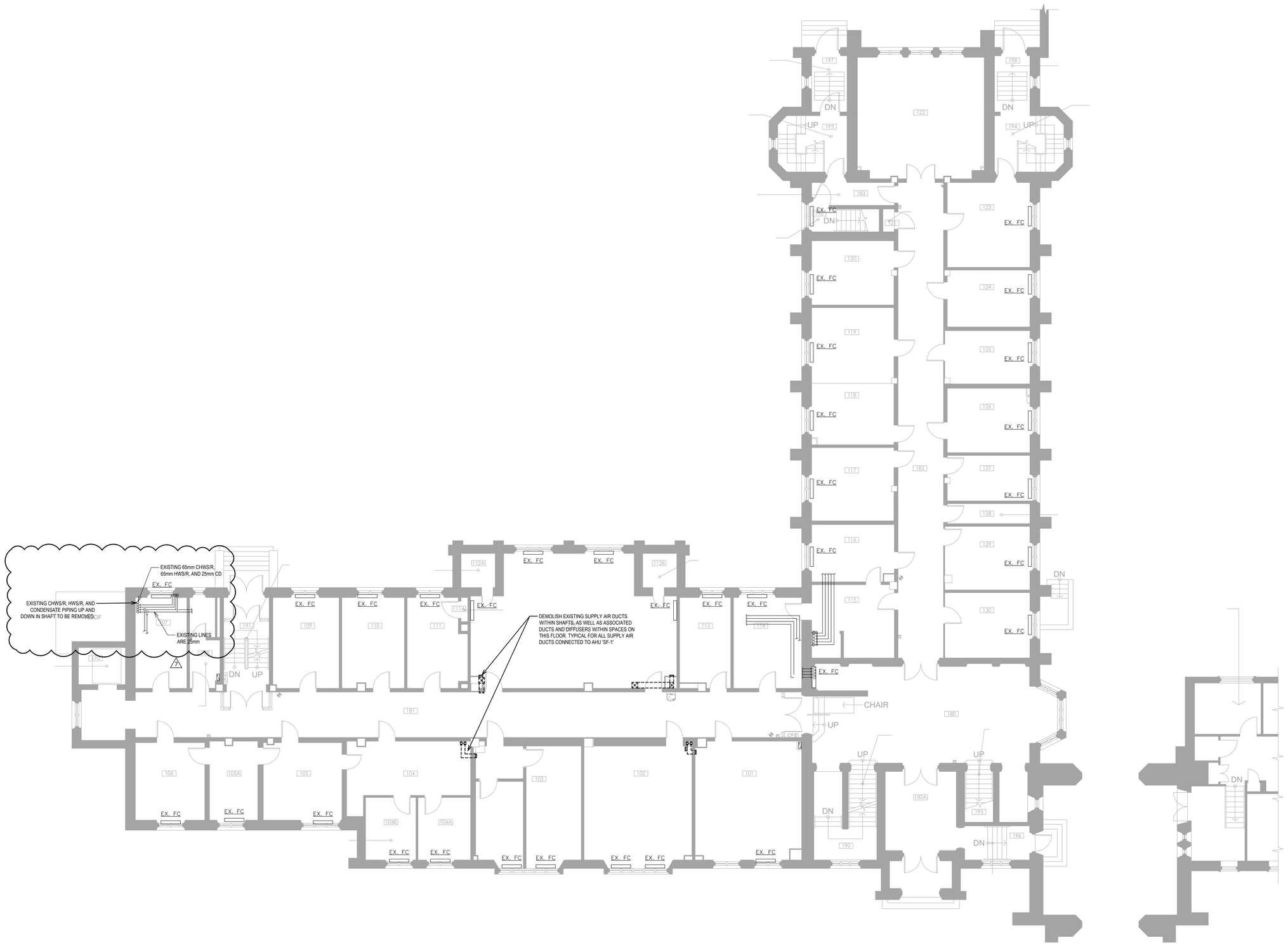

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6	25.08.05	ISSUED FOR TENDER
7	25.08.22	ISSUED FOR ADDENDUM 01

NOTES:

KEY PLAN:

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LEVLE 1 - MECHANICAL DEMOLITION

