MSHP GENERAL HEADQUARTERS COMPLEX

SECOND FLOOR ANNEX HVAC UNIT REPLACEMENT

JEFFERSON CITY, MISSOURI

OWNER: STATE OF MISSOURI
MIKE PARSON, GOVERNOR

PROJECT MANAGEMENT: OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES MANAGEMENT
DESIGN AND CONSTRUCTION

APPLICABLE CODES:
2021 INTERNATIONAL BUILDING CODE
2021 INTERNATIONAL EXISTING BUILDING CODE
2020 NATIONAL ELECTRICAL CODE
2021 INTERNATIONAL MECHANICAL CODE
2021 INTERNATIONAL PLUMBING CODE
2018 INTERNATIONAL FUEL GAS CODE
2010 ADA STANDARDS FOR ACCESSIBLE DESIGN

DESIGNER: CASCO DIVERSIFIED CORPORATION

PROJECT NUMBER: R2314-01

SITE NUMBER: 6001
ASSET NUMBER: 8136001002

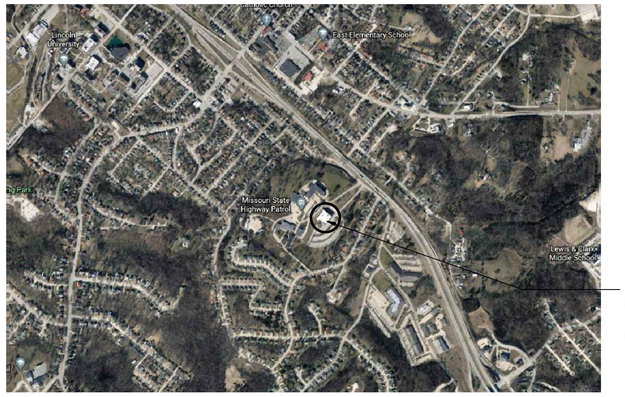
SCOPE: NEW HVAC / CONTROLS FOR PORTION OF THIRD FLOOR OF ANNEX BUILDING.

CASCO

12 SUNNEN DR, SUITE 100,
ST. LOUIS, MO 63143
ARCHITECTS/ ENGINEERS
T: 314.821.1100

CASCO DIVERSIFIED CORPORATION
MISSOURI STATE CERTIFICATE OF AUTHORITY #000329 ARCH.
MISSOURI STATE CERTIFICATE OF AUTHORITY #000613 ENG.

SHEET INDEX



ADDRESS:
1510 E ELM ST.
JEFFERSON CITY,
MO 65101

1 G-001
VICINITY MAP
SCALE: 6" = 1'-0"

BUILDING NORTH

STATE OF MISSOURI
MICHAEL S. SUNDERMEYER
NUMBER A-2014026855
ARCHITECT

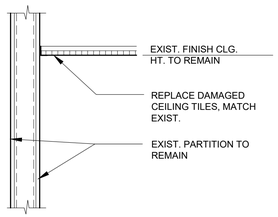
9/18/23

MICHAEL S. SUNDERMEYER
License Number: 2014026855
Expiration Date: 12/31/24

SHEET NUMBER:

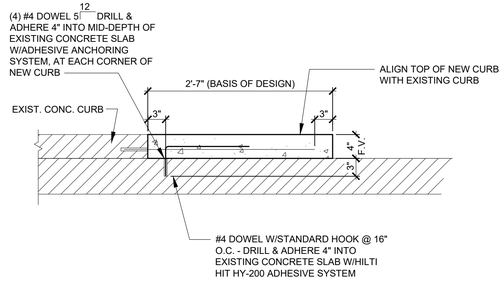
G-001

09/18/2023
01 OF 14 SHEETS



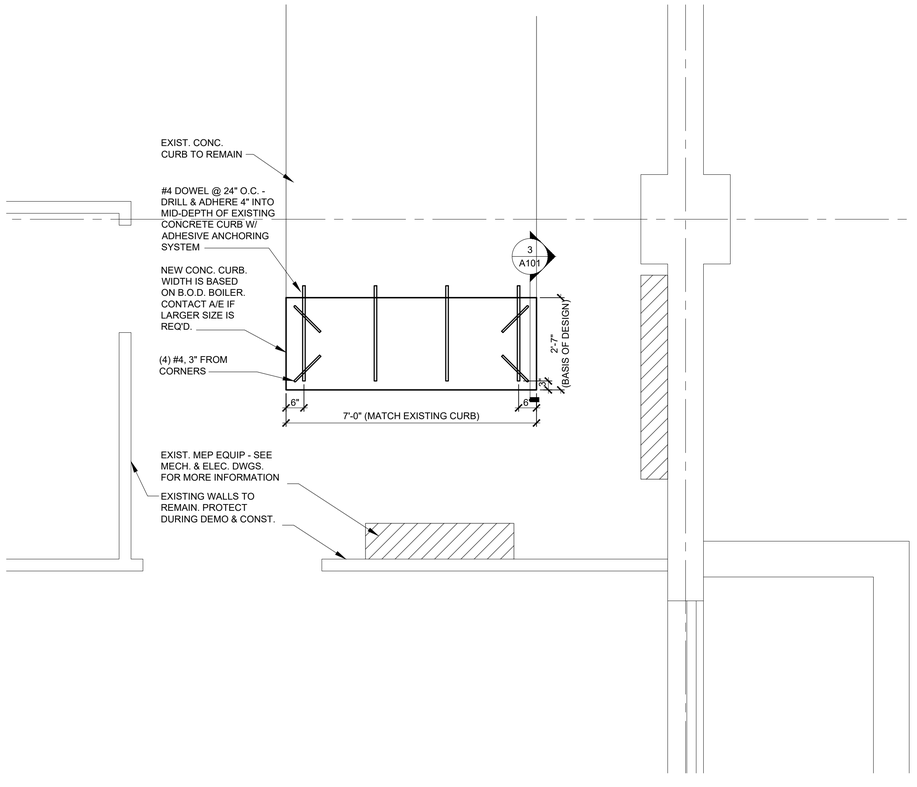
2 A-101 **A.C.T. DETAIL (OFFICES)**

SCALE: 1" = 1'-0"



3 A-101 **NEW CONC. CURB DETAIL**

SCALE: 1" = 1'-0"



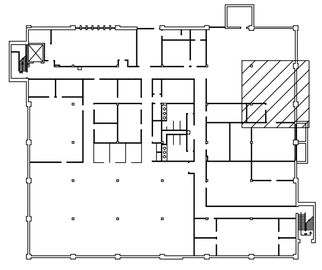
BUILDING NORTH

1 A-101 **ANNEX BLDG. - MECHANICAL ROOM NEW PLAN**

SCALE: 1/2" = 1'-0"

GENERAL NOTES

1. REFERENCE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFICATION OF CONTRACT DOCUMENTS. OWNER/ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY UNFORESEEN CONDITIONS WHICH MAY IMPACT THE PROGRESS OR COST OF WORK PERFORMED.
3. CONTRACTOR SHALL INCLUDE FURNISHING ALL MATERIAL, EQUIPMENT, TOOLS, LABOR, AND SERVICES NECESSARY FOR COMPLETION OF THE PROJECT.
4. REFERENCE SHEET M001 FOR ADDITIONAL GENERAL NOTES.
5. CONTACT OWNER//ENGINEER IMMEDIATELY IF ANY SUSPECTED HAZARDOUS MATERIALS ARE ENCOUNTERED. REFERENCE SPECIFICATIONS FOR ASBESTOS REPORT AND ABATEMENT SPECIFICATIONS.



KEYPLAN - N.T.S.

BUILDING NORTH

STATE OF MISSOURI
MICHAEL L. PARSON, GOVERNOR

STATE OF MISSOURI
MICHAEL S. SUNDERMEYER
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DEPARTMENT OF PUBLIC SAFETY

MISSOURI STATE HIGHWAY PATROL

ANNEX BUILDING, UPGRADE HVAC SYSTEM

MSHP GENERAL HEADQUARTERS ANNEX
1510 EAST ELM,
JEFFERSON CITY, MO 65101

PROJECT # R2314-01
SITE # 6001
FACILITY # 8136001002

REVISION:
DATE:
REVISION:
DATE:
REVISION:
DATE:

ISSUE DATE: 09/18/2023

CAD DWG FILE:
DRAWN BY: RAR
CHECKED BY:
DESIGNED BY:

SHEET TITLE:

MECHANICAL ROOM FLOOR PLAN & DETAILS

SHEET NUMBER:

A-101

GENERAL NOTES

1. THESE PLANS ARE DIAGRAMMATIC IN NATURE SINCE THEY REFLECT ONLY THE AVAILABLE INFORMATION OBTAINED FROM EXISTING PLANS, SPECIFICATIONS, AND FIELD SURVEYS. THE EXACT LOCATION OF EXISTING DUCTWORK, PIPING, AND EQUIPMENT MAY DEVIATE FROM THE LOCATION INDICATED ON THE DRAWINGS. THE CONTRACTOR SHALL BE PREPARED TO MAKE SOME ALTERATIONS TO NEW AND/OR EXISTING SERVICES TO FIT ACTUAL JOB CONDITIONS.
2. THE SPACE ALLOWED FOR MECHANICAL AND ELECTRICAL WORK ABOVE THE SUSPENDED CEILING IS CRITICAL AND REQUIRES COORDINATION BETWEEN TRADES. CONTRACTORS SHALL THOROUGHLY FAMILIARIZE THEMSELVES WITH THE EXISTING CONDITIONS PRIOR TO FABRICATION OR INSTALLATION OF ANY MATERIALS. DUCTWORK SHALL BE HUNG AS CLOSE AS POSSIBLE TO THE STRUCTURE ABOVE UNLESS INDICATED OTHERWISE. REWORK OF PIPING, DUCTWORK, EQUIPMENT LOCATION, CONDUIT, ETC. AS A RESULT OF POOR PLANNING, COORDINATION, OR SCHEDULING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
3. ANY HOLES LEFT IN EXISTING WALL CONSTRUCTION DUE TO DEMOLITION OR NEW WORK SHALL BE PATCHED TO MATCH EXISTING CONDITIONS.
4. PIPES/DUCTS/ETC. PENETRATING EXTERIOR WALLS AND ROOFS SHALL BE SEALED AND WEATHER PROOFED.
5. THERMOSTATS & ROOM TEMPERATURE SENSORS SHALL BE MOUNTED AT 48" A.F.F. TO THE TOP OF THERMOSTAT UNLESS NOTED OTHERWISE. DO NOT MOUNT IN DIRECT SUNLIGHT OR NEAR HEAT PRODUCING EQUIPMENT.
6. INSTALL H.V.A.C. SYSTEM IN ACCORDANCE WITH ALL STATE AND LOCAL CODES.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION OF ANY FRAMING REVISIONS, EQUIPMENT LOCATIONS, ADDITION OF CONTROLS, ELECTRICAL CIRCUITING REVISIONS, ETC. THAT RESULT FROM USING EQUIPMENT OTHER THAN INDICATED ON THE DRAWINGS. APPROVAL OF THE SHOP DRAWINGS BY THE ENGINEER WILL NOT WAIVE THE CONTRACTOR OF THIS RESPONSIBILITY.
8. THE CONTRACTOR SHALL HAVE THE FINAL RESPONSIBILITY FOR MECHANICAL EQUIPMENT START UP AND TURN OVER TO THE OWNER. MANUFACTURER OF EQUIPMENT SHALL BE ON SITE DURING THE SYSTEM START UP.
9. ALL ITEMS INCLUDED ON THESE DRAWINGS AND THE SPECIFICATIONS SHALL BE INCLUDED IN THE CONTRACTOR'S BID. IF THE CONTRACTOR DOES NOT CLEARLY UNDERSTAND THESE PLANS OR IS NOT SURE OF THEIR MEANING, THE CONTRACTOR SHOULD OBTAIN THE ENGINEER'S WRITTEN EXPLANATION AND INTERPRETATION PRIOR TO BID TIME. THE CONTRACTOR WILL BE HELD TO THE INTERPRETATION OF THE ENGINEER.
10. IN THE EVENT THE CONTRACTOR DISCOVERS ANY POTENTIALLY HAZARDOUS MATERIALS (ASBESTOS, MOLD, MILDEW, ETC.), THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER'S REPRESENTATIVE AND THE ARCHITECT/ENGINEER OF RECORD, IN WRITING, OF THE CONCERNS AND/OR SUSPICIONS.
11. CAULK ALL PENETRATIONS THRU WALLS TO MINIMIZE SOUND TRANSMISSION THRU WALLS.
12. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE ALL TEMPERATURE CONTROL SYSTEM REQUIREMENTS.
13. ANY DAMAGE TO THE SITE (SIDEWALKS, CURBS, ETC) OR TO THE BUILDING AS A RESULT OF WORK PERFORMED UNDER THIS CONTRACT SHALL BE FIXED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
14. CONTRACTOR WILL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING OF ROOFS/WALLS/FLOORS AND CORE DRILLS REQUIRED TO COMPLETE THEIR RESPECTIVE WORK.
15. THE OWNER SHALL HAVE FIRST SALVAGE RIGHTS OF EQUIPMENT AND MATERIALS REMOVED. ALL EQUIPMENT AND MATERIALS NOT CLAIMED BY THE OWNER SHALL BE REMOVED FROM THE PREMISES BY THE CONTRACTORS.
16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ANY TEMPORARY FENCING AROUND THE LIFT SITE DURING LIFTS.
17. ALL EXISTING MECHANICAL EQUIPMENT, DUCTWORK, ETC. THAT SERVES SPACES ON OTHER FLOORS SHALL REMAIN AS IS. DO NOT DISCONNECT OR REMOVE ANY EQUIPMENT NOT SHOWN IN THESE PLANS.
18. REMOVE AND RE-INSTALL EXISTING LAY-IN CEILING AS REQUIRED TO COMPLETE ALL DEMOLITION AND NEW WORK. REPLACE CEILING TILES DAMAGED DURING CONSTRUCTION WITH NEW TILES MATCHING EXISTING.

GENERAL NOTES (AIR SIDE)

1. NOTE, ALL DUCTWORK OFFSETS ARE NOT SHOWN. THE CONTRACTOR SHALL MODIFY DUCTS AND OFFSETS TO COORDINATE WITH THE BUILDING STRUCTURE AND ALL TRADE REQUIREMENTS.
2. ALL DUCTWORK SHALL BE CONSTRUCTED AND INSTALLED PER THE LATEST VERSION OF THE S.M.A.C.N.A. H.V.A.C. DUCT CONSTRUCTION STANDARDS, UNLESS SPECIFIED MORE STRINGENTLY IN THESE CONSTRUCTION DOCUMENTS. MINIMUM DUCT GAUGE SHALL BE 24.
3. 90° DUCT ELBOWS SHALL BE EQUIPPED WITH SINGLE THICKNESS TURNING VANES MOUNTED TO A PREFABRICATED VANE RAIL.
4. ALL ELBOWS SHALL BE SUPPLIED WITH TURNING VANES, WHETHER SHOWN ON DOCUMENTS OR NOT.
5. ALL 90° AND 45° RECTANGULAR RADIUS ELBOWS TO BE FABRICATED WITH AN INSIDE RADIUS NO LESS THAN 1/2 OF THE WIDTH OF THE DUCT - WHERE THE WIDTH OF THE DUCT IS DEFINED AS THE DIMENSION OF THE DUCT IN THE PLANE IN WHICH THE DUCT IS TURNING.
6. RECTANGULAR DUCTWORK SHALL BE SUPPORTED PER THE S.M.A.C.N.A STANDARDS AND AT EACH CHANGE IN DIRECTION.
7. PROVIDE MANUAL, SINGLE BLADE, BALANCING DAMPERS WITH STANDOFF LOCKING QUADRANT AND INTEGRAL POSITION INDICATOR ON ALL RUNOUTS TO SUPPLY AND EXHAUST AIR DEVICES EXCEPT THOSE LOCATED IN AREAS WITH PLASTER CEILINGS AND ARE NOT ACCESSIBLE (DAMPER SHALL BE INTEGRAL WITH THE AIR DEVICE IN THESE CASES.)
8. PROVIDE MANUAL OPPOSED BLADE DAMPERS STANDOFF WITH LOCKING QUADRANT AND INTEGRAL POSITION INDICATOR ON ALL RECTANGULAR BRANCH DUCTS AND AIR DEVICE RUNOUTS THAT EXCEED 12" IN HEIGHT.
9. MANUAL SPLITTER DAMPERS ARE NOT ACCEPTABLE.
10. NOT ALL OF THE ACCESS DOORS IN THE DUCT SYSTEMS OR PLENUMS ARE SHOWN. PROVIDE ACCESS DOORS IN ALL DUCT SYSTEMS OR PLENUMS WHERE REQUIRED TO ACCESS AND MAINTAIN MOTORIZED OR AUTOMATIC DAMPER BLADES AND LINKAGES.
11. ALL DUCTWORK SHALL BE SUPPORTED FROM ROOF OR FLOOR STRUCTURE ABOVE. DUCTWORK SHALL NOT LAY ON TOP OF CEILING OR LIGHT FIXTURES.
12. FLEXIBLE DUCT RUNOUTS TO AIR DEVICES SHALL NOT EXCEED 5'-0" IN LENGTH. FLEXIBLE RUNOUTS SHALL BE TRIMMED TO THE MINIMUM LENGTH NECESSARY TO MAKE THE CONNECTION.
13. WHERE DAMPER ACTUATORS ARE MOUNTED TO DUCTWORK OR PLENUMS PROVIDE A HEAVY GAGE BASE PLATE, ANGLE STIFFENERS, OR MOUNTING AS REQUIRED TO ELIMINATE DEFLECTION OF DUCTWORK DURING ACTUATOR OPERATION.
14. FLEXIBLE DUCT CONNECTIONS TO EQUIPMENT ARE NOT SHOWN ON THE DRAWINGS. PROVIDE EXTRA WIDE FLEXIBLE CONNECTIONS ON THE SUPPLY DUCT AND THE RETURN DUCT THE AIR HANDLING UNIT.
15. PROVIDE 45° FLARED TAKEOFFS FOR ALL RECTANGULAR BRANCH CONNECTIONS TO THE MAIN DUCT.
16. ALL DAMPER ACTUATORS FOR DUCT SYSTEMS OR EQUIPMENT THAT COMMUNICATES DIRECTLY WITH THE OUTDOORS SHALL BE SPRING RETURN TYPE TO CLOSE IN THE EVENT OF A POWER FAILURE.
17. WHERE PARTITIONS EXTEND TO THE CONSTRUCTION ABOVE, OPENINGS SHALL BE PROVIDED IN THE PARTITION ABOVE THE CEILING FOR DUCT ROUTING AS PER PLANS.
18. DUCT DIMENSIONS NOTED ON THE DRAWINGS ARE NET FREE AREA. DUCT LINER IS NOT ALLOWED.
19. AREAS ABOVE THE CEILING SERVE AS A RETURN AIR PLENUM WHERE INDICATED IN PLANS. ALL MATERIALS EXPOSED IN THE PLENUM SHALL HAVE A 25/50 SMOKE/FLAME SPREAD RATING.
20. ALL DUCT RUNOUTS TO AIR DEVICES ARE TO BE THE SAME SIZE AS THE NECK OF THE AIR DEVICE UNLESS NOTED OTHERWISE.
21. DIRECTIONAL ARROWS ON AIR DEVICES INDICATE THROWS FOR AIR DEVICE. VERIFY PROPER ADJUSTMENT OF THROW DEFLECTION VANES OF ALL AIR DEVICES PRIOR TO BEGINNING BALANCING. WHERE NO ARROWS ARE SHOWN, THROW SHALL BE 4-WAY.
22. CONTRACTOR SHALL BALANCE EACH AREA OF COMPLETED WORK. THE CONTRACTOR SHALL BALANCE SUPPLY, RETURN, AND EXHAUST AIR FLOWS AT EACH AIR DEVICE AFFECTED BY RENOVATION TO QUANTITY INDICATED ON THE DRAWINGS.
23. ALL NEW DUCT CONNECTIONS TO EXISTING DUCTWORK SHALL BE SEALED AIRTIGHT.

