

March 14, 2022

ADDENDUM NUMBER TWO (2)

Project: IHL #409-001
Research Lab AHU-2 Replacement
DA PN: 20057
(UMMC Bid # 3691)

FROM: Dean Architecture, P.A.
661 Sunnybrook Road, Suite 140
Ridgeland, MS 39157
(601) 939-7717

The following additions, changes, clarifications and/or substitutions to the Project Drawings as indicated, are hereby made a part of the Contract Documents. Acknowledge receipt of this Addendum by inserting its number and date in the Proposal Form where indicated.

Mechanical

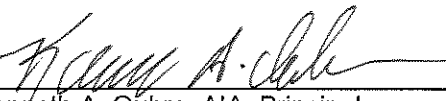
Item #1: See attached Mechanical Items provide by ERG dated March 14, 2022.

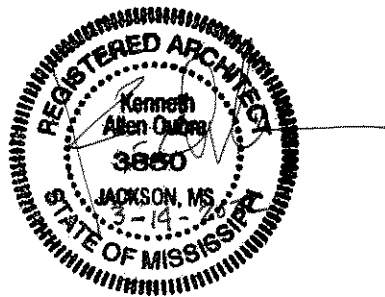
Drawings

Item #1: Electrical sheets E001 and E10. Replace these sheets in their entirety.

END OF ADDENDUM NUMBER TWO (2)

Dean Architecture, P.A.


Kenneth A. Oubre, AIA, Principal



PLEASE ATTACH THIS ADDENDUM TO THE INSIDE FRONT COVER OF EACH SET OF SPECIFICATIONS.

March 14, 2022

ADDENDUM NO. 2



March 14, 2022

IHL# 409-001
RESEARCH LAB AHU-2 REPLACEMENT
UNIVERSITY OF MISSISSIPPI MEDICAL CENTER
JACKSON, MS
ERG P.N. 21.030

- I. Bidder acknowledges that it is Bidder's responsibility to ascertain whether any Addenda have been issued and if so, to obtain copies of such Addenda. Bidder therefore agrees to be bound by all Addenda that have been issued for this Bid.

This Addendum forms a part of the Contract Documents and modifies the original Bidding Documents and consists of 2 pages (plus 8 pages of attachments). The following clarifications, changes, additions, or deletions shall be made to the following documents as indicated, and all other conditions shall remain the same.

II. PERTAINING TO THE SPECIFICATIONS

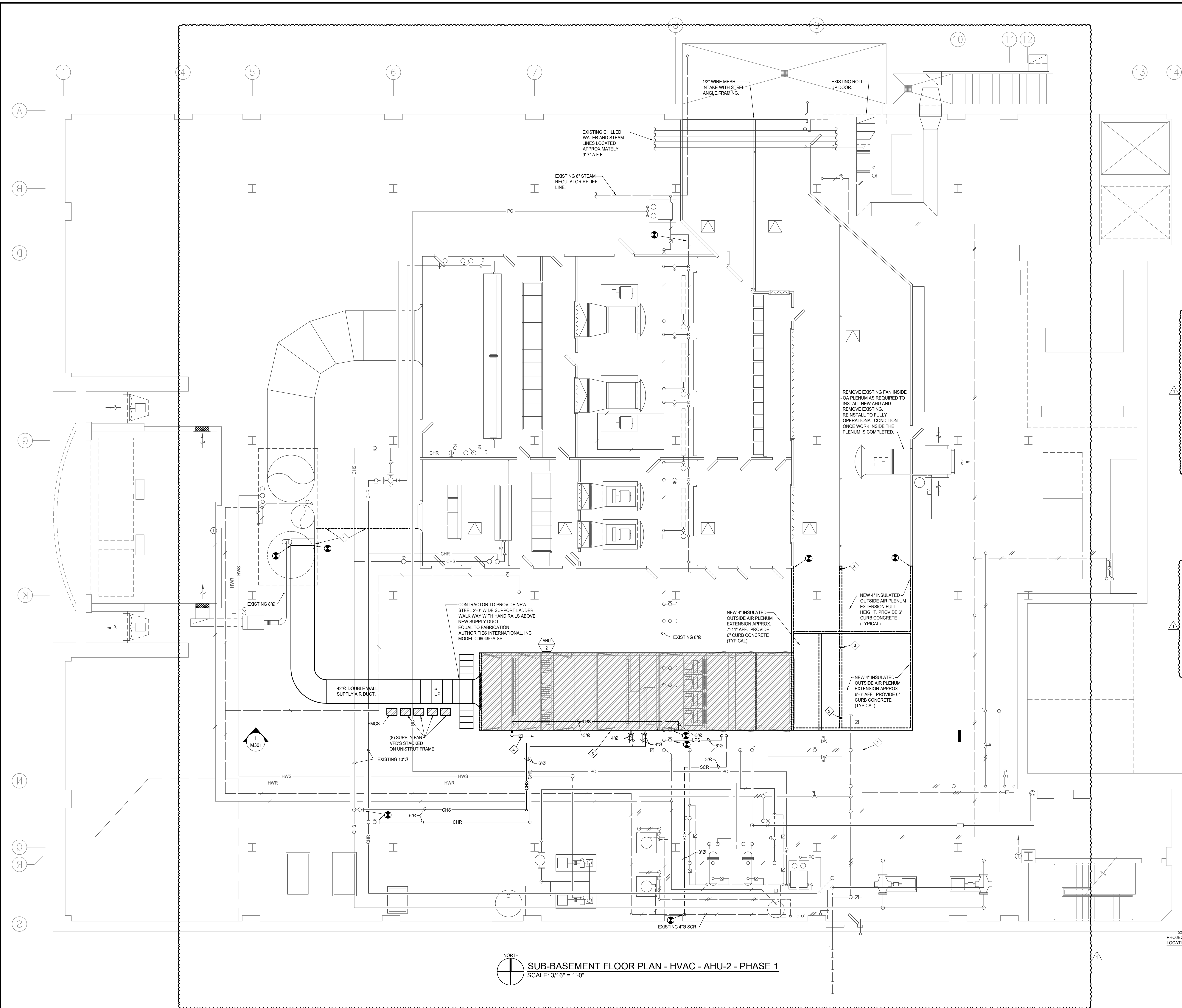
Item 1.	Reference:	Section 230513 – Motor and Controllers
	Scope:	Add the following paragraph 2.4F. F. Provide one (1) spare supply fan VSD of same size (hp) and by same manufacturer of other supply fan VSD's.
Item 2.	Reference:	230593 – Testing, Adjusting, and Balancing
	Scope:	Modify paragraph 1.2A to the following: A. The Testing, Adjusting, and Balancing (TAB) Agency shall be hired by the Owner directly, under a separate contract with the Owner. This Section is provided to establish the TAB scope of work and provide information to enable the Contractor to schedule TAB activities with all other trades.
Item 3.	Reference:	237500 – Custom Air-Handling Units
	Scope:	Add the following paragraph 2.10D: D. Provide one (1) spare fan motor of same size (hp) and by same manufacturer of factory installed fan motors.
Item 4.	Reference:	234000 – Air Cleaning Devices
	Scope:	Modify paragraph 2.2E.2 to the following:

		2.2E.2 Minimum depth: 18 inches as indicated on the Drawings. MERV 15.
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III. PERTAINING TO THE DRAWINGS

Item 5.	Reference:	Sheet M101
	Scope:	Replace sheet in its entirety with attached M101.
Item 6.	Reference:	Sheet M102
	Scope:	Replace sheet in its entirety with attached M102.
Item 7.	Reference:	Sheet M301
	Scope:	Replace sheet in its entirety with attached M301.
Item 8.	Reference:	Sheet M401
	Scope:	Replace sheet in its entirety with attached M401.
Item 9.	Reference:	Sheet M601
	Scope:	Replace sheet in its entirety with attached M601.
Item 10.	Reference:	Sheet M701
	Scope:	Replace sheet in its entirety with attached M701.
Item 11.	Reference:	Sheet P102
	Scope:	Replace sheet in its entirety with attached P102.
Item 12.	Reference:	Sheet P103
	Scope:	Replace sheet in its entirety with attached P103.