M1.1

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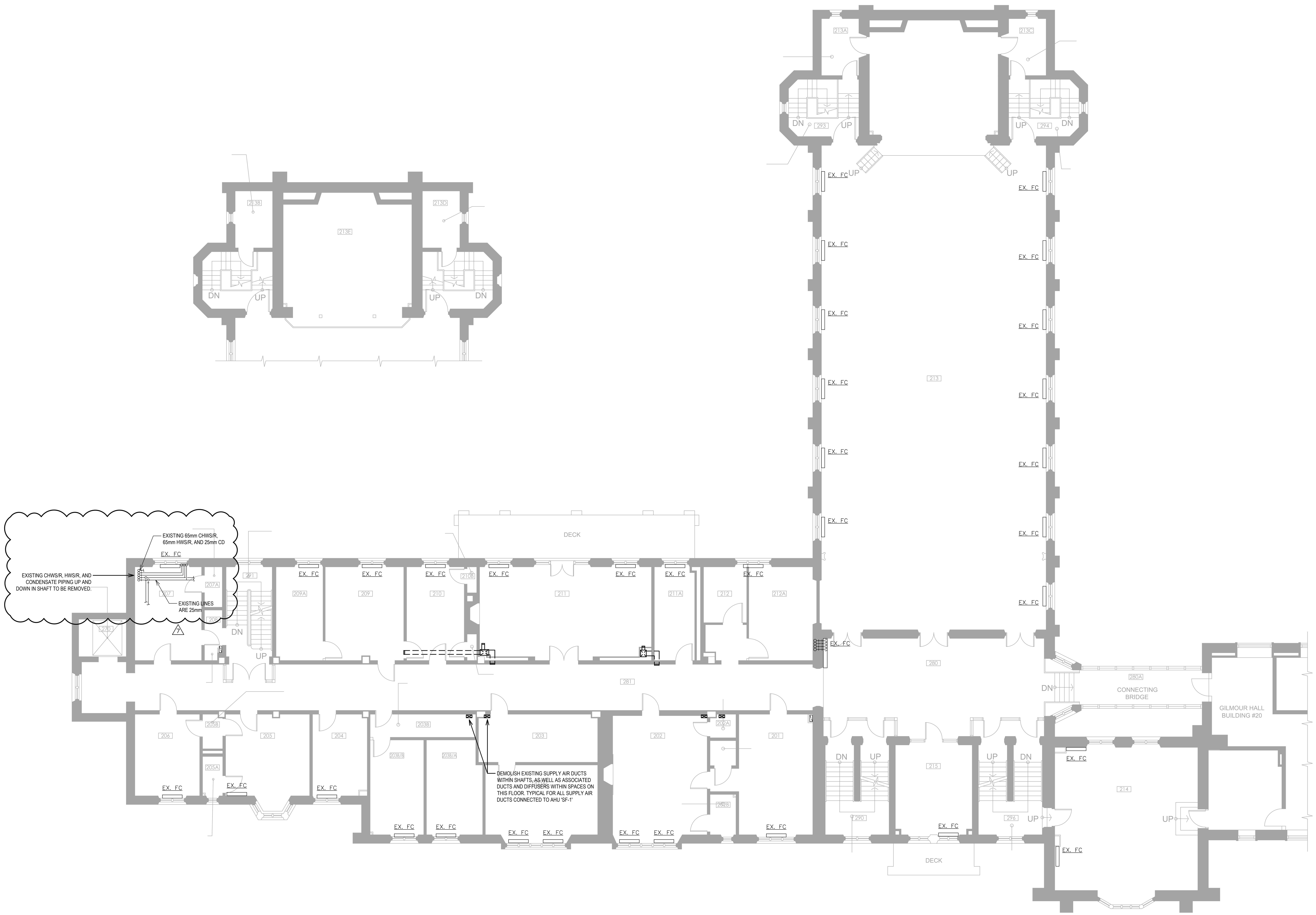

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LEVLE 2 - MECHANICAL DEMOLITION

M1.2

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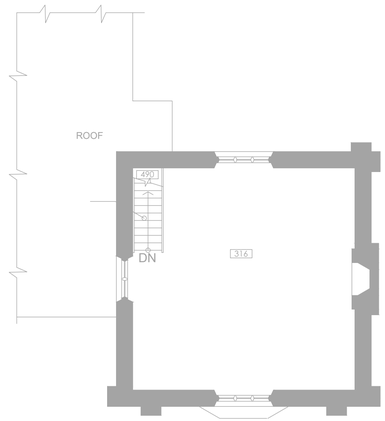