GENERAL NOTES (HYDRONIC)

1. THE CONTRACTOR SHALL COORDINATE SYSTEM SHUT-DOWNS, INCLUDING CHILLED WATER AND HEATING WATER SYSTEM SHUT-DOWNS, WITH THE OWNER. PROVIDE A MINIMUM 72 HOUR NOTICE PRIOR TO ANY SYSTEM SHUT-DOWN.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DRAINING, FILLING, AND VENTING OF ALL HYDRONIC SYSTEMS IMPACTED BY THIS PROJECT.

HEATING AND VENTILATION SYMBOLS

- VD — MANUAL VOLUME DAMPER
- BD — GRAVITY BACKDRAFT DAMPER
- MD — MOTORIZED VOLUME DAMPER
- SD — SMOKE DETECTOR
- RETURN/TRANSFER/COMBUSTION AIR DISCHARGE DUCT UP
- RETURN/TRANSFER/COMBUSTION AIR DISCHARGE DUCT DOWN
- SUPPLY AIR/COMBUSTION AIR INTAKE UP
- SUPPLY AIR/COMBUSTION AIR INTAKE DOWN
- EXHAUST AIR DUCT UP
- EXHAUST AIR DUCT DOWN
- ROUND DUCT DOWN
- ROUND DUCT UP
- INCLINED DROP IN THE DIRECTION OF AIR FLOW
- INCLINED RISE IN THE DIRECTION OF AIR FLOW
- ECCENTRIC DUCT TRANSITION
- CONCENTRIC DUCT TRANSITION

AIR DEVICE TYPE:
S - SUPPLY DIFFUSER
R - RETURN GRILLE
E - EXHAUST GRILLE
T - TRANSFER GRILLE

DUCT SYSTEM TYPE:
SA - SUPPLY AIR
RA - RETURN AIR
EA - EXHAUST AIR
TA - TRANSFER AIR
OA - OUTDOOR AIR
MD - COLD/HOT MIXED DUCT
CD - COLD DUCT
HD - HOT DUCT

- CWS — CHILLED WATER SUPPLY
- CWR — CHILLED WATER RETURN
- HWS — HEATING WATER SUPPLY
- HWR — HEATING WATER RETURN
- T — THERMOSTAT / TEMPERATURE SENSOR

MISCELLANEOUS SYMBOLS

- EQUIPMENT OR PLUMBING FIXTURE DESIGNATION
- (DETAIL NUMBER) DETAIL DESIGNATION (SHEET NUMBER WHERE DETAIL IS FOUND)
- KEYED NOTES
- REVISIONS
- NEW CONNECTION
- S-1 / 1000 — (AIR DEVICE TYPE) - (SCHEDULE NUMBER) (AIR FLOW IN CFM)

NOTE: NOT ALL SYMBOLS OR ABBREVIATIONS MAY BE USED.

PIPING SPECIALTIES

GV	GATE VALVE	
BV	BALANCING VALVE	
CV	CHECK VALVE	
GLV	GLOBE VALVE	
BLV	BALL VALVE	
STR	STRAINER	
U	UNION	
BC	BALANCING COCK	
SOC	SHUT-OFF COCK	
SLV	SOLENOID VALVE	
BFV	BUTTERFLY VALVE	
FS	FLOW SWITCH	
	VALVE W/ SUPERVISORY SWITCH	
FCV	FLOW CONTROL VALVE (GPM INDICATED)	
T&PR	TEMPERATURE AND PRESSURE RELIEF VALVE	
PG	PRESSURE GAUGE	
TH	THERMOMETER (TUBE OR DIAL AS INDICATED)	
MV	MOTORIZED VALVE	
DV	DIAPHRAGM VALVE	

ABBREVIATIONS

FFE	FINISH FLOOR ELEVATION
AFF	ABOVE FINISH FLOOR
TE	TOP ELEVATION
BE	BOTTOM ELEVATION
FL	FLOW LINE
INV	INVERT ELEVATION
℄	CENTER LINE
GC	GENERAL CONSTRUCTION CONTRACTOR
HAC	HEATING & AIR CONDITIONING CONTRACTOR
PC	PLUMBING CONTRACTOR
EC	ELECTRICAL CONTRACTOR
ACS	AUTOMATIC CONTROL SUB-CONTRACTOR
FPC	FIRE PROTECTION CONTRACTOR
HSC	HALON SUB-CONTRACTOR
KEC	KITCHEN EQUIPMENT CONTRACTOR
MC	MECHANICAL CONTRACTOR
TCC	TEMPERATURE CONTROL CONTRACTOR

GENERAL NOTES (DEMOLITION)

1. THESE PLANS ARE DIAGRAMMATIC IN NATURE. SINCE THEY REFLECT ONLY THE AVAILABLE INFORMATION OBTAINED FROM EXISTING PLANS, SPECIFICATIONS, AND FIELD SURVEYS. THE EXACT LOCATION OF EXISTING DUCTWORK, PIPING, AND EQUIPMENT MAY DEVIATE FROM THE LOCATION INDICATED ON THESE DRAWINGS. THE CONTRACTOR SHALL BE PREPARED TO MAKE SOME ALTERATIONS TO NEW AND/OR EXISTING SERVICES TO FIT ACTUAL JOB CONDITIONS.
2. ITEMS AND SYSTEMS IDENTIFIED WITH KEY NOTES OR SHOWN BOLD AND/OR DASHED ON THE DEMOLITION SHEETS INDICATE ITEMS TO BE DEMOLISHED.
3. OWNER HAS FIRST RIGHT OF REFUSAL FOR ALL EQUIPMENT BEING DEMOLISHED. CONTRACTOR TO DISPOSE OF EQUIPMENT BEING DEMOLISHED BUT NOT RETAINED BY OWNER.

GENERAL NOTES (ROOF PROTECTION)

1. THE CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE A MINIMUM OF 72 HOURS PRIOR TO THE BEGINNING OF WORK THAT INVOLVES ACTIVITY ON THE ROOF.
2. TRAFFIC OVER THE EXISTING ROOF SURFACES SHALL BE KEPT TO AN ABSOLUTE MINIMUM.
3. THE CONTRACTOR AND THE OWNER'S REPRESENTATIVE SHALL INSPECT THE EXPOSED ROOFING MEMBRANE SYSTEM PRIOR TO THE START OF CONSTRUCTION. ANY PREVIOUS DAMAGE OR DEFECTS OF THE ROOFING SYSTEM SHALL BE DOCUMENTED BY WRITING AND/OR PHOTOGRAPHS.
4. THE CONTRACTOR SHALL PLACE MINIMUM OF 48" WIDE, 1/2" THICK APPROVED PROTECTION BOARDS (1 LAYER) MADE OF CONSTRUCTION GRADE PLYWOOD (ORIENTED STRAND BOARD WILL BE ACCEPTABLE) OVER ALL MEMBRANE ROOFING THAT WILL HAVE CONSTRUCTION TRAFFIC. THIS ROOF PROTECTION SHALL BE PROVIDED FOR THE ENTIRE AREA WITHIN THE LIMITS OF THE WORK. SUCH PROTECTION SHALL ALSO BE PROVIDED IN THE FORM OF A WALKWAY FROM THE ROOF ACCESS DOOR TO THE PROTECTED CONSTRUCTION AREA.
5. STORAGE OF MATERIALS ON EXISTING ROOF WILL NOT BE ALLOWED.
6. THE CONTRACTOR SHALL REMOVE ALL PROJECT DEBRIS FROM ROOFING SURFACES ON A DAILY BASIS.
7. THE CONTRACTOR SHALL ADVISE THE OWNER WHEN WORK ON THE ROOF IS COMPLETE AND THE PROTECTION BOARDS HAVE BEEN REMOVED. THE CONTRACTOR AND THE OWNER SHALL EXAMINE ALL ROOF SURFACES WHERE WORK HAS OCCURRED AND WILL REPAIR ALL DEFECTS NOT PREVIOUSLY DOCUMENTED.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE BUILDING, ROOF, STRUCTURAL FRAMING, ETC. INCURRED DURING CONSTRUCTION.
9. THE CONTRACTOR SHALL VERIFY WARRANTY OF THE EXISTING MEMBRANE ROOFING SYSTEM. THE CONTRACTOR SHALL UTILIZE A LICENSED APPLICATOR OF THE EXISTING ROOFING SYSTEM TO PERFORM ALL ROOFING WORK AND TO REPAIR ANY AND ALL DAMAGE. UPON COMPLETION, THE CONTRACTOR SHALL OBTAIN A LETTER FROM THE ROOF MANUFACTURER STATING THAT THE EXISTING WARRANTY REMAINS IN FULL FORCE AND EFFECT.