END OF ADDENDUM NO. 2

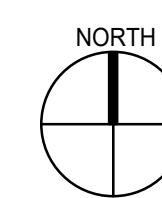


GENERAL NOTES

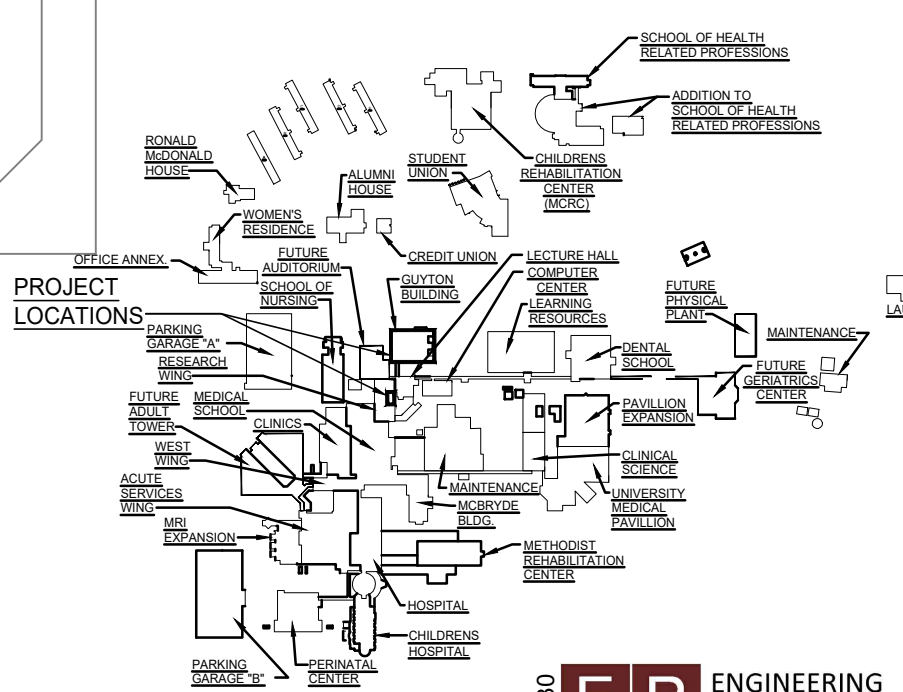
- WHEN MOVING THE NEW AHU COMPONENTS INTO THE SUBBASEMENT, THROUGH THE OUTDOOR AIR PLENUM, CONTRACTOR SHALL LIMIT THE DURATION THE PLENUM IS OPEN TO THE SUBBASEMENT. CONTRACTOR SHALL PROVIDE TEMPORARY OPENING IN PLENUM WALL AND SEAL THE OPENING WHEN NOT BEING USED TO INSTALL NEW AHU COMPONENTS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR MODIFYING EXISTING MECHANICAL, ELECTRICAL, STRUCTURAL SYSTEM COMPONENTS AS REQUIRED TO PERFORM WORK UNDER THIS CONTRACT.
- CONTRACTOR SHALL BE RESPONSIBLE FOR MODIFYING EXISTING SUPPORTS WITHIN THE OUTDOOR AIR PLENUM AS REQUIRED TO INSTALL AND REMOVE AHU COMPONENTS. CONTRACTOR SHALL RESTORE EXISTING OUTDOOR AIR PLENUM TO THE CONDITION PRIOR TO BEGINNING WORK.

PLAN NOTES

- REMOVE EXISTING 42\"/>
- CONTRACTOR SHALL PROTECT STEAM AND CONDENSATE FOR INSTALLATION OF NEW AIR HANDLING UNIT HOUSING.
- CONTRACTOR SHALL PROVIDE NEW STEEL SUPPORT BEAM AND COLUMNS AS RECOMMENDED BY THE PLENUM WALL PANEL MANUFACTURER.
- PROVIDE STEAM DRIP AND RECONNECT TO EXISTING CONDENSATE LINE.
- PROVIDE 4\"/>



SUB-BASEMENT FLOOR PLAN - HVAC - AHU-2 - PHASE 1
SCALE: 3/16\"/>





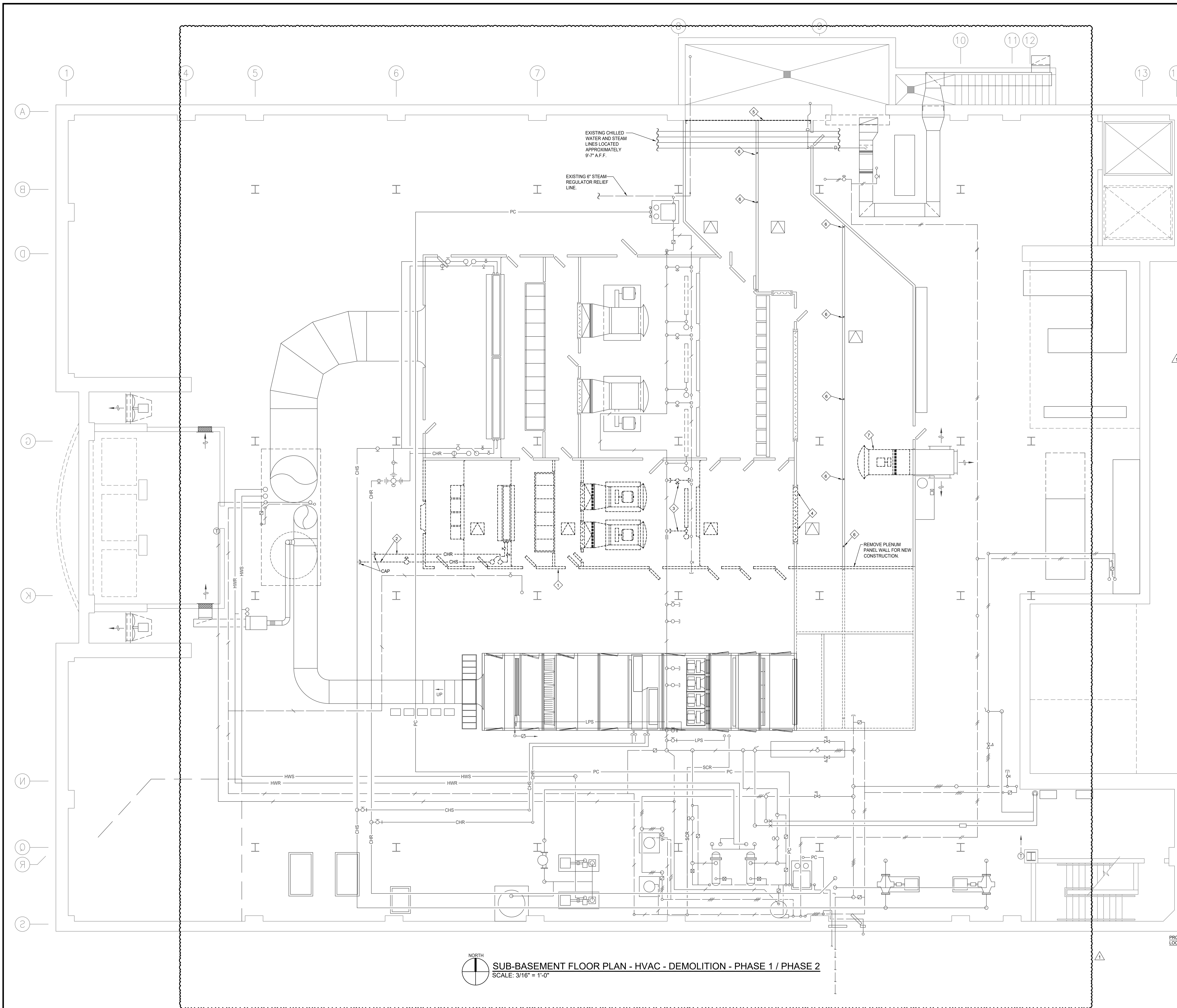
Project No.: 20057
Date: FEBRUARY 7, 2022
Drawn: CM, DB
Checked: CMM
Revisions: Δ ADDENDUM #2 - 3-14-2022

IHL 409-001
RESEARCH LAB AHU-2 REPLACEMENT
UNIVERSITY OF MISSISSIPPI CENTER
JACKSON, MS

Sheet Number:

M102

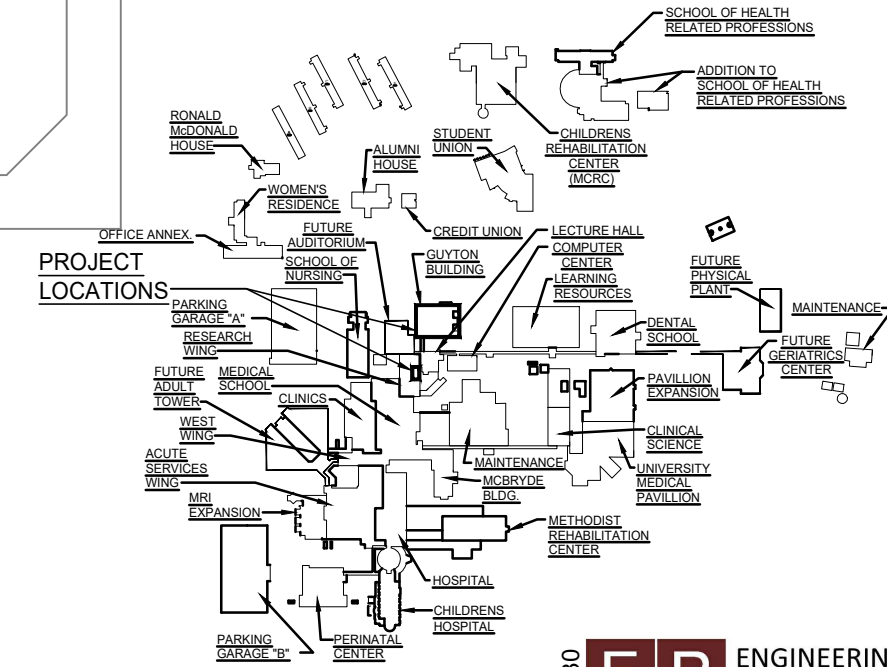
SUB-BASEMENT FLOOR
PLAN - HVAC -
DEMOLITION - PHASE 2

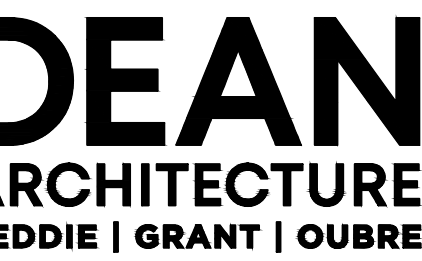


- GENERAL NOTES**
- A. WHEN MOVING THE NEW AHU COMPONENTS INTO THE SUBBASEMENT, THROUGH THE OUTDOOR AIR PLENUM, CONTRACTOR SHALL LIMIT THE DURATION THE PLENUM IS OPEN TO THE SUBBASEMENT. CONTRACTOR SHALL PROVIDE TEMPORARY OPENING IN PLENUM WALL AND SEAL THE OPENING WHEN NOT BEING USED TO INSTALL NEW AHU COMPONENTS.
 - B. CONTRACTOR SHALL BE RESPONSIBLE FOR MODIFYING EXISTING MECHANICAL, ELECTRICAL, STRUCTURAL SYSTEM COMPONENTS AS REQUIRED TO PERFORM WORK UNDER THIS CONTRACT.
 - C. CONTRACTOR SHALL BE RESPONSIBLE FOR MODIFYING EXISTING SUPPORTS WITHIN THE OUTDOOR AIR PLENUM AS REQUIRED TO INSTALL AND REMOVE AHU COMPONENTS. CONTRACTOR SHALL RESTORE EXISTING OUTDOOR AIR PLENUM TO THE CONDITION PRIOR TO BEGINNING WORK.
 - D. MODIFY EXISTING OUTSIDE AIR PLENUM AS REQUIRED TO REMOVE EXISTING AHU-2 IN PHASE 2. RESTORE MODIFIED PLENUM WITH 4\"/>