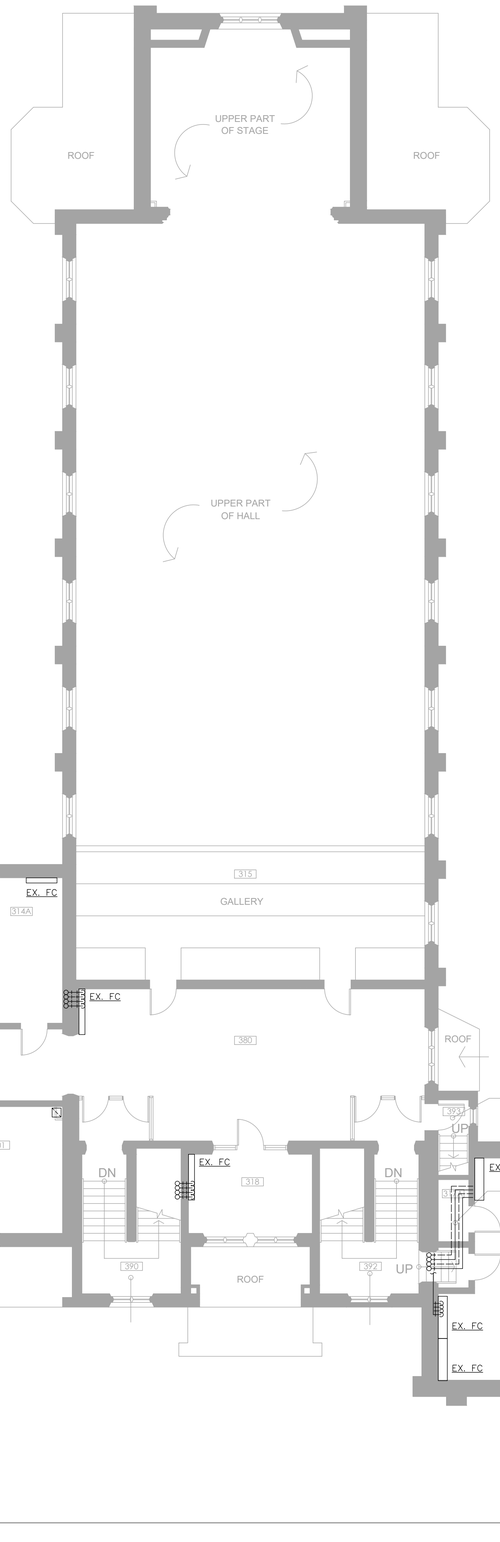

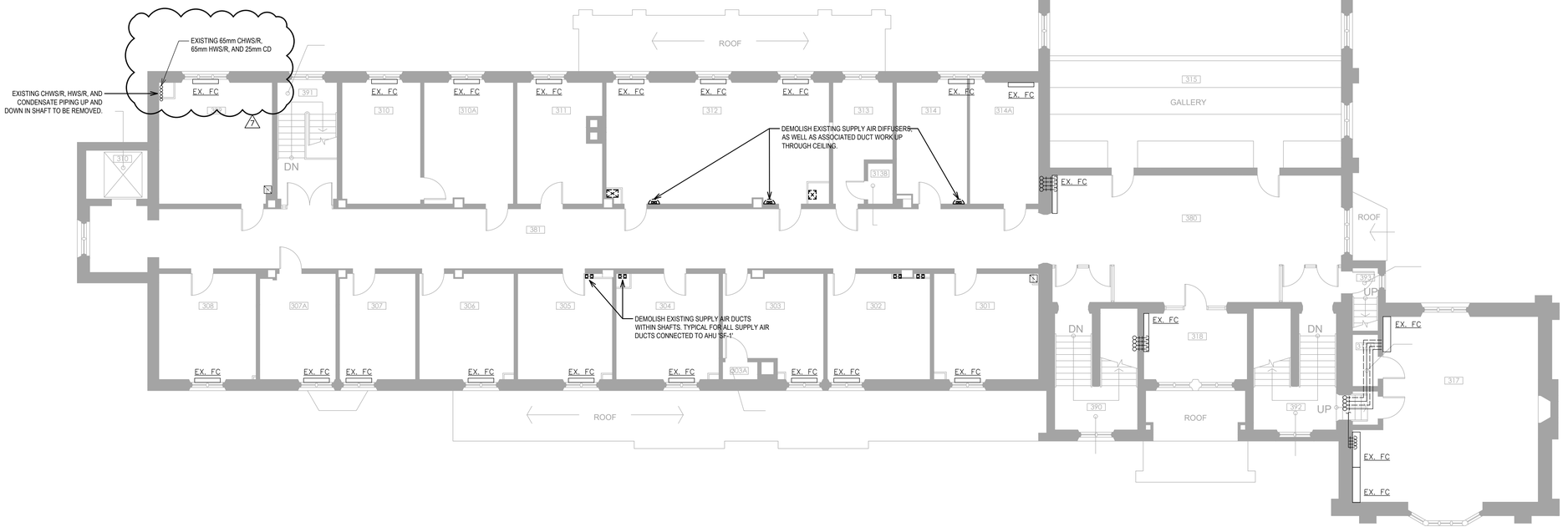

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LEVLE 3 - MECHANICAL DEMOLITION