STATE OF MISSOURI
MICHAEL L. PARSON, GOVERNOR

STATE OF MISSOURI — THOMAS M. GRASSI — NUMBER PE-23938 — PROFESSIONAL ENGINEER
09/18/23

THOMAS M. GRASSI
License Number: E-23938
Expiration Date: 12/31/24

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DEPARTMENT OF PUBLIC SAFETY

MISSOURI STATE HIGHWAY PATROL

ANNEX BUILDING, UPGRADE HVAC SYSTEM

MSHP GENERAL HEADQUARTERS ANNEX
1510 EAST ELM,
JEFFERSON CITY, MO 65101

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ISSUE DATE: 09/18/2023

CAD DWG FILE:
DRAWN BY: RCB
CHECKED BY: TMG
DESIGNED BY: RCB

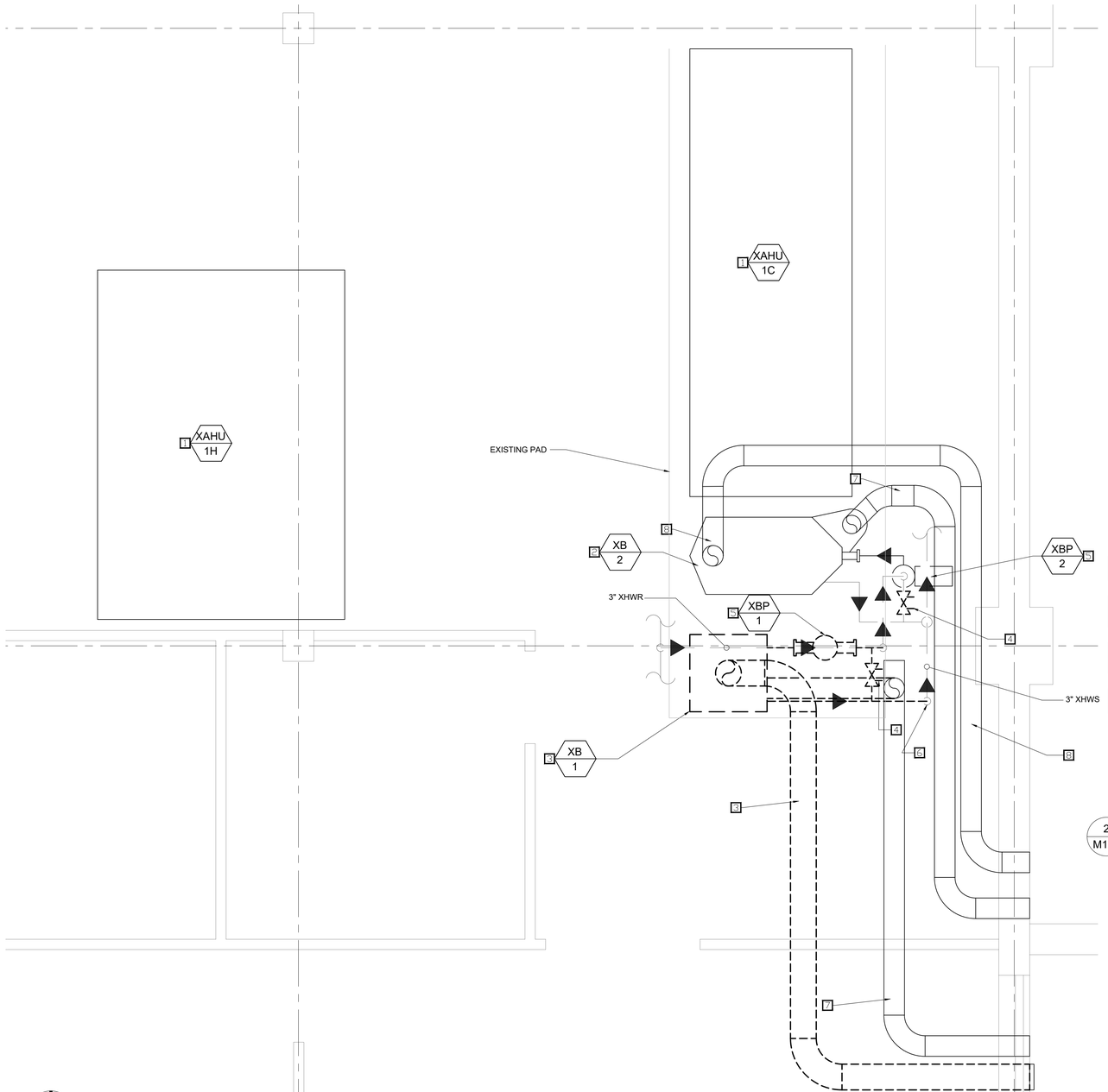
SHEET TITLE:

MECHANICAL GENERAL NOTES & SYMBOLS

SHEET NUMBER:

M-001

3 OF 14 SHEETS
09/18/2023



BUILDING NORTH

1 M101

ANNEX BLDG. - MECHANICAL ROOM DEMO PLAN

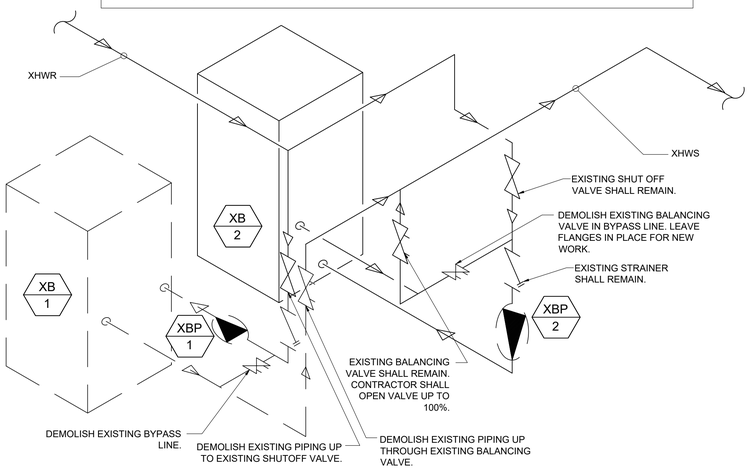
SCALE: 1/2" = 1'-0"

GENERAL DEMOLITION NOTES

1. REFER TO SHEET M001 FOR GENERAL DEMOLITION NOTES THAT APPLY TO THIS SHEET.
2. THESE GENERAL NOTES APPLY TO ALL DEMOLITION WORK.
3. REMOVE DUCTS, PIPING, AND EQUIPMENT SHOWN AS DASHED.
4. PROTECT EXISTING SYSTEMS, ROOFING, AND EQUIPMENT DURING CONSTRUCTION. CONTRACTOR SHALL REPAIR ANY DAMAGE RESULTING FROM CONSTRUCTION AT NO EXPENSE TO OWNER.
5. WHERE ITEMS ARE DEMOLISHED, UTILITIES AND THE AREA FROM WHICH THE ITEMS HAVE BEEN DEMOLISHED SHALL BE LEFT IN SUCH A MANNER THAT IT IS SAFE FOR BOTH PEOPLE AND PROPERTY ON A DAILY BASIS.
6. THESE DRAWINGS MAY NOT FULLY DEPICT ALL AS-BUILT CONDITIONS, CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO SUBMITTING BIDS. NOTIFY THE ENGINEER AT ONCE SHOULD A DISCREPANCY OR OMISSION BE FOUND.
7. THE OWNER RETAINS ALL SALVAGE RIGHTS OF DEMOLISHED EQUIPMENT AND MATERIALS. COORDINATE DEMOLITION WITH OWNER. ALL MATERIALS NOT CLAIMED BY OWNER SHALL BE DEMOLISHED BY THE CONTRACTOR.
8. CONTACT OWNER/ENGINEER IMMEDIATELY IF ANY SUSPECTED HAZARDOUS MATERIALS ARE ENCOUNTERED. REFERENCE SPECIFICATIONS FOR ASBESTOS REPORT AND ABATEMENT SPECIFICATIONS.

DEMOLITION KEYED NOTES

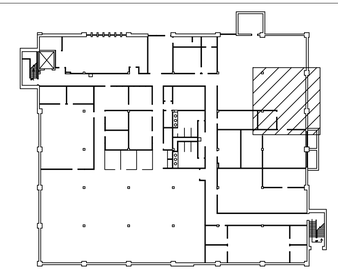
1. EXISTING AHU SHALL REMAIN.
2. EXISTING BOILER SHALL REMAIN.
3. EXISTING BOILER SHALL BE DEMOLISHED. CONCRETE PAD SHALL REMAIN. LEAVE OUTSIDE AIR INTAKE IN PLACE FOR FUTURE USE. DEMOLISH EXISTING COMBUSTION FLUE BACK TO EXTERIOR WALL. LOUVER ON EXTERIOR WALL SHALL REMAIN. CUT AND CAP GAS LINE TO UNIT FOR FUTURE USE DURING NEW WORK PHASE. CONTRACTOR SHALL ENSURE THAT EXISTING REGULATOR IS FUNCTIONAL. CONTRACTOR SHALL FIELD VERIFY REGULATOR OUTPUT PRESSURE. CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING REGULATOR IF NEW BOILER REQUIRES A NEW REGULATOR. CAP HOT WATER SUPPLY PIPE TO BE REUSED DURING NEW WORK PHASE OF PROJECT.
4. DEMOLISH BALANCING VALVE IN EXISTING BYPASS LINE. PREPARE BYPASS LINE STUBS FOR CONNECTION TO NEW VALVE DURING NEW WORK.
5. EXISTING BOILER PUMP SHALL BE DEMOLISHED. DEMOLISH PIPE BETWEEN EXISTING PUMP AND EXISTING BOILER. CAP SUCTION SIDE PIPE FOR CONNECTION DURING NEW WORK.
6. DEMOLISH EXISTING BALANCING VALVE IN VERTICAL PIPING.
7. EXISTING COMBUSTION AIR DUCT SHALL REMAIN.
8. EXISTING BOILER FLUE FOR EXISTING BOILER 1 SHALL REMAIN.



2 M101

ANNEX BLDG. - BOILER PIPING DEMOLITION ISOMETRIC

SCALE: N. T. S.



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CASCO Diversified Corporation
MO Certificate of Authority
#000329 ARCHITECTURAL and #000613 ENGINEERING

CASCO
12 Sunnen Drive, Suite 100, St. Louis, MO 63143 T: 314.821.1100

DEPARTMENT OF PUBLIC SAFETY

MISSOURI STATE HIGHWAY PATROL

ANNEX BUILDING, UPGRADE HVAC SYSTEM

MSHP GENERAL HEADQUARTERS ANNEX
1510 EAST ELM,
JEFFERSON CITY, MO 65101

PROJECT # R2314-01
SITE # 6001
FACILITY # 8136001002

REVISION:
DATE:
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: 09/18/2023

CAD DWG FILE:
DRAWN BY: RCB
CHECKED BY: TMG
DESIGNED BY: RCB

SHEET TITLE:

MECHANICAL ROOM DEMO PLAN

SHEET NUMBER:

M-101

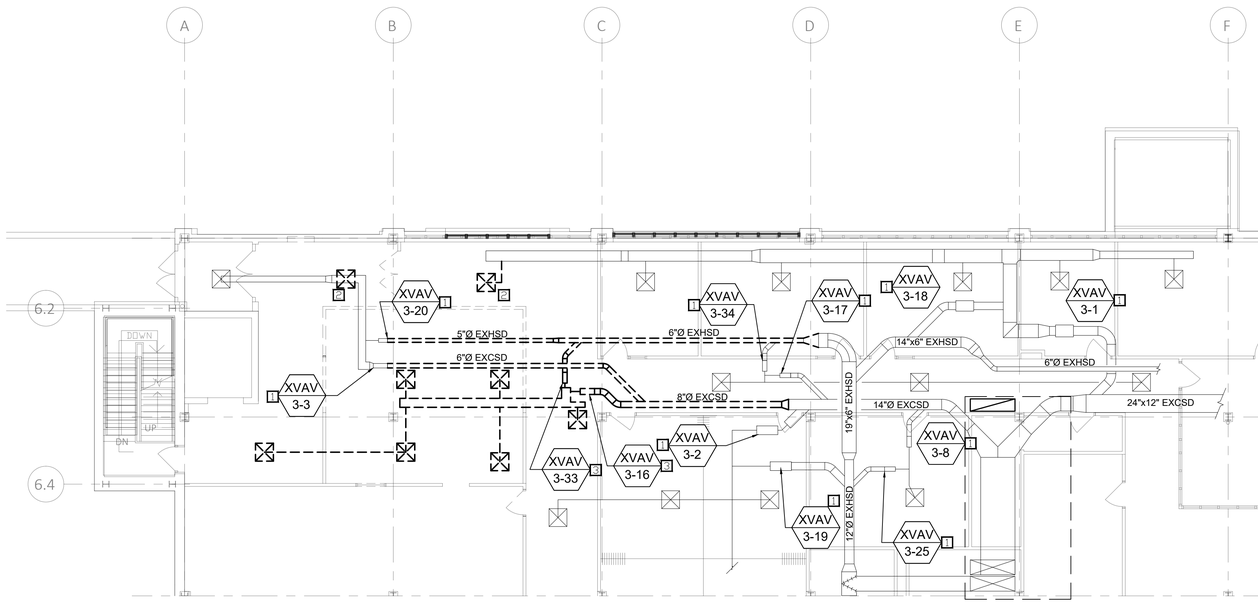
4 OF 14 SHEETS
09/18/2023

GENERAL DEMOLITION NOTES

1. REFER TO SHEET M001 FOR GENERAL DEMOLITION NOTES THAT APPLY TO THIS SHEET.
2. THESE GENERAL NOTES APPLY TO ALL DEMOLITION WORK.
3. DEMOLISH DUCTS, PIPING, AND EQUIPMENT SHOWN AS DASHED.
4. PROTECT EXISTING SYSTEMS, ROOFING, AND EQUIPMENT DURING CONSTRUCTION. CONTRACTOR SHALL REPAIR ANY DAMAGE RESULTING FROM CONSTRUCTION AT NO EXPENSE TO OWNER.
5. WHERE ITEMS ARE DEMOLISHED, UTILITIES AND THE AREA FROM WHICH THE ITEMS HAVE BEEN DEMOLISHED SHALL BE LEFT IN SUCH A MANNER THAT IT IS SAFE FOR BOTH PEOPLE AND PROPERTY ON A DAILY BASIS.
6. THESE DRAWINGS MAY NOT FULLY DEPICT ALL AS-BUILT CONDITIONS, CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO SUBMITTING BIDS. NOTIFY THE ENGINEER AT ONCE SHOULD A DISCREPANCY OR OMISSION BE FOUND.
7. THE OWNER RETAINS ALL SALVAGE RIGHTS OF DEMOLISHED EQUIPMENT AND MATERIALS, COORDINATE DEMOLITION WITH OWNER. ALL MATERIALS NOT CLAIMED BY OWNER SHALL BE DEMOLISHED BY THE CONTRACTOR.
8. CONTACT OWNER/ENGINEER IMMEDIATELY IF ANY SUSPECTED HAZARDOUS MATERIALS ARE ENCOUNTERED. REFERENCE SPECIFICATIONS FOR ASBESTOS REPORT AND ABATEMENT SPECIFICATIONS.

⊡ DEMOLITION KEYED NOTES

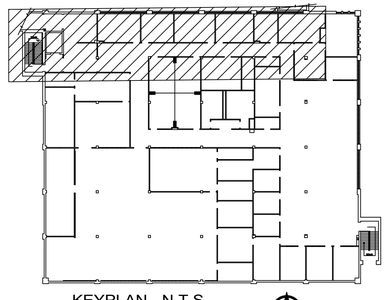
1. EXISTING VAV AND ITS ASSOCIATED TEMPERATURE SENSOR SHALL REMAIN.
2. DEMOLISH SUPPLY DIFFUSER AND BRANCH TO DIFFUSER. CAP HOLE WITH AIRTIGHT SEAL IN DUCTWORK WHERE BRANCH CONNECTED TO MAIN DUCTWORK. INSULATE CAP WITH LIKE MATERIALS TO EXISTING.
3. EXISTING VAV SHALL BE DEMOLISHED. ALL DUCTWORK DOWNSTREAM OF VAV, INCLUDING DIFFUSERS, DAMPERS, GRILLES, ETC SHALL BE DEMOLISHED. ASSOCIATED TEMPERATURE SENSOR SHALL BE DEMOLISHED. CAP DUCT CONNECTION POINT WITH AN AIR TIGHT SEAL AND INSULATE USING MATERIALS TO MATCH EXISTING INSULATION.



1 M102 ANNEX BLDG. - THIRD FLOOR PARTIAL MECHANICAL DEMO PLAN

SCALE: 1/8" = 1'-0"

BUILDING NORTH



KEYPLAN - N.T.S.

BUILDING NORTH

STATE OF MISSOURI
MICHAEL L. PARSON, GOVERNOR

STATE OF MISSOURI
THOMAS M. GRASSI
NUMBER PE-23938
PROFESSIONAL ENGINEER

09/18/23

THOMAS M. GRASSI
License Number: E-23938
Expiration Date: 12/31/24

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DRAWN BY: RCB
CHECKED BY: TMG
DESIGNED BY: RCB

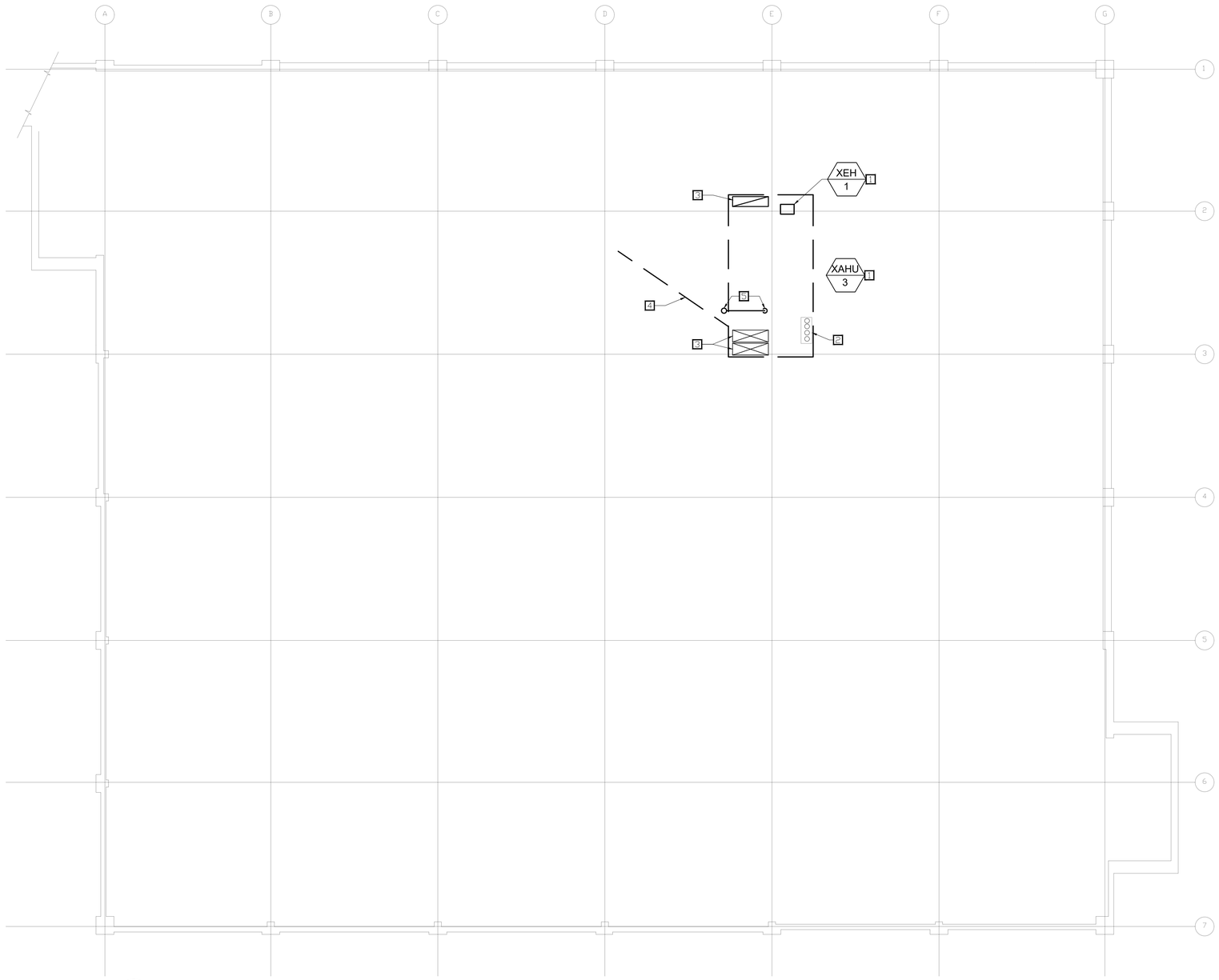
SHEET TITLE:

MECHANICAL THIRD FLOOR DEMO PLAN

SHEET NUMBER:

M-102

5 OF 14 SHEETS
09/18/2023



1 M101 ANNEX BLDG. - ROOF MECHANICAL DEMO PLAN

SCALE: 1/8" = 1'-0"

BUILDING NORTH

GENERAL DEMOLITION NOTES

1. REFER TO SHEET M001 FOR GENERAL DEMOLITION NOTES THAT APPLY TO THIS SHEET.
2. THESE GENERAL NOTES APPLY TO ALL DEMOLITION WORK.
3. DEMOLISH DUCTS, PIPING, AND EQUIPMENT SHOWN AS DASHED.
4. PROTECT EXISTING SYSTEMS, ROOFING, AND EQUIPMENT DURING CONSTRUCTION. CONTRACTOR SHALL REPAIR ANY DAMAGE RESULTING FROM CONSTRUCTION AT NO EXPENSE TO OWNER.
5. WHERE ITEMS ARE DEMOLISHED, UTILITIES AND THE AREA FROM WHICH THE ITEMS HAVE BEEN DEMOLISHED SHALL BE LEFT IN SUCH A MANNER THAT IT IS SAFE FOR BOTH PEOPLE AND PROPERTY ON A DAILY BASIS.
6. THESE DRAWINGS MAY NOT FULLY DEPICT ALL AS-BUILT CONDITIONS, CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO SUBMITTING BIDS. NOTIFY THE ENGINEER AT ONCE SHOULD A DISCREPANCY OR OMISSION BE FOUND.
7. THE OWNER RETAINS ALL SALVAGE RIGHTS OF DEMOLISHED EQUIPMENT AND MATERIALS, COORDINATE DEMOLITION WITH OWNER. ALL MATERIALS NOT CLAIMED BY OWNER SHALL BE DEMOLISHED BY THE CONTRACTOR.
8. CONTACT OWNER/ENGINEER IMMEDIATELY IF ANY SUSPECTED HAZARDOUS MATERIALS ARE ENCOUNTERED. REFERENCE SPECIFICATIONS FOR ASBESTOS REPORT AND ABATEMENT SPECIFICATIONS.