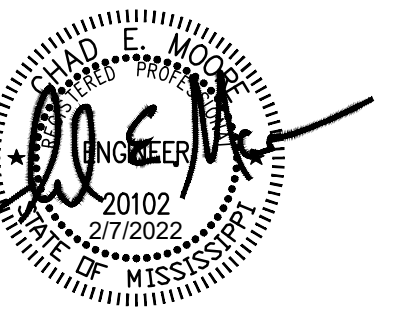
- PLAN NOTES**
- 1. REMOVE EXISTING AIR HANDLING UNIT AND ALL APPURTENANCES.
 - 2. REMOVE EXISTING CHILLED WATER SUPPLY AND CHILLED WATER RETURN PIPING BACK TO MAIN AND CAP.
 - 3. REMOVE EXISTING STEAM PIPING AND STEAM CONDENSATE PIPING BACK TO MAIN AND CAP.
 - 4. REMOVE EXISTING OUTSIDE AIR DAMPER AND INSTALL NEW 4\"/>
 - 5. REMOVE EXISTING WIRE MESH AND STEEL FRAMING FOR INSTALLATION ACCESS IN PHASE 1. INSTALL NEW WIRE MESH AND STEEL FRAMING AND RESTORE TO ORIGINAL CONDITION WHEN ALL WORK IS COMPLETE IN PHASE 2.
 - 6. REMOVE EXISTING PIPE COLUMNS AND TEMPORALLY SUPPORT BEAMS FOR INSTALLATION ACCESS IN PHASE 1. REINSTALL COLUMNS WHEN ALL WORK IS COMPLETE IN PHASE 2.
 - 7. REMOVE EXISTING OUTSIDE VENTILATION FAN FOR INSTALLATION ACCESS IN PHASE 1. REINSTALL OUTSIDE VENTILATION FAN WHEN ALL WORK IS COMPLETE. MODIFY ALL MECHANICAL CONTROLS AND ELECTRICAL WORK AS REQUIRED IN PHASE 2.

SUB-BASEMENT FLOOR PLAN - HVAC - DEMOLITION - PHASE 1 / PHASE 2
SCALE: 3/16\"/>





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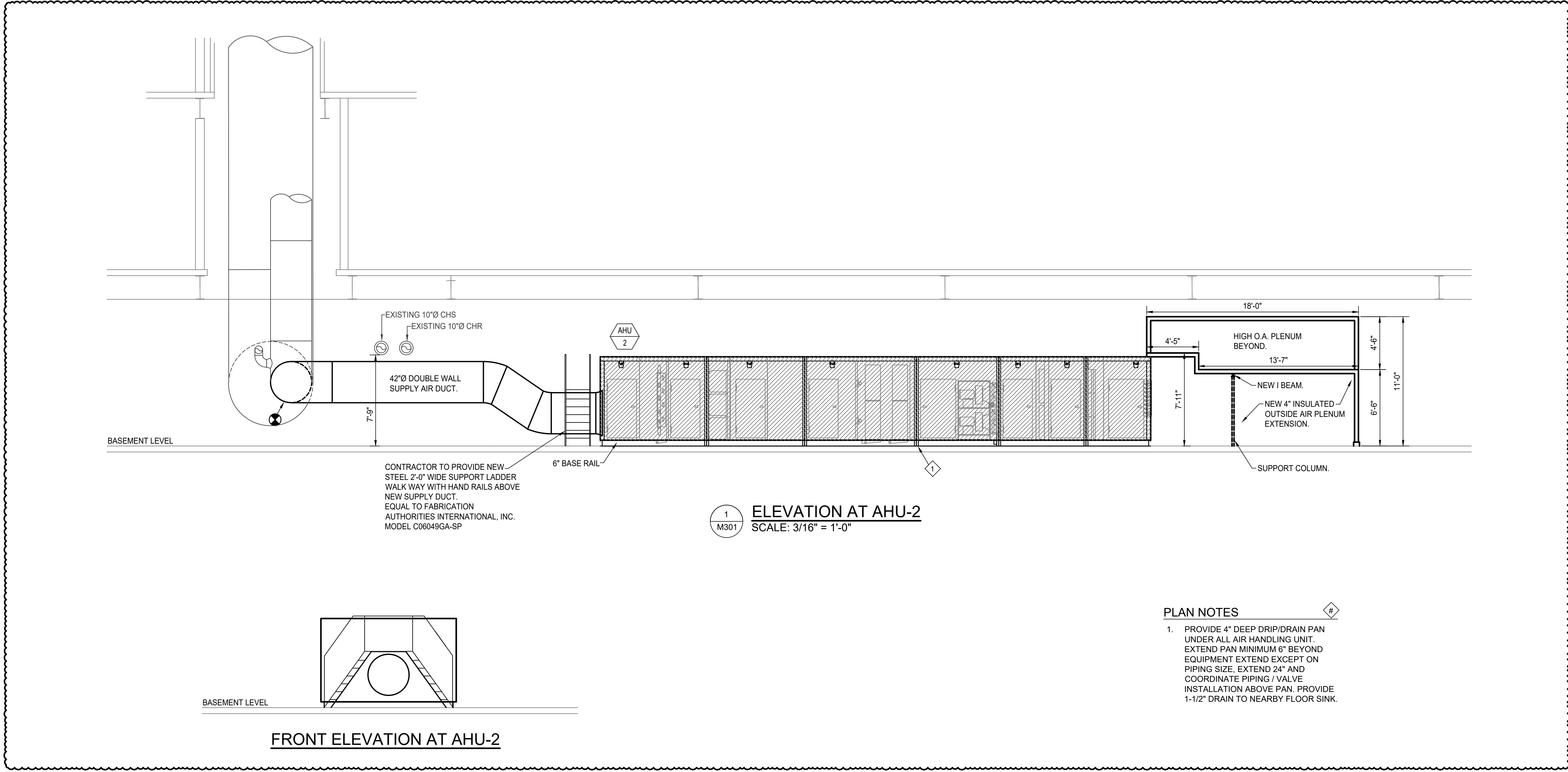
Project No. : 2005/
Date: FEBRUARY 7, 2022
Drawn: CM,DB
Checked: CMM
Revisions: 1 ADDENDUM #2 - 3-14-2022

RESEARCH LAB AHU-2 REPLACEMENT
UNIVERSITY OF MISSISSIPPI CENTER
JACKSON, MS

Sheet Number:

M301

ELEVATION AT AHU-2



MMC 409-001
RESEARCH LAB AHU-2 REPLACEMENT
0057

CONSTRUCTION DOCUMENTS

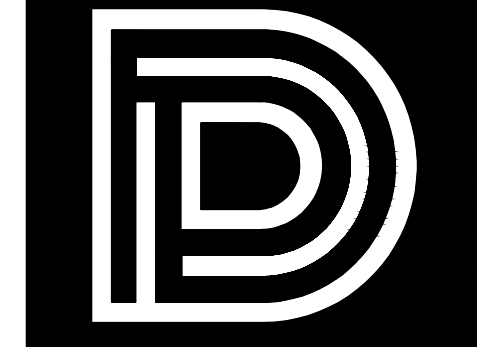
ERG 21-30

ER
G

ENGINEERING
RESOURCE GROUP
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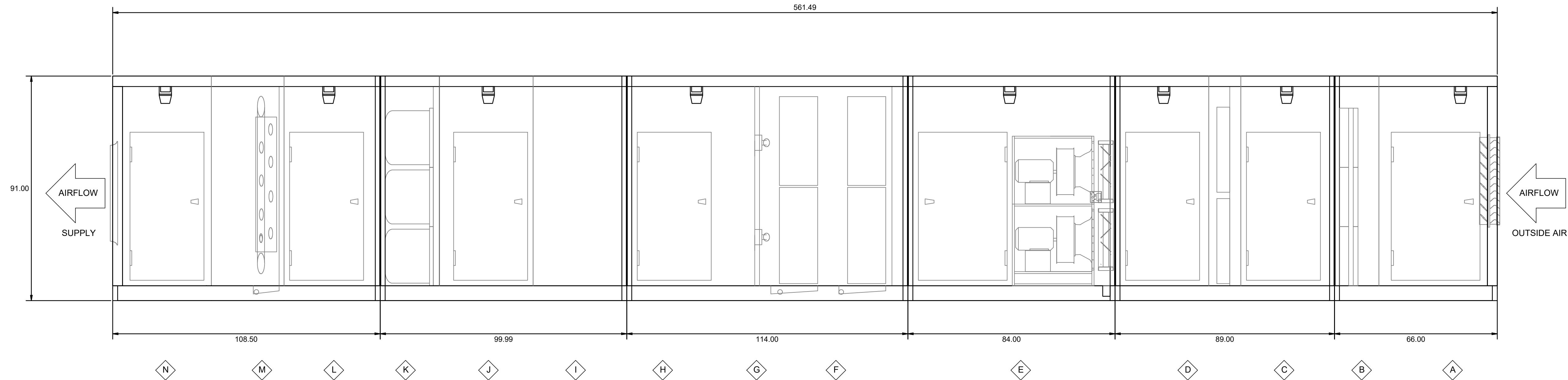
Project No.: 20057
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IHL 409-001
RESEARCH LAB AHU-2 REPLACEMENT
UNIVERSITY OF MISSISSIPPI CENTER
JACKSON, MS