M1.3

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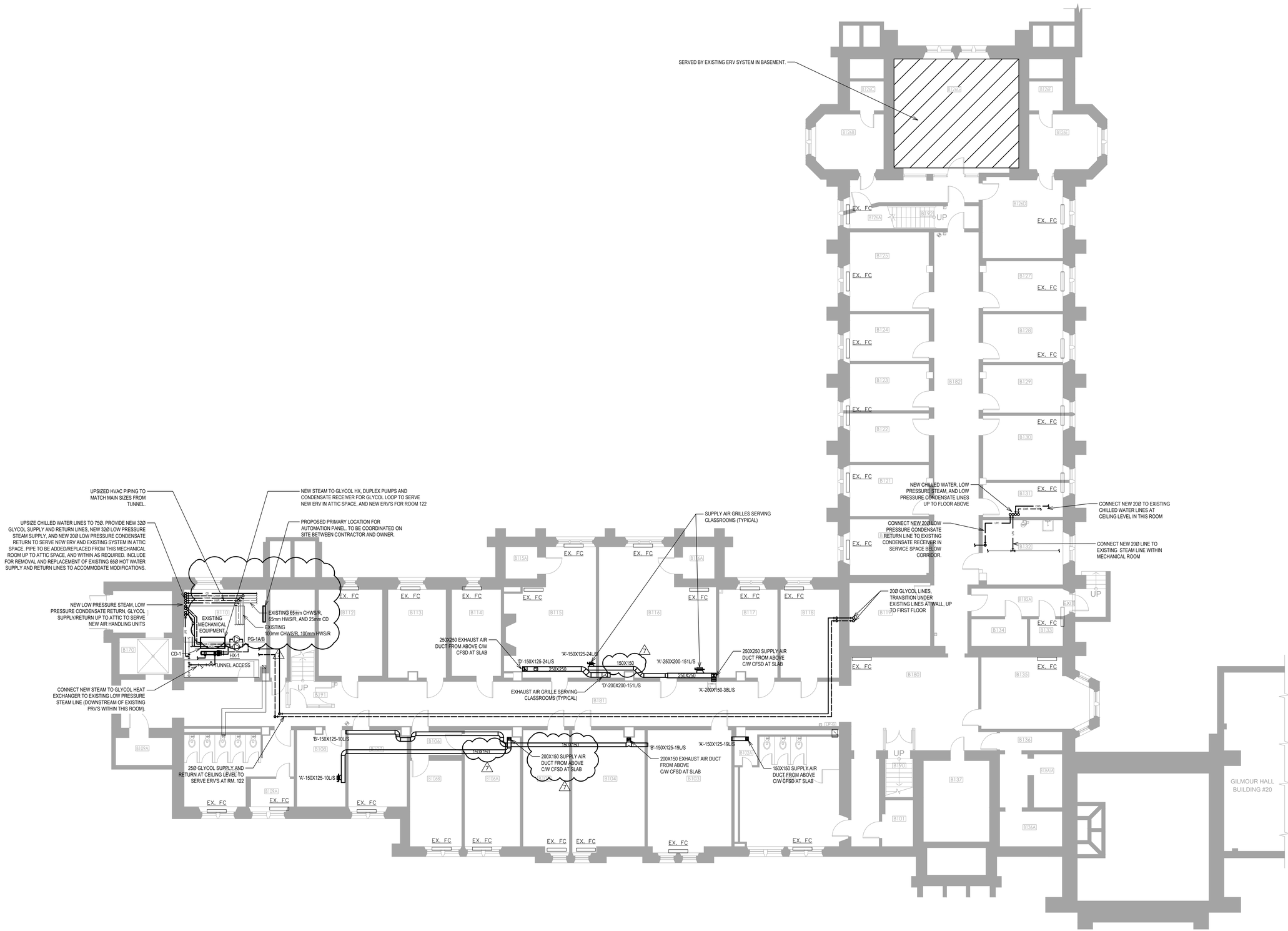

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BASEMENT - MECHANICAL NEW WORK

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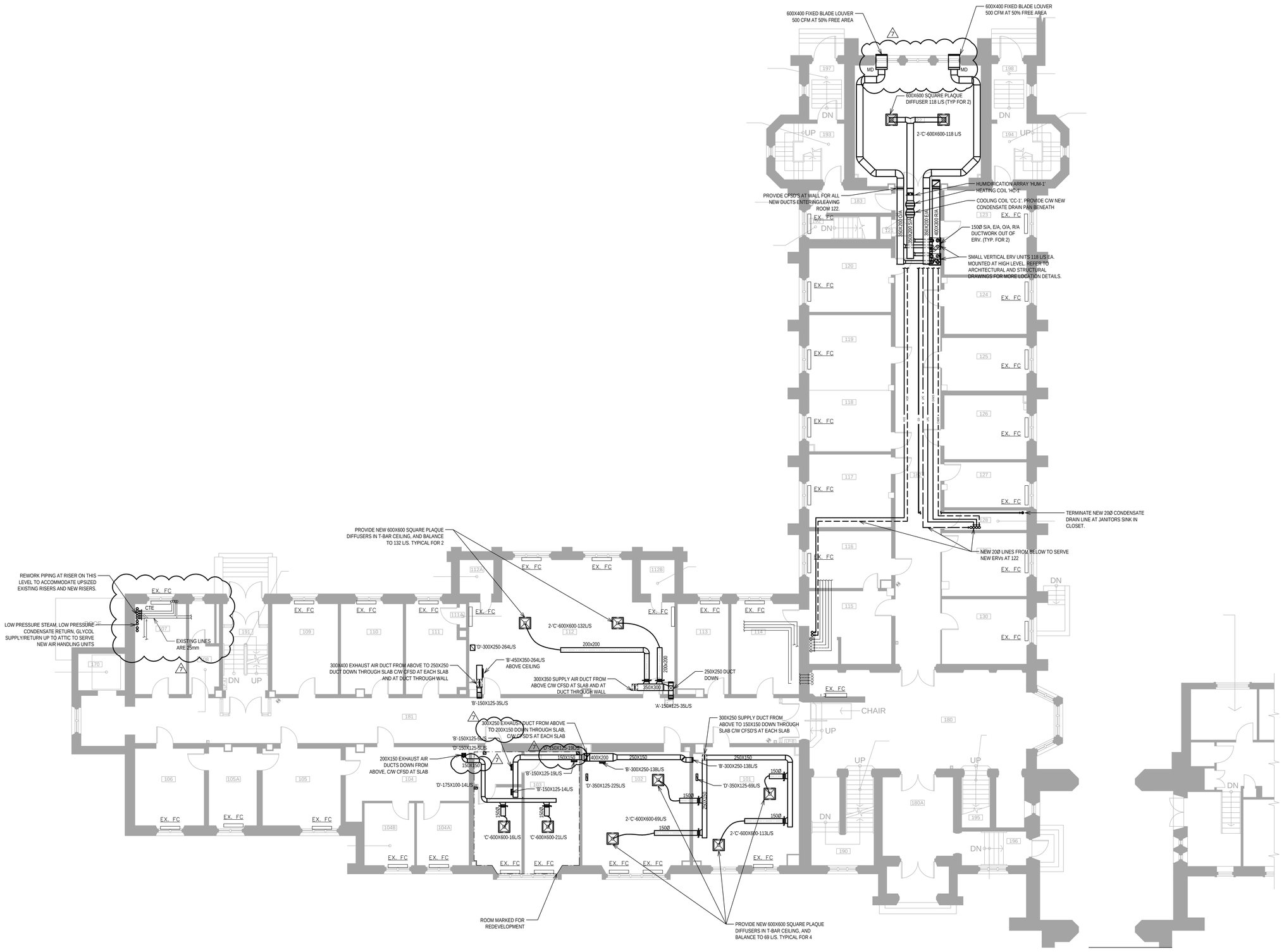
Filename: H:\22000\22227B - McMaster University - University Hall Ventilation Renovations\01 DRAWINGS\01 02 MECH\M2.0 - BASEMENT - MECHANICAL NEW WORK.dwg