[1] DEMOLITION KEYED NOTES

1. EXISTING, CUSTOM AIR HANDLING UNIT SHALL BE DEMOLISHED. EXISTING ELECTRIC UNIT HEATER LOCATED WITHIN SERVICE VESTIBULE SHALL BE DEMOLISHED. STEEL SUPPORTING AIR HANDLING UNIT SHALL REMAIN.
2. DEMOLISH SHEET METAL ENCLOSURE SURROUNDING PIPES. CUT PIPES 12" ABOVE CURB AND INSTALL FLANGED CAP TO ALLOW FOR FUTURE CONNECTION. PIPE CURB THAT SHEET METAL PIPE ENCLOSURE IS INSTALLED ON SHALL REMAIN.
3. CUT DUCT 12" ABOVE DUCT CURB AND PREPARE TO RECONNECT DURING NEW WORK. EXISTING DUCT CURB SHALL REMAIN.
4. EXISTING CONDENSATE DRAIN SHALL BE DEMOLISHED.
5. EXISTING PLUMBING VENT SHALL BE CUT ABOVE ROOF. OPENING SHALL BE PREPARED FOR NEW WORK.

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CHECKED BY: MCG
DESIGNED BY: RCB

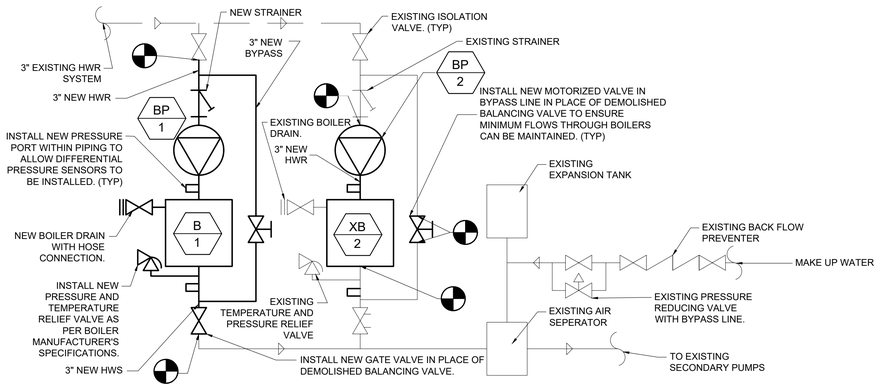
SHEET TITLE:

MECHANICAL ROOF DEMO PLAN

SHEET NUMBER:

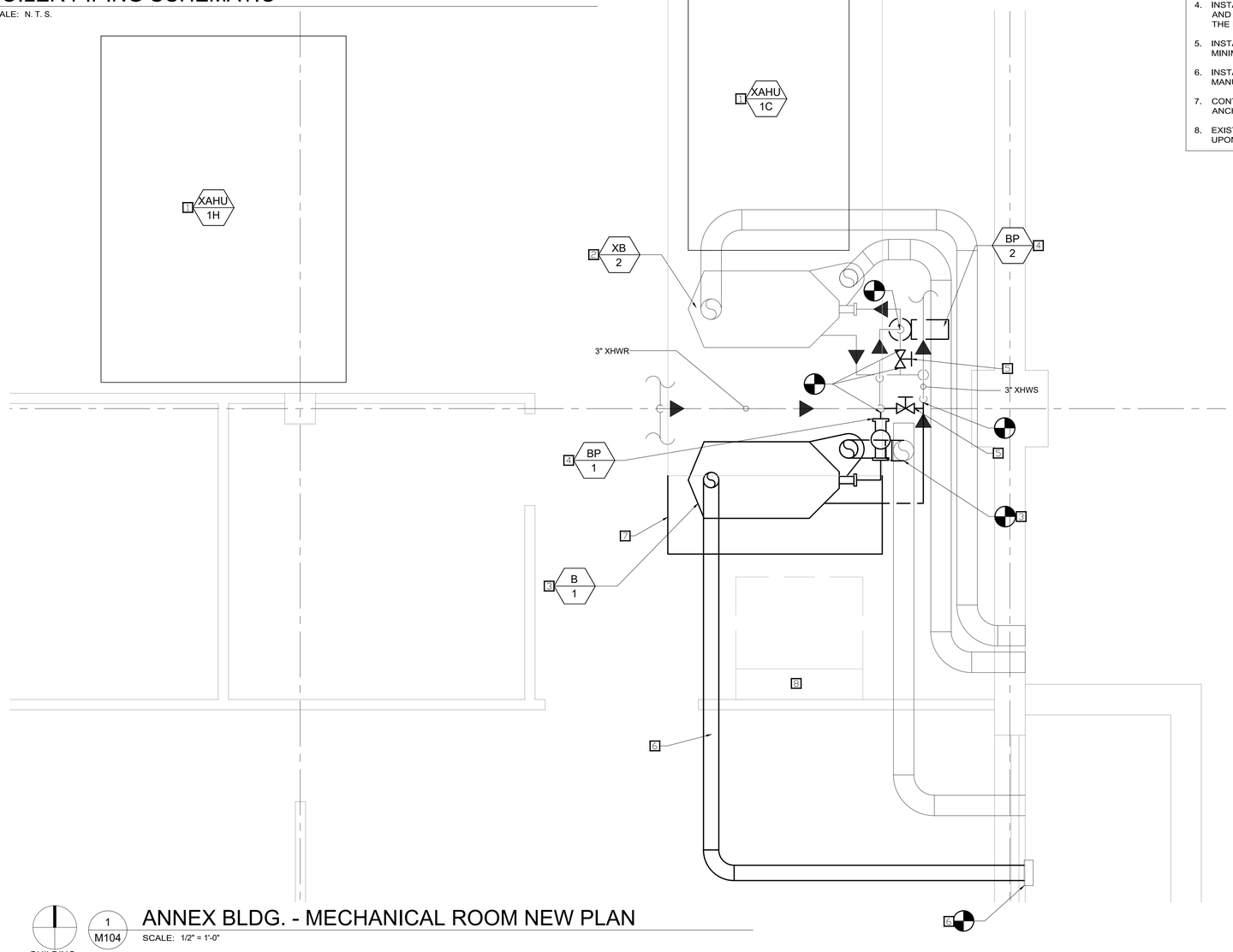
M-103

6 OF 14 SHEETS
09/18/2023



3 M104 BOILER PIPING SCHEMATIC

SCALE: N. T. S.



1 M104 ANNEX BLDG. - MECHANICAL ROOM NEW PLAN

SCALE: 1/2" = 1'-0"

BUILDING NORTH

KEYPLAN - N.T.S.

BUILDING NORTH

GENERAL NOTES

1. REFERENCE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFICATION OF CONTRACT DOCUMENTS. OWNER/ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY UNFORESEEN CONDITIONS WHICH MAY IMPACT THE PROGRESS OR COST OF WORK PERFORMED.
3. CONTRACTOR SHALL INCLUDE FURNISHING ALL MATERIAL, EQUIPMENT, TOOLS, LABOR, AND SERVICES NECESSARY FOR COMPLETION OF THE PROJECT.
4. REFERENCE SHEET M001 FOR ADDITIONAL GENERAL NOTES.
5. CONTACT OWNER//ENGINEER IMMEDIATELY IF ANY SUSPECTED HAZARDOUS MATERIALS ARE ENCOUNTERED. REFERENCE SPECIFICATIONS FOR ASBESTOS REPORT AND ABATEMENT SPECIFICATIONS.

KEYED NOTES

1. EXISTING AHU. NO SCOPE.
2. CONNECT EXISTING BOILER AND NEW BOILER TOGETHER VIA CONTROLS TO ALLOW BOILERS TO COMMUNICATE. CONNECT NEW BOILER PUMP TO EXISTING BOILER.
3. INSTALL NEW BOILER ON CONCRETE PAD. ANCHOR BOILER TO CONCRETE PAD USING CONCRETE ANCHOR BOLTS. CONNECT BOILER TO EXISTING OA INTAKE AND NEW FLUE. INSTALL ACID NEUTRALIZATION KIT ON DRAIN AND ROUTE TO NEAREST FLOOR DRAIN.
4. INSTALL NEW BOILER PUMP IN PLACE OF DEMOLISHED PUMP. PUMP SHALL COMMUNICATE WITH NEW AND EXISTING BOILER. AS PER MANUFACTURER'S INSTRUCTIONS, CONNECT PUMP, VIA CONTROLS ON THE BOILER, TO ASSOCIATED BOILER.
5. INSTALL NEW MOTORIZED VALVE IN BYPASS LINE. MOTORIZED VALVE SHALL BE SET UP TO MAINTAIN MINIMUM FLOW THROUGH THE BOILER.
6. INSTALL NEW, EXHAUST FLUE TO EXTERIOR OF BUILDING. CONSTRUCT EXHAUST FLUE AS PER THE MANUFACTURER'S REQUIREMENTS.
7. CONTRACTOR SHALL EXTEND 4" CONCRETE PAD TO ACCOMMODATE NEW BOILER. NEW PAD SHALL BE ANCHORED INTO FLOOR.
8. EXISTING ELECTRICAL EQUIPMENT. ENSURE THAT NEW MECHANICAL EQUIPMENT DOES NOT ENCROACH UPON ELECTRICAL SERVICE SPACE.