Sheet Number:

M401

DETAIL OF CUSTOM BUILT
MODULAR AHU-2

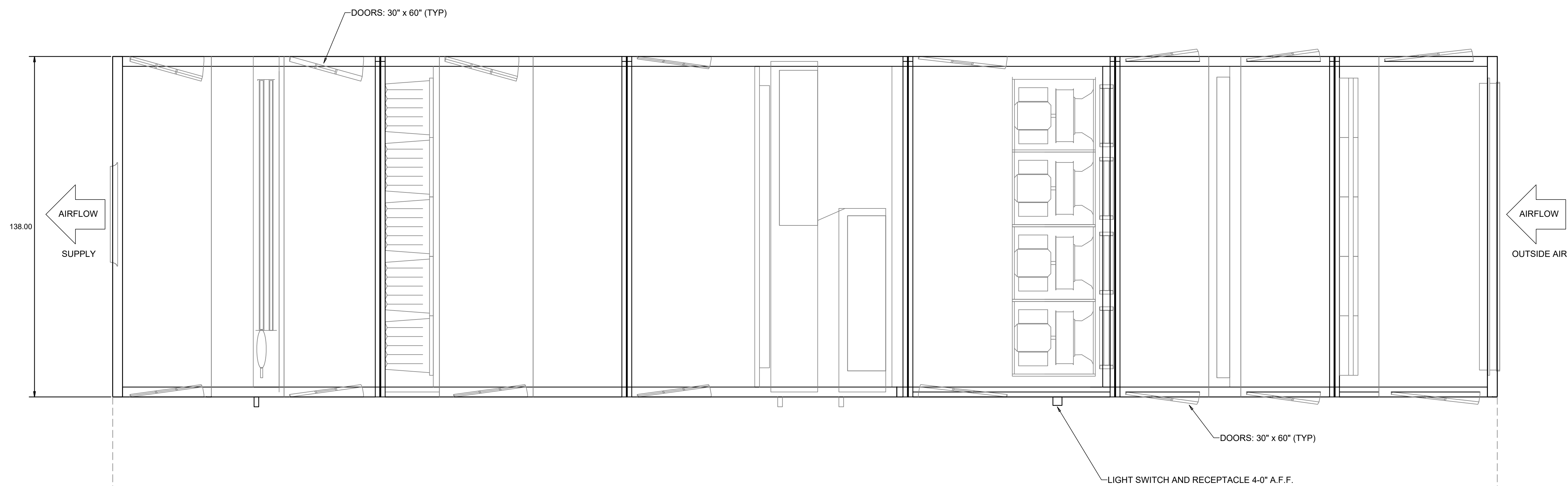


AHU GENERAL NOTES

- EACH FAN (SUPPLY) SHALL BE FACTORY WIRED TO AN EXTERNAL JUNCTION BOX FOR ELECTRICAL SERVICE FIELD CONNECTION. ELECTRICAL SERVICE TO EACH FACTORY WIRED EXTERNAL JUNCTION BOX BY DIVISION 26 ELECTRICAL.
- EACH LED MARINE LIGHT SHALL BE FACTORY WIRED TO AN EXTERNAL SWITCH FOR ELECTRICAL SERVICE FIELD CONNECTION. ELECTRICAL SERVICE TO EACH FACTORY WIRED EXTERNAL SWITCH BY DIVISION 26 ELECTRICAL.
- UV LIGHTS SHALL BE FACTORY WIRED TO AN EXTERNAL JUNCTION BOX FOR ELECTRICAL SERVICE FIELD CONNECTION. PROVIDE FACTORY INSTALLED DISCONNECT SWITCH FOR UV LIGHTS. ELECTRICAL SERVICE TO EACH FACTORY WIRED EXTERNAL JUNCTION BOX BY DIVISION 26 ELECTRICAL.

AHU SECTION DESCRIPTION Δ

- OUTDOOR AIR INTAKE SECTION W/1" TEST PORT & VALVE, OUTDOOR AIR DAMPER, LED MARINE LIGHT, DUAL PANE WINDOW (MINIMUM DIMENSIONS 8x8", TYPICAL).
- PRE-FILTER SECTION W/1" TEST PORT & VALVE, MAGNEHELIC DIFFERENTIAL PRESSURE GAUGE.
- ACCESS SECTION W/1" TEST PORT & VALVE, LED MARINE LIGHT, DUAL PANE WINDOW.
- STEAM PRE-HEAT COIL W/STAINLESS STEEL DRAIN PAN, PIPING CONNECTIONS ON EXTERIOR OF UNIT, LED MARINE LIGHT.
- SUPPLY FAN SECTION, (8) DIRECT-DRIVE PLENUM FANS, LED MARINE LIGHT, DUAL PANE WINDOW, MOTOR REMOVAL BEAM (SPAN WIDTH OF SECTION). FANS SHALL BE SELECTED SUCH THAT DESIGN AIRFLOW AND TSP SCHEDULED CAN BE OBTAINED WITH STABLE OPERATION WITH ONE FAN FAILED, WITHOUT REMAINING FANS OPERATING INTO MOTOR SERVICE FACTOR.
- CHILLED WATER COOLING COIL W/STAINLESS STEEL DRAIN PAN, PIPING CONNECTION ON EXTERIOR OF UNIT.
- UV LIGHT SECTION.
- ACCESS SECTION W/1" TEST PORT & VALVE, LED MARINE LIGHT, DUAL PANE WINDOW.
- SILENCER SECTION W/1" TEST PORT & VALVE.
- ACCESS SECTION W/1" TEST PORT & VALVE, LED MARINE LIGHT, DUAL PANE WINDOW.
- FINAL FILTER SECTION W/1" TEST PORT & VALVE, MAGNEHELIC DIFFERENTIAL PRESSURE GAUGE.
- ACCESS SECTION W/1" TEST PORT & VALVE, LED MARINE LIGHT, DUAL PANE WINDOW.
- STEAM HUMIDIFIER SECTION.
- DISCHARGE SECTION W/1" TEST PORT & VALVE, WINDOW, LED MARINE LIGHT, DUAL PANE WINDOW.



1
M401
DETAIL OF CUSTOM BUILT MODULAR AHU-2
SCALE: 1/2" = 1'-0"

CONSTRUCTION DOCUMENTS



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PROJECT LAB AHU-2 REPLACEMENT
ISSUE

MODULAR AIR HANDLING UNIT SCHEDULE (PART 1 OF 2)

TAG	MANUFACTURER AND MODEL NO.	SUPPLY FAN												COOLING COIL												STEAM HEATING COIL (PREHEAT)										CONTINUED BELOW	
		TYPE	FAN (QTY)	CFM	OUTDOOR AIR		ESP TSP	RPM	ISOLATION		ELEC (PER FAN)			CFM	FV	EDB		LDB		APD	GPM	EWT	LWT	WPD	CAPACITY (MBH)		ROWS FPI	CFM	FV	EDB	LDB	APD	LBS/HR	STEAM PRESS	CAPACITY (MBH)		ROWS FPI
					MAX	MIN			TYPE	DEFL	BHP	HP	V/Ø			EWB	LWB	TOTAL	SENS																		
AHU 2	TRANE TCSF 59	DIRECT-DRIVE PLENUM FAN	8	30,000	30,000	30,000	3.00 7.48	3502	SPRING	2	6.48	7.5	460/3	30,000	484	95.0 79.0	52.0 51.9	1.0	373.2	42.0	57.2	10.1	2840.8	1438.9	8 10.0	30,000	541	15.0	55.0	0.09	1364.5	10.0	1301	1 3.66			

MODULAR AIR HANDLING UNIT SCHEDULE (PART 2 OF 2)

TAG	MANUFACTURER AND MODEL NO.	PRE-FILTER			FINAL FILTER			OP WT (LBS.)	HUMIDIFIER			CONDENSATE TRAP SIZE	REMARKS
		TYPE	DEPTH	MERV	TYPE	DEPTH	MERV		TYPE	LBS/HR	STEAM PRESS		
AHU 2	TRANE TCSF 59	PLEATED	2"	8	BAG	18"	15	27.770	STEAM- GRID	717.4	10.0	54 LBS/HR	6" INTEGRAL BASE FRAME, PREMIUM EFF. INVERTER DUTY MOTORS, SUPPLY FAN MOTOR SHALL NOT EXCEED 60 HZ AT DESIGN CFM, DOUBLE WALL ACCESS PANELS WITHINGES & LATCHES, OA AIRFLOW MEASURING STATION, UV LIGHTS DOWNSTREAM OF COOLING COIL, TRAP TO BE SIZE BY MANUFACTURER.

VARIABLE FREQUENCY DRIVE (VFD) SCHEDULE - FIELD INSTALLED

SERVES	MANUFACTURER AND MODEL NO.	ELECTRICAL		REMARKS
		VOLTS-PH	HP	
AHU 2 (8) SUPPLY FANS	YASKAWA	460/3	7.5	NEMA-1 ENCLOSURE, BYPASS, FIELD MOUNTED, INTEGRAL DISCONNECT SWITCHES, QUANTITY (8)

VIBRATION ISOLATION/SEISMIC RESTRAINTS

EQUIPMENT TYPE	BASIS OF DESIGN	SEISMIC DESIGN CATEGORY "SDC"	SEISMIC COMPONENT IMPORTANCE FACTOR	REMARKS
MECHANICAL EQUIPMENT	VIBRO ACOUSTICS	C	1.5	1, 2
AIR-HANDLING UNITS	VIBRO ACOUSTICS	C	1.5	1, 2
DUCTWORK	VIBRO ACOUSTICS	C	1.5	1, 2
PIPING	VIBRO ACOUSTICS	C	1.5	1, 2

NOTES: 1. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. SEISMICALLY RATED FOR PROJECT CONDITIONS.
3. ALL SEISMIC SHALL MEET ASCE 7-10.