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LEVLE 1 - MECHANICAL NEW WORK

M2.1

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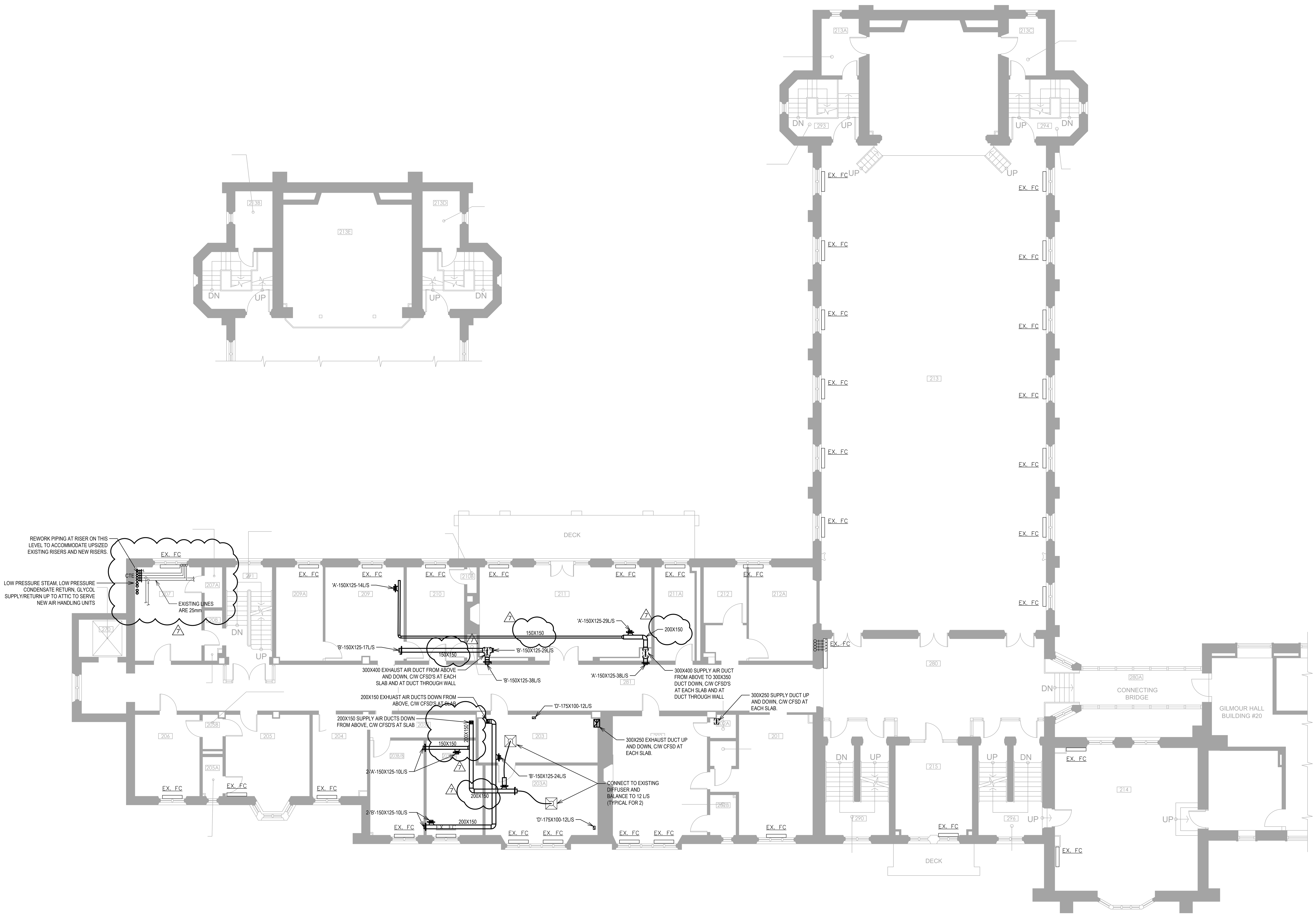