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CAD DWG FILE:
DRAWN BY: RCB
CHECKED BY: TMG
DESIGNED BY: RCB

SHEET TITLE:

MECHANICAL ROOM PLAN

SHEET NUMBER:

M-104

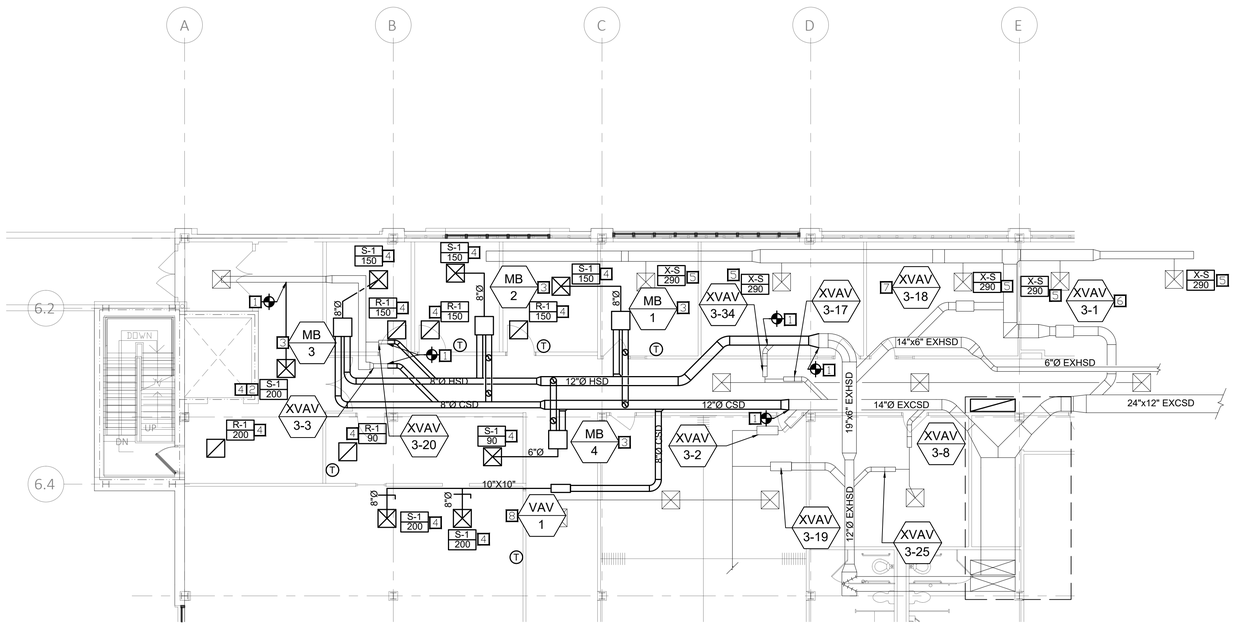
7 OF 14 SHEETS
09/18/2023

GENERAL NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLETING A PRE-CONSTRUCTION BALANCE REPORT. CONTRACTOR SHALL BE RESPONSIBLE FOR REBALANCING ALL AIR FLOWS TO ALL EXISTING BOXES TO MATCH PRECONSTRUCTION VALUES UNLESS NOTED OTHERWISE.
2. REFERENCE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFICATION OF CONTRACT DOCUMENTS. OWNER/ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY UNFORESEEN CONDITIONS WHICH MAY IMPACT THE PROGRESS OR COST OF WORK PERFORMED.
4. CONTRACTOR SHALL INCLUDE FURNISHING ALL MATERIAL, EQUIPMENT, TOOLS, LABOR, AND SERVICES NECESSARY FOR COMPLETION OF THE PROJECT.
5. REFERENCE SHEET M001 FOR ADDITIONAL GENERAL NOTES.
6. CONTACT OWNER//ENGINEER IMMEDIATELY IF ANY SUSPECTED HAZARDOUS MATERIALS ARE ENCOUNTERED. REFERENCE SPECIFICATIONS FOR ASBESTOS REPORT AND ABATEMENT SPECIFICATIONS.
7. SPACE ABOVE CEILING IS A PLENUM. ALL MATERIALS LOCATED ABOVE THE CEILING MUST BE PLENUM RATED.

⊞ KEYED NOTES

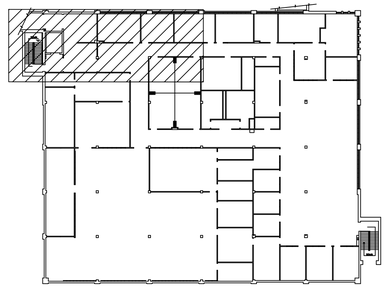
1. CONNECT NEW SUPPLY DUCTWORK TO EXISTING SUPPLY DUCTWORK.
2. INSTALL NEW DIFFUSER IN EXISTING CEILING GRID.
3. INSTALL NEW MIXING BOX. INSTALL NEW TEMPERATURE SENSOR WITHIN SPACE SERVED BY MIXING BOX.
4. SEE DETAIL SHEET M-601 FOR MORE INFORMATION ON DIFFUSER/REGISTER INSTALLATION.
5. REBALANCE EXISTING SUPPLY DIFFUSER TO INDICATED CFM.
6. REBLANCE EXISTING VAV TO HAVE A MAXIMUM AIRFLOW 1450 CFM AND MINIMUM FLOW OF 500 CFM.
7. REBLANACE EXISTING VAV TO HAVE A MAXIMUM AIRFLOW OF 670 CFM AND A MINIMUM FLOW OF 0 CFM.
8. BID ALTERNATE #1: INSTALL A NEW, COOLING ONLY VAV THAT WILL ALLOW COLD AIR TO BE ROUTED INTO NEW IT HELP ROOM. INSTALL NEW TEMPERATURE SENSOR WITHIN ROOM.



1 M-105 ANNEX BLDG. - THIRD FLOOR PARTIAL MECHANICAL PLAN

SCALE: 1/8" = 1'-0"

BUILDING NORTH



KEYPLAN - N.T.S.

BUILDING NORTH

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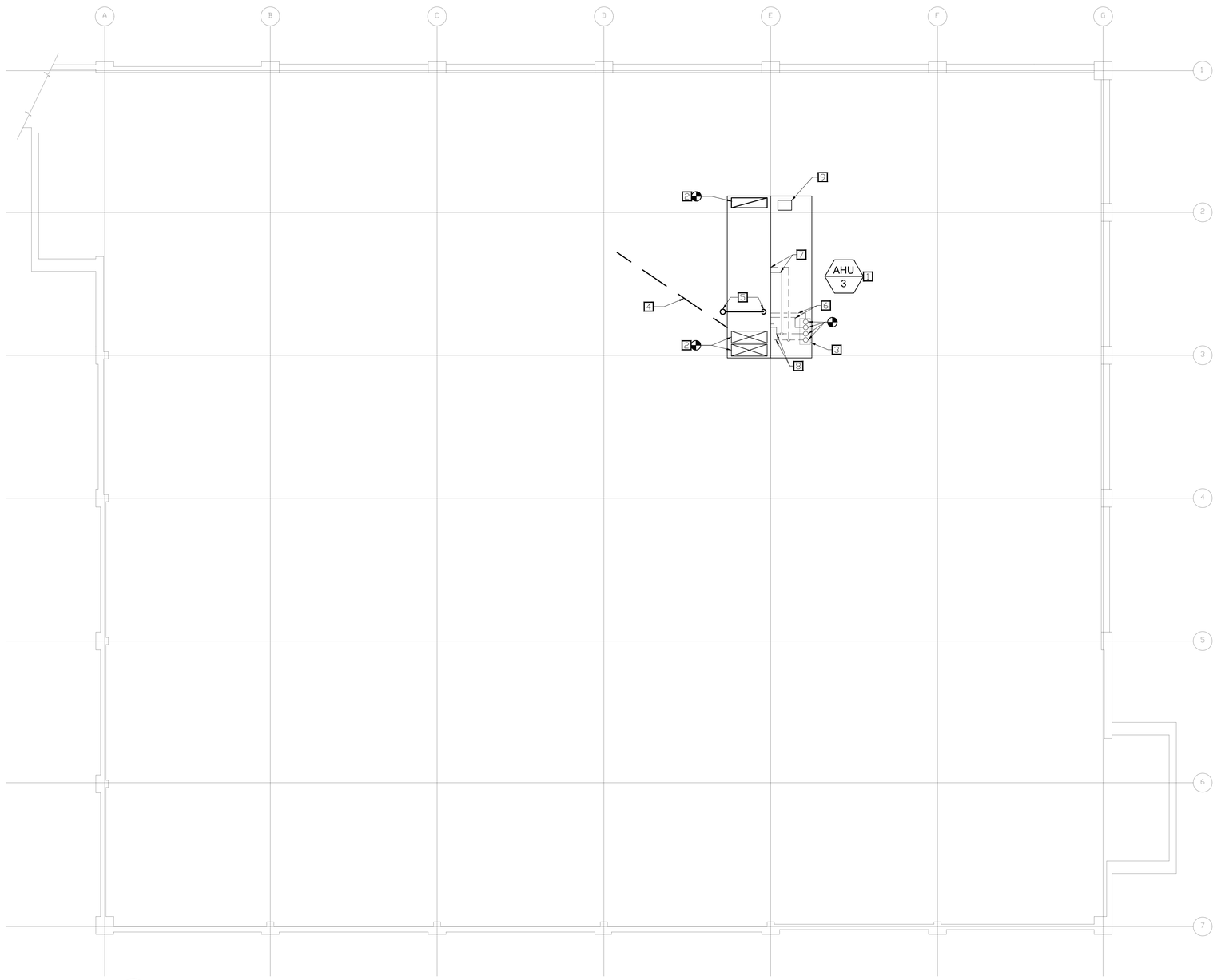
MECHANICAL THIRD FLOOR PLAN