MECHANICAL UTILITY OUTAGE SCHEDULE - PLUMBING

UTILITY	SHUT-OFF DEVICE / LOCATION	AREA(S) AFFECTED	REMARKS
MEDICAL VACUUM	VALVE / TBD	TBD	*
SANITARY SEWER - LAB WASTE	--	TBD	*

MECHANICAL UTILITY OUTAGE SCHEDULE - HVAC

UTILITY	SHUT-OFF DEVICE / LOCATION	AREA(S) AFFECTED	REMARKS
AHU-2	AHU-2 / SUB-BASEMENT	BASEMENT FLOOR LABORATORY.	*
STEAM	VALVE / TBD	TBD	*



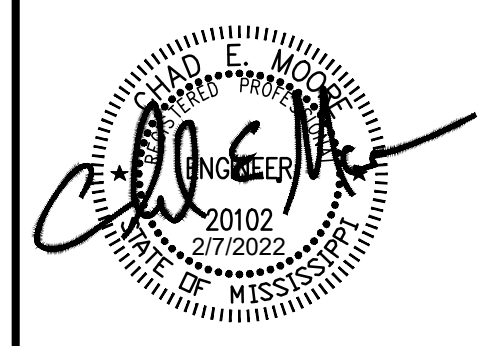
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IHL 409-001
RESEARCH LAB AHU-2 REPLACEMENT
UNIVERSITY OF MISSISSIPPI CENTER
JACKSON, MS

Sheet Number:

M601

MECHANICAL SCHEDULES



Project No.: 20037
Date: FEBRUARY 7, 2022
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IHL 409-001
RESEARCH LAB AHU-2 REPLACEMENT
UNIVERSITY OF MISSISSIPPI CENTER
JACKSON, MS

Sheet Number:

M702

MECHANICAL CONTROLS

AHU SEQUENCE OF OPERATION

General: Blow-Thru, Custom Built, Variable Air Volume (VAV) Air Handling Unit (AHU) with pre-heat coil, chilled water coil, supply fans, return air filter, UV light and filters.

AHU System Modes: AHU shall operate in the occupied mode at all times (e.g., 24/7).

Supply Fan Control:

- Supply Fan Start/Stop (See Drawings for quantity of supply and relief fans)
- AHU supply fans shall run continuously.
Fan VFDs shall be hard-wired interlocked through smoke detectors, high-discharge pressure, and low mixed air temperature safety relay mounted in the control panel at each AHU control panel. The relay energizes when high limit DP switches sense pressure above 3.0 inches (gauge) at the fan discharge, smoke detector auxiliary contacts are energized or the low limit thermostat trips, locks out the fans until they are reset by the reset DO point or a push button on the panel face. A pilot light on the panel face indicates static pressure safety without an effect.
- Totalize current airflow rate from VAV boxes and display on AHU graphic or discharge duct.

Static Pressure Setpoint Reset:

- Static pressure setpoint: Setpoint shall be reset using Trim & Respond Logic (see Trim & Respond description herein) with the following parameters.

Variable	Value
Device	Supply Fan
SPO	0.5 inches
SPmin	0.1 inches
SPmax	Per 23059.3
Ts	10 minutes
T	2 minutes
I	2
R	Zone Static Pressure Reset Requests
SPtrim	-0.5 inches
SPres	+0.05 inches
SPres-max	+0.13 inches

Static Pressure Control:

- Fan speed shall be controlled to rise very slowly to prevent high pressure trips in case all VAV boxes are closed (they should close during unoccupied periods) or in case fire/smoke dampers are closed in some FSD designs; the dampers are interlocked to the fan status rather than being controlled by smoke detectors). This can be configuring the VFD ramp rate or controlling ramp rate in EMCS software.
- Supply fan speed is controlled to maintain dust static pressure setpoint when the fan is proven on. See Specifications for minimum speed setpoint. Where the Zone Groups served by the system are small, provide multiple sets of PID gains that are used in the PID loop as a function of a load indicator (such as supply fan airflow rate, the area of the Zone Groups that are occupied, etc.).

Supply Air Temperature Control:

- Control loop is enabled when the supply air fan is proven on and disabled and output set to zero otherwise.
- Supply Air Temperature Setpoint: 52 °F.
- Supply air temperature shall be controlled to setpoint using a PID loop whose output is mapped to sequence the hot water valve, economizer/return air damper, return air damper, and chilled water valve as shown in the diagram below. Outdoor air and return air dampers are sequenced rather than complementing (in per most standard sequence) to reduce fan power at part loads.

For units with a single common minimum outdoor air and economizer damper: MaxRA-P and MinOA-P are modulated to control minimum outdoor air volume, as described below.

Humidifier Control: EMCS shall control the humidifier as follows:

- Humidifier isolation valve: Whenever the AHU is energized in occupied mode and outside air temperature is below 55°F (adj.) the isolation valve shall be commanded open.
- Humidifier valve: Whenever the humidifier isolation valve is open the humidifier valve shall be modulated to maintain the zone humidification setpoint (30% adj.) per the lower of:
 - Reverse acting PID loop to maintain the Return Air humidification setpoint.
 - Proportional only loop maintaining maximum supply humidity at 30% (adj.).

Outdoor Air Damper Control:

- Maximum Outdoor Air Control Loop:
 - 1.1.1. Maximum outdoor air control loop is enabled when the supply fans are proven on and the AHU is in Occupied Mode.

AHU SEQUENCE OF OPERATION CONT'

Freeze Protection:

- If the leaving pre-heat coil air temperature drops below 40°F for 5 minutes, send two (or more, as required) to ensure that heating plant is active; Hot Water Requests, override the outside air damper to the minimum position, and modulate the pre-heat coil to maintain a leaving pre-heat coil air temperature of at least 42°F. Disable this function when leaving pre-heat coil air temperature rises above 45°F for 5 minutes.
- If the leaving pre-heat coil air temperature drops below 38°F for 5 minutes, fully close the outdoor air damper for one hour, and set a Level 2 alarm noting that minimum ventilation was interrupted. After one hour, the unit shall resume minimum outdoor air ventilation and enter the previous stage of freeze protection (see 1.).
- Upon signal from the freeze/defrost or if supply air temperature drops below 38°F for 15 minutes or below 34°F for 5 minutes, shut down supply and return/relief fans; close outdoor air damper, make the minimum cooling coil valve position 20%, and energize the hot water and chilled water pump systems. Also send two (or more, as required) to ensure that heating plant is active; Hot Water Requests, modulate the heating coil to maintain the higher of the supply air temperature or the mixed air temperature at 65°F, and set a Level 2 alarm indicating the unit is shut down by freeze protection.
 - 1.1. If a freeze protection shutdown is triggered by a low air temperature sensor reading, it shall remain in effect until it is reset by a software switch from the operator's workstation. (If a freeze stat with a physical reset switch is used instead, there shall be no software reset switch.)

Safety and Interlocks:

- Supply fan shall be hardware interlocked through the unit smoke detector(s), low limit thermostat and high static pressure switch to shut down the unit upon smoke detection.

EMCS Alarms: Provide the following EMCS alarms:

- Maintenance interval alarm when unit has operated for more than 1500 hours; Level 5. Reset interval counter when alarm is acknowledged.
- Fan alarm is indicated by the status being different from the command for a period of 60 seconds.
 - 2.1. Commanded on, status off; Level 2
 - 2.2. Commanded off, status on; Level 4
- Filter pressure drop exceeds alarm limit; Level 5. The alarm limit shall vary with fan speed as follows:
$$DPx = DP100X/V^{1.4}$$

Where DP100 is the high limit pressure drop at design cfm (determine limit from filter manufacturer) and DPx is the high limit at speed signal x (expressed as a fraction of full signal). For instance, the setpoint at 50% of full speed would be (0.5)^{1.4} or 38% of the design high limit pressure drop.

- High supply air temperature (more than 5 °F above setpoint) when control loop is active for longer than 15 minutes; Level 3.
- If the outside air temperature is above the supply air temperature setpoint and the economizer is enabled and the mixed air temperature is more than 2 °F different from the outside air temperature for more than 30 minutes continuously; OR if the outside air temperature is more than 5 °F below the supply air temperature setpoint and the chilled water valve is open; Level 4 indicating economizer damper control problem.
- Low static pressure (more than 0.25 inches below setpoint) when fan control loop is active for longer than 5 minutes; Level 3.
- High building pressure (more than 0.1") for 5 minutes; Level 3.
- Low building pressure (less than 0.07") for 5 minutes; Level 4.
- Outdoor airflow less than setpoint by 10% for 10 minutes when loop is active; Level 3.
- Supply air Relative Humidity is greater than 80%.

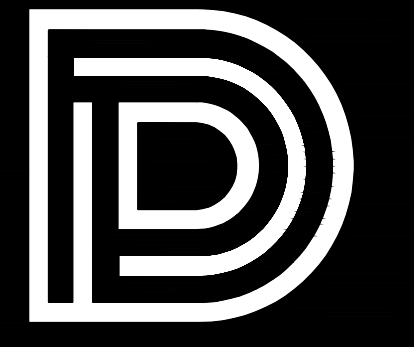
Testing/Commissioning Overrides: Provide software points that interlock to a chilled water and hot water plant level point to:

Force chilled water valve full open.
Force chilled water valve full closed.
Force hot water valve full open.
Force hot water valve full closed.