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LEVLE 2 - MECHANICAL NEW WORK

M2.2

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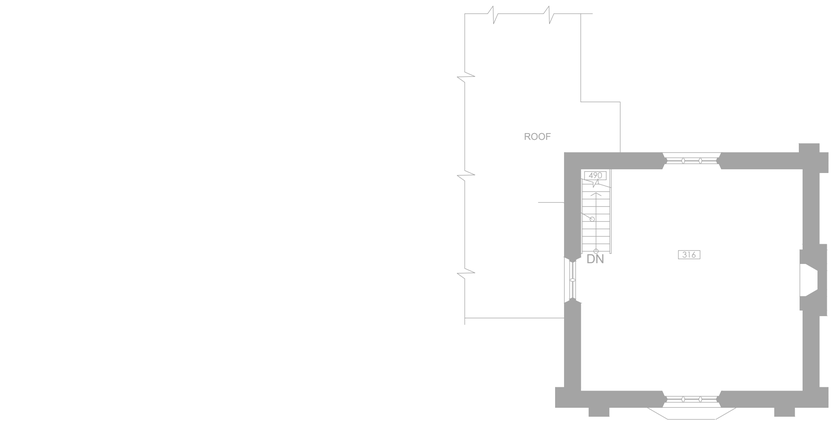

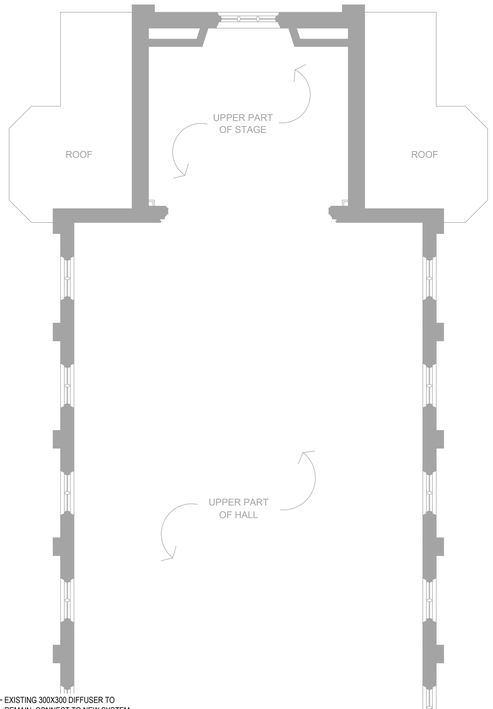

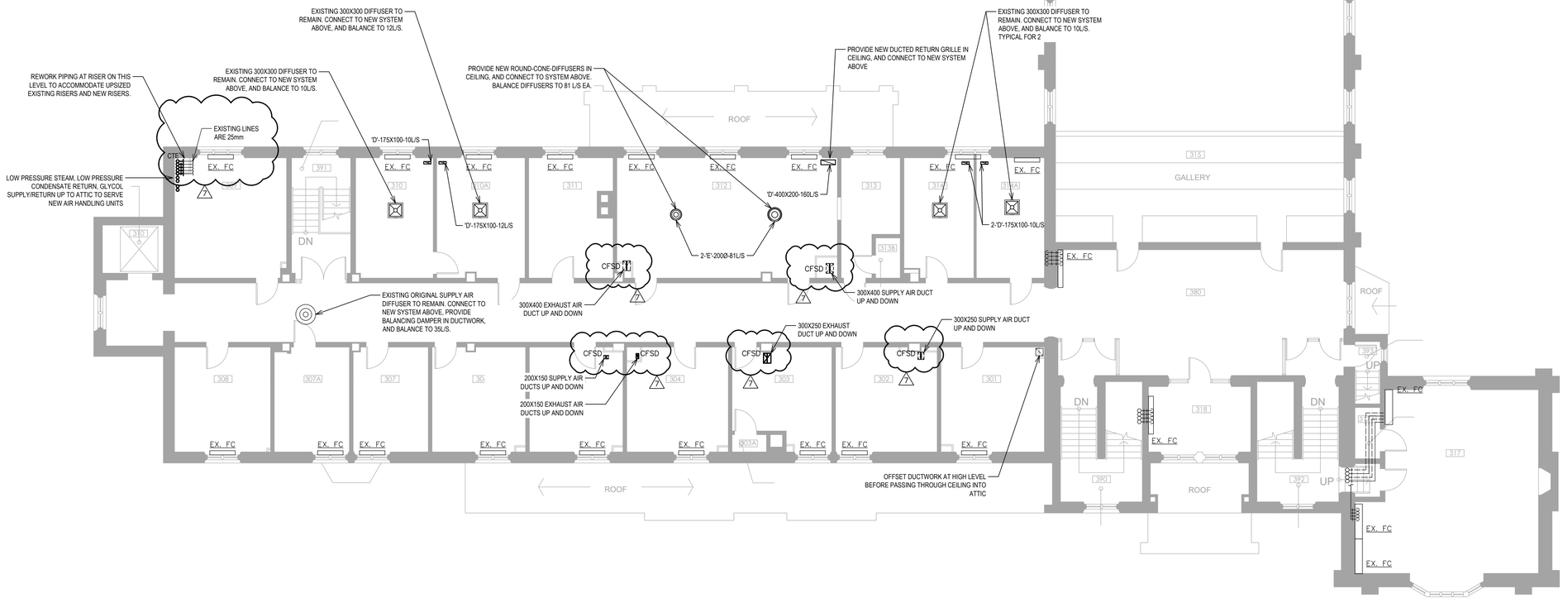

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UNIVERSITY HALL VENTILATION UPGRADE

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LEVLE 3 - MECHANICAL NEW WORK

M2.3

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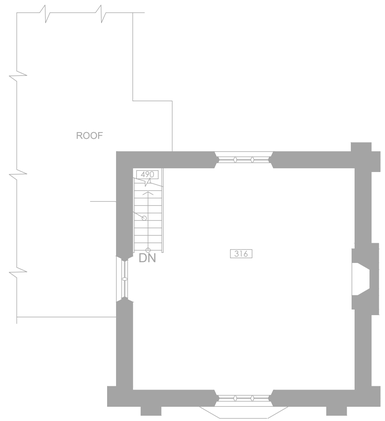

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UNIVERSITY HALL VENTILATION UPGRADE

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ATTIC - MECHANICAL NEW

M2.4

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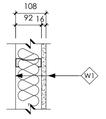
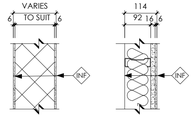
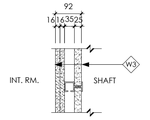
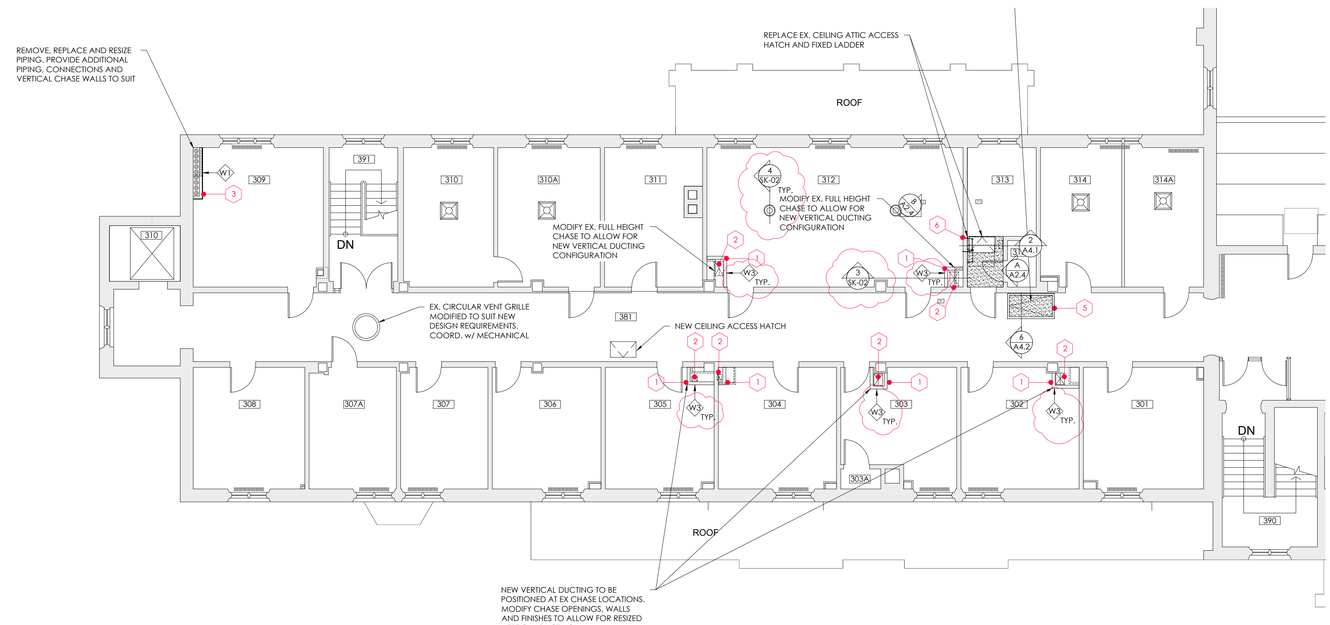
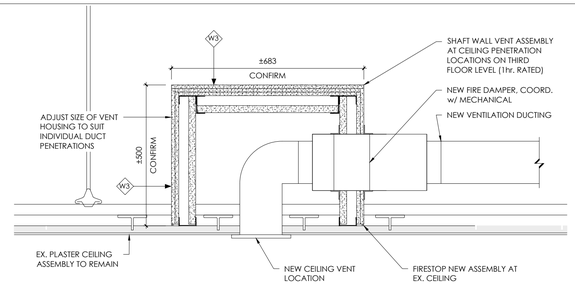
WALL TYPE LEGEND