AHU SUPPLY FAN LADDER DIAGRAMS

SUPPLY FAN(S) VFD

AHU HARDWIRED POINTS LIST						POINTS MAPPED FROM AFMS BACNET CARD					
Description	Type	Device	Trend Logging		Calibra-tion	Description	Type	Device	Trend Logging		Calibra-tion
			Comm-issioning	Contin-uous					Comm-issioning	Contin-uous	
Supply Fan Start/Stop (8) Total	DO	Connect to VFD "Run"	COV	COV	-	Average flow	AI	Through network	1 min	60 min	-
Supply Fan High Static Alarm Reset	DO	Dry contact to 120V or 24V control circuit	COV	COV	-	Average temp	AI	Through network	1 min	60 min	-
Humidifier Isolation Valve	DO	Two-Position valve	COV	COV	-	Alarm Status	DI	Through network	COV	COV	-
Water Leak Detector	DI	WLD-1	COV	COV	-	Area	AV	Through network	-	-	-
Outside Air Damper	AO	Modulating actuator	1 min	15 min	-	Traverse data status	AV	Through network	-	-	-
Supply Fan Speed	AO	Connect to VFD Speed	1 min	15 min	-	Flow traverse	AV	Through network	-	-	-
Steam Control Valve	AO	Modulating 2-way valve	1 min	15 min	-	Temp traverse	AV	Through network	-	-	-
Chilled Water Control Valve	AO	Modulating 2-way valve	1 min	15 min	-	POINTS MAPPED FROM VFD BACNET CARD					
Mixed Air Temperature	AI	TS-1B, across filter bank	1 min	15 min	-	Description	Type	Device	Trend Logging		Calibra-tion
Filter Pressure Drop (Pre-Filter)	AI	DPT-2A, 0 to 1 inch	-	60 min	-				Comm-issioning	Contin-uous	
Filter Pressure Drop (Final Filter)	AI	DPT-2A, 0 to 1 inch	-	60 min	-	Fault reset	DO	Through network	COV	COV	-
Lvg. HW Coil Temperature	AI	TS-1B	1 min	15 min	-	On/off status	DI	Through network	COV	COV	-
Supply Air Temperature	AI	TS-1A	1 min	15 min	-	Fault (Critical Alarm)	DI	Through network	COV	COV	-
SA Humidity	AI	HT-1 (Duct mtd)	1 min	15 min	-	Minor Alarm	DI	Through network	COV	COV	-
EA Humidity	AI	HT-1 (Duct mtd)	1 min	15 min	-	Fault Text	DI	Through network (convert code to plain English text)	COV	COV	-
Humidifier Valve	AO	Modulating 2-way valve	1 min	15 min	-	Alarm Text	DI	Through network (convert code to plain English text)	COV	COV	-
Duct Static Pressure	AO		1 Min	15 Min	-	Keypad in hand/auto	DI	Through network	COV	COV	-
						Minimum frequency setpoint	AO	Through network	±5%	±5%	-
						Maximum frequency setpoint	AO	Through network	±5%	±5%	-
						Acceleration rate	AO	Through network	±5%	±5%	-
						Deceleration rate	AO	Through network	±5%	±5%	-
						Actual frequency	AI	Through network	1 min	15 min	-
						AC output voltage	AI	Through network	±10%	±10%	-
						Current	AI	Through network	15 min	60 min	-
						VFD temperature	AI	Through network	60 min	60 min	-
						Power, kW	AI	Through network	1 min	15 min	-
						Energy, MWh	AI	Through network	15 min	60 min	-
						DC Bus Voltage	AI	Through network	±10%	±10%	-



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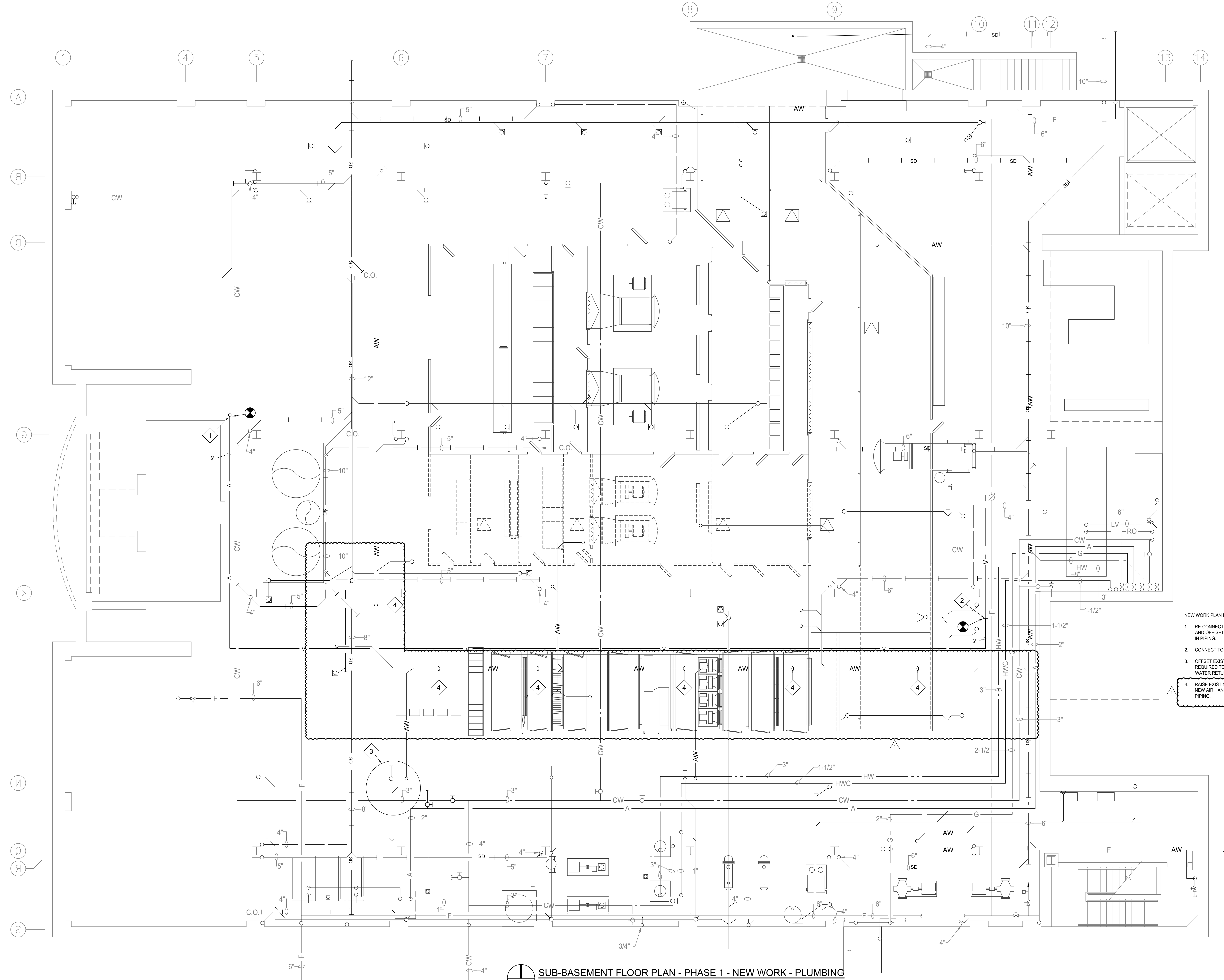
ADDENDUM #2 - 3-14-2022

IHL 409-001
RESEARCH LAB AHU-2 REPLACEMENT
UNIVERSITY OF MISSISSIPPI CENTER
JACKSON, MS

Sheet Number:

P102

SUB-BASEMENT FLOOR
PLAN - PHASE 1 - NEW
WORK - PLUMBING

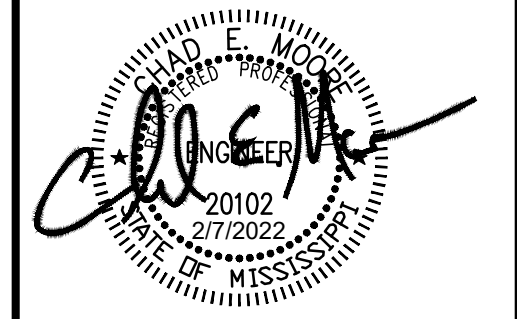


- NEW WORK PLAN NOTES:**
- RE-CONNECT TO EXISTING COPPER VACUUM PIPE HIGH IN MECH ROOM AND OFF-SET HORIZONTALLY, HIGH AS POSSIBLE AND MAINTAIN A SLOPE IN PIPING.
 - CONNECT TO EXISTING PIPING APPROX THIS LOCATION.
 - OFFSET EXISTING SANITARY SEWER PIPING AND 3 COPPER LINES AS REQUIRED TO INSTALL NEW 6" CHILLED WATER SUPPLY AND 6" CHILLED WATER RETURN PIPING AT EXISTING VALVES ON MAIN.
 - RAISE EXISTING GLASS ACID WASTE LINE (APPROX 10') IF REQUIRED FOR NEW AIR HANDLING UNIT INSTALLATION. MAINTAIN SLOP OF ACID WASTE PIPING.