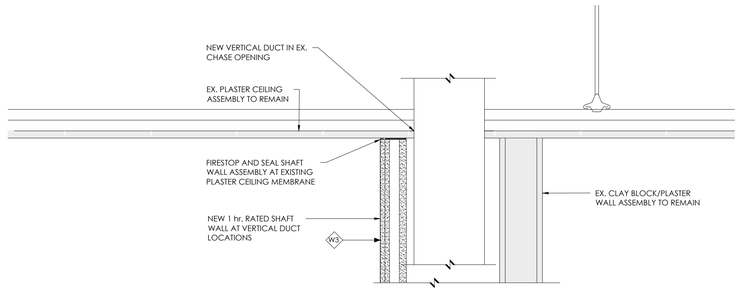
TYPE	DESIGN	CONSTRUCTION
W1		**INTERIOR WALLS:** **WALL TYPE W1:** 92mm METAL STUDS @400mm o/c SOUND ATTENUATION BATTS 16mm GYPSUM BOARD INTERIOR FINISH
INF		**INTERIOR INFILL WALL:** **WALL TYPE INF.:** INFILL w/ LIKE MATERIAL or WHERE ACCEPTABLE (92mm METAL STUDS @400mm o/c SOUND ATTENUATION BATTS 16mm GYPSUM SHEATHING) 6mm PLASTER FINISH INTERIOR FINISH
W3		**INTERIOR SHAFT WALL:** **WALL TYPE W3: (VERT.)** 25mm GYP. BD. FITTED BETWEEN 'H' FLANGES OF STUDS 64mm C-H METAL FRAMING @600mm o/c 2 LAYERS 16mm TYPE'X' GYP. BD. ON 'C' SIDE OF STUDS INTERIOR FINISH USE SHAFT WALL CONST. WHERE ENCLOSING VERT. SERVICE SHAFT **INSTALL AS PER ULC DESIGN # W452 FOR VERT. SHAFT (1 HR.)**



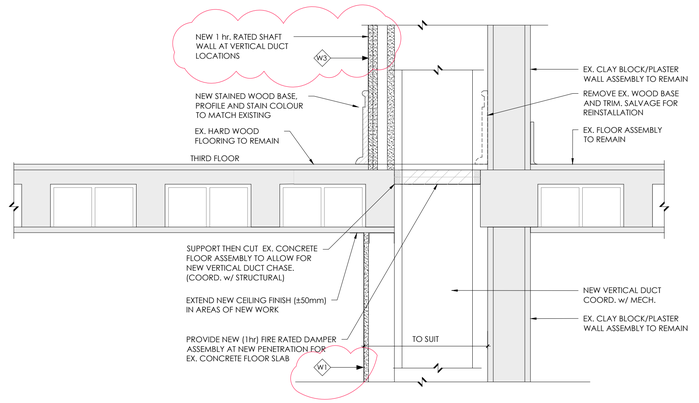
1 A2.4 THIRD FLOOR PLAN
0 1 2 5m



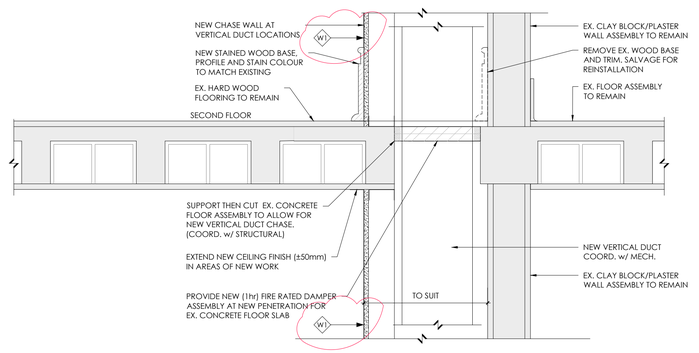
4 SK-02 TYPICAL THIRD FLOOR CEILING PENETRATION
0 100 200 500mm



3 SK-02 TYPICAL VERTICAL CHASE AT CEILING
0 100 200 500mm



2 SK-02 TYPICAL VERTICAL CHASE AT THIRD FLOOR LEVEL
0 100 200 500mm



1 SK-02 TYPICAL VERTICAL CHASE AT SECOND FLOOR LEVEL
0 100 200 500mm

REVISIONS

NO.	DATE	PARTICULAR
1	25.08.26	ISSUED FOR ADDENDUM No.3

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THIRD FLOOR SHAFT AND CEILING DETAILS

SK-02

DRAWN BY : ES CHECKED BY : XX

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