SUB-BASEMENT FLOOR PLAN - PHASE 1 - NEW WORK - PLUMBING
SCALE: 3/16" = 1'-0"

CONSTRUCTION DOCUMENTS
ER ENGINEERING RESOURCE GROUP

UNIVERSITY OF MISSISSIPPI
RESEARCH LAB AHU-2 REPLACEMENT
SUB-BASEMENT FLOOR PLAN



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IHL 409-001
RESEARCH LAB AHU-2 REPLACEMENT
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Sheet Number:

P103

SUB-BASEMENT FLOOR PLAN - UNDER FLOOR - PHASE 1 - PLUMBING

CONSTRUCTION DOCUMENTS



 **SUB-BASEMENT FLOOR PLAN - UNDER FLOOR - PHASE 1 - PLUMBING**
SCALE: 3/16" = 1'-0"

- NEW WORK PLAN NOTES: $\diamond$
1. INDICATES EXISTING FLOOR DRAIN TO BE CAPPED AND SEALED AIR TIGHT.
 2. PROVIDE NEW 12"x12" FLOOR SINK (EQUAL TO 2URN) FOR CONDENSATE DRAIN. PIPE 4" FROM SINK BACK TO EXISTING DRAIN LINE.
 3. EXTEND CONDENSATE DRAIN TRAP LINES FULL SIZE FROM BOTH COILS TO FLOOR SINK. ELBOW DOWN FULL SIZE IN FLOOR SINK APPROX. 3".

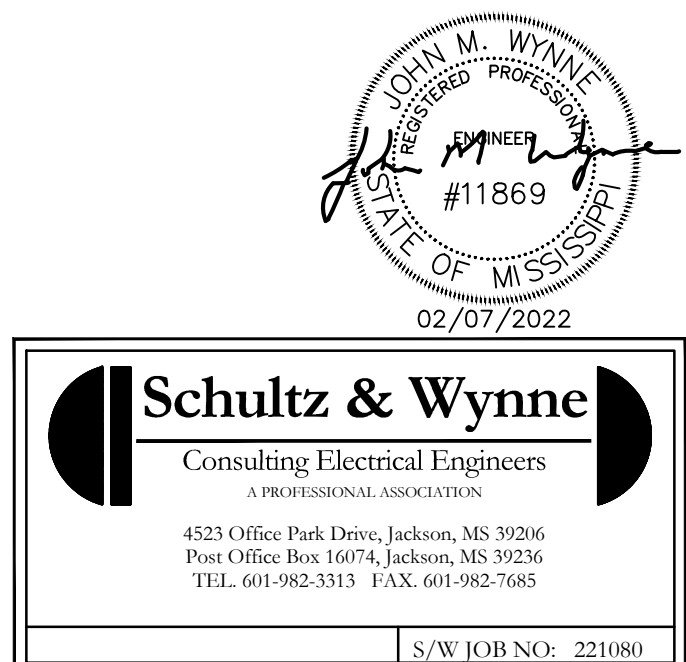
PHASE 2 DEMOLITION
OF AIR HANDLING UNIT

PHASE 1 INSTALLATION
OF AIR HANDLING UNIT

4" WASTE LINE
INSULATED WITH 3/4"
ARMAFLEX INSULATION.

PANEL "GXPLP"													
VOLTS: 208Y/120		PHASE: 3				MOUNTING: SURFACE							
MAIN: 150A		WIRE: 4				K.A.I.C.: 10							
NEUTRAL: 100%		FED FROM: EX3 PANEL "GDPX"				MAIN BREAKER: NONE							
CRIT NO	LOAD DESCRIPTION	KVA		BREAKER		KVA		LOAD DESCRIPTION	CRIT NO				
		PH. A	PH. B	PH. A	PH. B	PH. A	PH. B			PH. C			
1	EMS CNTL. PANEL	1.00		20	1	A	1		SPACE	22			
2	ALH-1 LIGHTING	1.00		20	1	B	1		SPACE	23			
3	SPARE			20	1	C	1		SPACE	24			
4	SPARE			20	1	A	1		SPACE	25			
5	SPARE			20	1	B	1		SPACE	26			
6	SPARE			20	1	C	1		SPACE	27			
7	SPARE			20	1	A	1		SPACE	28			
8	SPARE			20	1	B	1		SPACE	29			
9	SPARE			20	1	C	1		SPACE	30			
10	SPARE			20	1	A	1		SPACE	31			
11	SPARE			20	1	B	1		SPACE	32			
12	SPARE			20	1	C	1		SPACE	33			
13	SPARE			20	1	A	1		SPACE	34			
14	SPARE			20	1	B	1		SPACE	35			
15	SPARE			20	1	C	1		SPACE	36			
16	SPARE			20	1	A	1		SPACE	37			
17	SPARE			20	1	B	1		SPACE	38			
18	SPARE			20	1	C	1		SPACE	39			
19	SPARE			20	1	A	1		SPACE	40			
20	SPARE			20	1	B	1		SPACE	41			
21	SPARE			20	1	C	1		SPACE	41			
REMARKS:													

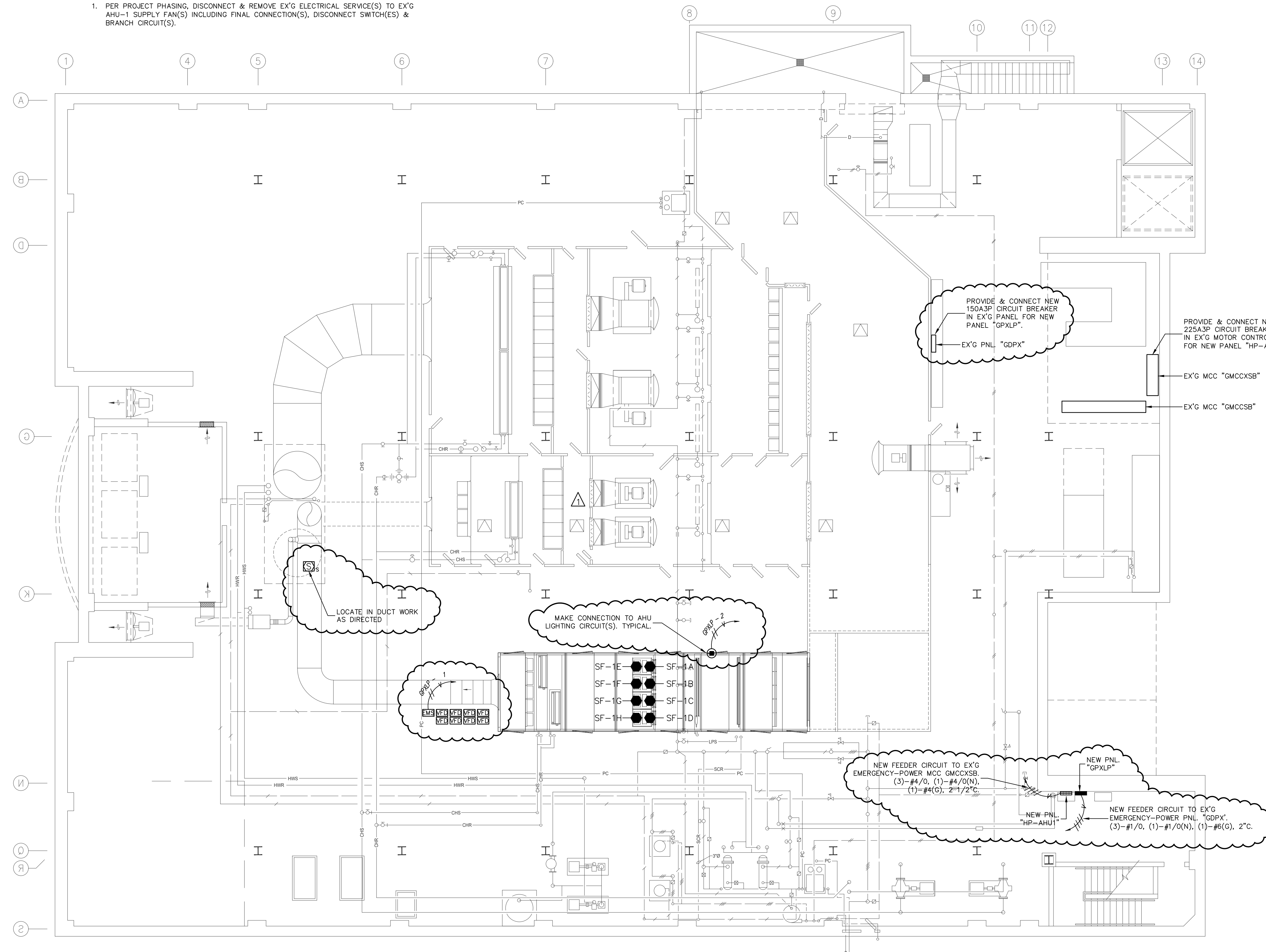
ELECTRICAL SYMBOLS LEGEND	
RACEWAYS & BOXES BRANCH CIRCUIT (CONDUIT AND WIRING) CONCEALED ABOVE CEILING OR IN WALL, NUMBER OF CONDUCTORS. (---) INDICATES GROUND GROUNDING CONDUIT SIZED PER BRANCH CIRCUIT UNLESS OTHERWISE NOTED. BRANCH CIRCUIT (CONDUIT AND WIRING) CONCEALED IN/UNDER FLOOR SLAB PER THE SPECIFICATIONS OR BELOW GRADE PER THE SPECIFICATIONS, NUMBER OF CONDUCTORS. BRANCH CIRCUIT (CONDUIT AND WIRING) EXPOSED ON CEILING ONLY, NUMBER OF CONDUCTORS. BRANCH CIRCUIT (CONDUIT AND WIRING) EXPOSED IN FLEXIBLE METALLIC CONDUIT, NUMBER CONDUCTORS. BRANCH CIRCUIT (CONDUIT AND WIRING) EXPOSED IN LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT WITH PROPER LIQUID-TIGHT FITTINGS, NUMBER OF CONDUCTORS. BRANCH CIRCUIT(S) HOMERUN, PANEL, & CIRCUIT DESIGNATIONS, ROUTE CONCEALED, NUMBER OF CONDUCTORS, MINIMUM 3/4" CONDUIT UNLESS NOTED OTHERWISE, ALL HOMERUNS GREATER THAN 50 FEET IN LENGTH SHALL USE #10 AWG CONDUCTORS MINIMUM. BRANCH CIRCUIT(S) HOMERUN, PANEL, & CIRCUIT DESIGNATIONS, ROUTE CONCEALED IN/UNDER FLOOR SLAB OR BELOW GRADE PER THE SPECIFICATIONS, NUMBER OF CONDUCTORS, MINIMUM 3/4" CONDUIT UNLESS NOTED OTHERWISE, ALL HOMERUNS GREATER THAN 50 FEET IN LENGTH SHALL USE #10 AWG CONDUCTORS MIN. MINIMUM. SURFACE JUNCTION BOX WITH COVER, SIZE & MOUNTING HEIGHT AS INDICATED, MINIMUM BOX SIZE SHALL BE 4" SQUARE. FLUSH BOX WITH COVER, SIZE & MOUNTING HEIGHT AS INDICATED, MINIMUM BOX SIZE SHALL BE 4" SQUARE WITH 1 GANG RAISED COVER. BRANCH CIRCUIT HOMERUN JUNCTION BOX, 4" SQUARE MINIMUM, MOUNT ABOVE ACCESSIBLE CEILING WHERE PRESENT, AT OVERHEAD STRUCTURE OR AS INDICATED.	
LUMINAIRES LIGHTING FIXTURE OUTLET WITH FIXTURE PER LIGHTING FIXTURE SCHEDULE, FIXTURE SYMBOL, CIRCUIT DESIGNATION(S), MOUNTING PER THE LIGHTING FIXTURE SCHEDULE. LIGHTING FIXTURE WALL BRACKET OUTLET WITH FIXTURE, FIXTURE SYMBOL, CIRCUIT DESIGNATION, MOUNTING PER THE LIGHTING FIXTURE SCHEDULE. FLUORESCENT FIXTURE OUTLET WITH FIXTURE PER LIGHTING FIXTURE SCHEDULE, FIXTURE SYMBOL, CIRCUIT DESIGNATION(S), MOUNTING PER THE LIGHTING FIXTURE SCHEDULE. RECESSED FLUORESCENT FIXTURE OUTLET WITH FIXTURE PER LIGHTING FIXTURE SCHEDULE, FIXTURE SYMBOL, CIRCUIT DESIGNATION(S), MOUNTING PER THE LIGHTING FIXTURE SCHEDULE. FLUORESCENT WALL BRACKET OUTLET WITH FIXTURE PER LIGHTING FIXTURE SCHEDULE, FIXTURE SYMBOL, CIRCUIT DESIGNATION(S), MOUNTING PER THE LIGHTING FIXTURE SCHEDULE. SINGLE HATCH LINES THRU ANY LIGHTING FIXTURE SYMBOL DENOTES LIGHTING FIXTURE CONNECTED TO THE LIFE SAFETY BRANCH OF THE EMERGENCY POWER DISTRIBUTION SYSTEM.	
SWITCHES & LIGHTING CONTROL DEVICES TOGGLE SWITCH WITH BOX & PLATE, 20AIP, 120/277V, FLUSH MOUNT C.L. UP 48" A.F.F. UNLESS NOTED OTHERWISE. TOGGLE SWITCH WITH BOX & PLATE, THREE-WAY, 20AIP, 120/277V, FLUSH MOUNT C.L. UP 48" A.F.F. UNLESS NOTED OTHERWISE. TOGGLE SWITCH WITH BOX & PLATE, FOUR-WAY, 20AIP, 120/277V, FLUSH MOUNT C.L. UP 48" A.F.F. UNLESS NOTED OTHERWISE. MANUAL MOTOR SWITCH WITH BOX AND PLATE, 20AIP, 120/277V, FLUSH MOUNT C.L. UP 48" A.F.F. UNLESS NOTED OTHERWISE.	
RECEPTACLES & POWER OUTLETS DUPLEX GROUNDING RECEPTACLE WITH BOX, PLATE & BRANCH CIRCUIT, 125 VOLT, NEMA 5-20R, MOUNT C.L. UP 18" A.F.F. UNLESS OTHERWISE INDICATED, CIRCUIT DESIGNATION. DUPLEX GROUNDING RECEPTACLE WITH BOX, PLATE & BRANCH CIRCUIT, 125 VOLT, NEMA 5-20R, MOUNT C.L. UP 4" ABOVE COUNTER/BACKSPLASH UNLESS OTHERWISE INDICATED, CIRCUIT DESIGNATIONS. DOUBLE DUPLEX GROUNDING RECEPTACLES WITH BOX, PLATE & BRANCH CIRCUIT, 125 VOLT, NEMA 5-20R, MOUNT C.L. UP 18" A.F.F. UNLESS OTHERWISE INDICATED, CIRCUIT DESIGNATION. DUPLEX GROUNDING RECEPTACLE WITH BOX, PLATE & BRANCH CIRCUIT, G.F.I. TYPE, 125 VOLT, NEMA 5-20R, MOUNT C.L. UP 18" A.F.F. UNLESS OTHERWISE INDICATED, CIRCUIT DESIGNATION. DUPLEX GROUNDING RECEPTACLE WITH BOX, PLATE & BRANCH CIRCUIT, G.F.I. TYPE, 125 VOLT, NEMA 5-20R, MOUNT C.L. UP 4" ABOVE COUNTER/BACKSPLASH WHERE PRESENT OR C.L. UP 48" A.F.F. UNLESS OTHERWISE INDICATED, CIRCUIT DESIGNATION. DOUBLE DUPLEX GROUNDING RECEPTACLE WITH BOX, PLATE & BRANCH CIRCUIT, G.F.I. TYPE, 125 VOLT, NEMA 5-20R, MOUNT C.L. UP 18" A.F.F. UNLESS OTHERWISE INDICATED, CIRCUIT DESIGNATION. DUPLEX GROUNDING RECEPTACLE WITH BOX, PLATE & EMERGENCY-POWER BRANCH CIRCUIT, RED DEVICE, 125 VOLT, NEMA 5-20R, MOUNT C.L. UP 18" A.F.F. UNLESS OTHERWISE INDICATED, CIRCUIT DESIGNATION. DUPLEX GROUNDING RECEPTACLE WITH BOX, WEATHERPROOF COVER & BRANCH CIRCUIT, G.F.I. TYPE, 125 VOLTS, NEMA 5-20R, MOUNT C.L. UP 18" A.F.F. UNLESS NOTED OTHERWISE, CIRCUIT DESIGNATION. GROUNDING RECEPTACLE WITH BOX, PLATE & BRANCH CIRCUIT, 250 VOLT, NEMA CONFIGURATION & SERVING BRANCH CIRCUIT AS INDICATED, FLUSH MOUNT C.L. UP 18" A.F.F. OR AS INDICATED. BRANCH CIRCUIT POWER CONNECTION TO HVAC EQUIPMENT LIGHTING LUMINAIRES PROVIDED WITH EQUIPMENT, VERIFY CONNECTION LOCATION & REQUIREMENTS W/EQUIPMENT PROVIDER, CIRCUIT DESIGNATION.	
EQUIPMENT POWER CONNECTIONS EQUIPMENT POWER CONNECTION MARK, SEE EQUIPMENT ELCE SERVICE SCHEDULE FOR BRANCH CIRCUIT & CONNECTION REQUIREMENTS, LOCATION SHOWN IS APPROXIMATE & REPRESENTATIVE. BRANCH CIRCUIT & POWER CONNECTION TO ELECTRIC MOTOR, PROVIDE & CONNECT THRU PROPER DISCONNECT SWITCH ADJACENT TO UNIT, LOCATION SHOWN IS APPROXIMATE, CIRCUIT DESIGNATION. BRANCH CIRCUIT & POWER CONNECTION TO EXHAUST FAN, INSTALL & CONNECT THRU CONTROL DEVICE & INTEGRAL DISCONNECT SWITCH, LOCATION SHOWN IS APPROXIMATE, CIRCUIT DESIGNATION. BRANCH CIRCUIT & POWER CONNECTION TO MOTORIZED DAMPER, PROVIDE & CONNECT THRU 20AIP SWITCH ADJACENT TO UNIT FOR DISCONNECT, LOCATION SHOWN IS APPROXIMATE, CIRCUIT DESIGNATION. VARIABLE FREQUENCY DRIVE, FURNISHED UNDER DIVISION 23, INSTALLED & CONNECTED BY DIVISION 26 CONTRACTOR, VERIFY LOCATION & CONNECTED EQUIPMENT PRIOR TO ROUGH-IN. ENERGY MANAGEMENT SYSTEM CONTROL PANEL, PROVIDED UNDER DIVISION 23, POWER CONNECTION BY DIVISION 26 CONTRACTOR, VERIFY LOCATION PRIOR TO ROUGH-IN.	





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1. PER PROJECT PHASING, DISCONNECT & REMOVE EX'G ELECTRICAL SERVICE(S) TO EX'G AHU-1 SUPPLY FAN(S) INCLUDING FINAL CONNECTION(S), DISCONNECT SWITCH(ES) & BRANCH CIRCUIT(S).



UMMC – GUYTON BUILDING
SUB-BASEMENT ELECTRICAL FLOOR PLAN

1
E101

SCALE: 3/16" = 1'-0"



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ELECTRICAL FLOOR PLAN