SHEET NUMBER:

M-105

8 OF 14 SHEETS
09/18/2023



1 M104 BUILDING NORTH

ANNEX BLDG. - ROOF MECHANICAL PLAN

SCALE: 1/8" = 1'-0"

GENERAL NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE FOR REBALANCING ALL HYDRONIC FLOW RATES TO COILS.
2. REFERENCE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFICATION OF CONTRACT DOCUMENTS. OWNER/ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY UNFORESEEN CONDITIONS WHICH MAY IMPACT THE PROGRESS OR COST OF WORK PERFORMED.
4. CONTRACTOR SHALL INCLUDE FURNISHING ALL MATERIAL, EQUIPMENT, TOOLS, LABOR, AND SERVICES NECESSARY FOR COMPLETION OF THE PROJECT.
5. REFERENCE SHEET M001 FOR ADDITIONAL GENERAL NOTES.
6. CONTACT OWNER//ENGINEER IMMEDIATELY IF ANY SUSPECTED HAZARDOUS MATERIALS ARE ENCOUNTERED. REFERENCE SPECIFICATIONS FOR ASBESTOS REPORT AND ABATEMENT SPECIFICATIONS.
7. ALL EXTERIOR HYDRONIC PIPING SHALL BE INSTALLED WITH SELF REGULATING HEAT TRACE ALONG PIPES TO HELP PREVENT FREEZING. HEAT TRACE SHALL BE AT LEAST 10 W/FT. CONTRACTOR SHALL INSTALL ALARMS ON HEAT TRACE TO ALERT MAINTENANCE WHEN HEAT TRACING IS NOT WORKING. HEAT TRACING TYPE SHALL BE TYPE THAT CAN BE CUT AND STILL BE ENERGIZED FROM OPPOSITE END.

KEYED NOTES

1. NEW, CUSTOM AIR HANDING UNIT SHALL BE INSTALLED ON EXISTING STEEL. CONTRACTOR SHALL INSPECT THE STATE OF THE STEEL. REPAIR ANY RUSTED AREAS WITH ZINC RICH PAINT. TACK WELD THE NEW UNIT TO THE STEEL STRUCTURE.
2. CONNECT NEW DUCTWORK TO EXISTING DUCTWORK ABOVE ROOF. ATTACH NEW DUCTWORK TO BOTTOM OF NEW, CUSTOM UNIT USING FLEX CONNECTION. INSULATE AND JACKET DUCTWORK AS PER SPECIFICATIONS.
3. ATTACH NEW HYDRONIC PIPES TO EXISTING PIPES LOCATED ABOVE THE ROOF. ROUTE INTO VESTIBULE OF AIR HANDLING UNIT.
4. NEW, 1" CONDENSATE DRAIN SHALL BE INSTALLED. SPILL ONTO ROOF OF BUILDING. INSTALL P-TRAP AS PER DETAIL ON MECHANICAL DETAIL SHEETS.
5. CONTRACTOR SHALL INSTALL NEW PLUMBING VENT. ATTACH NEW VENT PIPING TO EXISTING STUB ABOVE ROOF. NEW VENT PIPING SHALL MATCH SIZE OF EXISTING VENT PIPING. SLOPE HORIZONTAL PIPE WITH A 1/8" SLOPE IN TOWARDS THE EXISTING VENT PIPE. NEW VENT PIPING SHALL TERMINATE AT LEAST TWO (2) FEET ABOVE THE TOP OF THE NEW AHU.
6. CONNECT NEW, 2-1/2" CHILLED WATER PIPING TO NEW COILING COIL. SEE MECHANICAL DETAILS SHEET FOR MORE INFORMATION.
7. CONNECT NEW, 2" HOT WATER PIPING TO PREHEAT COIL. SEE MECHANICAL DETAILS SHEET FOR MORE INFORMATION.
8. CONNECT NEW, 2" HOT WATER PIPING TO HEATING COIL. SEE MECHANICAL DETAILS SHEET FOR MORE INFORMATION.
9. 3kW ELECTRIC UNIT HEATER INSTALLED IN VESTIBULE. UNIT HEATER SHALL BE FURNISHED BY AIR HANDLER MANUFACTURER.

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SHEET TITLE:

MECHANICAL ROOF PLAN

SHEET NUMBER:

M-106

9 OF 14 SHEETS
09/18/2023

AHU ## HOT DECK, COLD DECK AIR HANDLING UNIT SCHEDULE

ID	MANUFACTURER	MODEL NO.	VENTILATION		SUPPLY FAN			RETURN FAN			CHILLED WATER COOLING DATA										HOT WATER HEATING DATA							PRE-HEAT COIL DATA							ELECTRICAL			OPER
			MIN CFM	MAX CFM	TOTAL CFM	ESP IN W.G.	MOTOR HPxNo.	TOTAL CFM	ESP IN W.G.	MOTOR HPx#	CFM	TOTAL CAP MBH	SENS CAP MBH	EAT (°F) DB/WB	LAT (°F) DB/WB	APD (IN WC)	EWT (°F)	LWT (°F)	FLOW (GPM)	WPD (FT)	FACE AREA (FT^2)	CFM	EAT (°F) DB	LAT (°F) DB	EWT (°F)	LWT (°F)	TOTAL CAP MBH (MIN)	FLOW GPM	CFM	EAT (°F) DB	LAT (°F) DB	EWT (°F)	LWT (°F)	TOTAL CAP MBH	FLOW GPM	VOLT/PH	MCA	MOCP	WEIGHT LBS.
AHU-3	ENGINEERED AIRE	LM10/C/O/R	2720	3555	9505	3	15X1	9505	0.5	5X1	9305	552	353	87.7/70.9	52.5/52.3	0.94	45.0	56.5	96	11.5	18.75	9305	55.5	120	180	140	660	33	9505	40.0	55.5	180	150	159	10.6	460V/3PH	51.1	60	10700

NOTES:

1) INSTALL UNIT ON EXISTING STEEL STRUCTURE ON ROOF.
2) CONTRACTOR SHALL BE RESPONSIBLE FOR ALL VALVING AND PIPING WITHIN THE SERVICE VESTIBULE.
3) FACTORY INSTALLED SERVICE RECEPTACLE INSIDE VESTIBULE. POWERED FROM UNIT POWER SUPPLY.
4) SINGLE POINT POWER CONNECTION. ALL POWER WIRING AFTER SINGLE POINT POWER CONNECTION SHALL BE BY AIR HANDLER MANUFACTURER.
5) UNIT ON/OFF CONTACT SWITCH SHALL BE FURNISHED BY CONTRACTOR.

ACCESORIES:

A. SUPPLY AND RETURN FAN EXTENDED LUBE LINES
B. SUPPLY AND RETURN FAN VFD BY MANUFACTURER WITH HAND/OFF/AUTO FUNCTION AND FACTORY INSTALLED BYPASS.
C. HINGED ACCESS DOORS.
D. SERVICE VESTIBULE.
E. MARINE LIGHTS. FACTORY INSTALLED AND WIRED FROM UNIT POWER SUPPLY.
F. PIPING AND ELECTRICAL CHASES IN THE MAIN SERVICE VESTIBULE
G. FACTORY FURNISHED AND INSTALLED 3kW ELECTRIC HEATER IN SERVICE VESTIBULE.
H. OSHA RATED BELT GUARD ON BOTH SUPPLY AND RETURN FAN MOTORS.
I. ENTIRE UNIT SHALL BE DOUBLE WALL / INSULATED CONSTRUCTION.
J. PREHEAT COIL SHALL BE AN INTERNAL FACE AND BYPASS.
K. FACTORY FURNISHED AND INSTALLED UNIT DISCONNECT.
L. 200 CFM CORRIDOR VENT TO TEMPER SERVICE VESTIBULE.
M. THRUST ISOLATION OF FANS.
N. STAINLESS STEEL CONDENSATE DRAIN ON COOLING COINS.
O. 24 V, 0-10 VDC DAMPER ACTUATORS FURNISHED WITH AIR HANDLER.

APPROVED EQUALS:
TRANE, CARRIER

B ## BOILER SCHEDULE

MARK	MANUFACTURER	MODEL	INPUT MBH	OUTPUT MBH	GPM	EWT (DEG F)	LWT (DEG F)	MAX PD (FT HD)	RELIEF VALVE (PSIG)	ELECTRICAL DATA				REMARKS
										VOLTAGE	PHASE	MCA	MOCP	
B-1	LOCHINVAR	FB1000N	1000	961	96	160	180	8	50	120	1	8	15	1-8

REMARKS:
1) ALARM ON ANY FAILURE
2) BACNET CONNECTIVITY
3) CONDENSATE NEUTRALIZATION KIT
4) INLET AND OUTLET TEMPERATURE SENSORS
5) LOW WATER CUTOFF WITH MANUAL RESET
6) ADJUSTABLE HIGH LIMIT WITH MANUAL RESET
7) LINK WITH EXISTING BOILER TO ALLOW COMMUNICATION BETWEEN THE TWO BOILERS.
8) 0-10 OUTPUT SIGNAL TO CONTROL THE BOILER PUMP

ALTERNATE MANUFACTURER'S: AERCO, CLEAVER BROOKS

BP ## PUMP SCHEDULE

TAG	MANUFACTURER	MODEL	GPM	HEAD (FT)	ELECTRICAL			
					HP	VOLTAGE	PHASE	REMARKS
BP-1	GRUNDFOSS	MAGNA 3	96	20	0.75	208	1	1, 2
BP-2	GRUNDFOSS	MAGNA 3	143	20	2	208	1	1, 2

REMARKS:
1) VARIABLE SPEED, INLINE ECM PUMPS.
2) CONNECT NEW PUMPS INTO THEIR RESPECTIVE BOILERS.

ALTERNATE MANUFACTURER'S: TACO, BELL AND GOSSETT

MB ## MIXING BOX SCHEDULE

TAG	MANUFACTURER	MODEL	COOLING INLET SIZE	HEATING INLET SIZE	COOLING MIN	COOLING MAX	HEATING MIN	HEATING MAX	REMARKS
MB-1	PRICE	DDS	8	8	0	150	0	150	1-5
MB-2	PRICE	DDS	8	8	0	150	0	150	1-5
MB-3	PRICE	DDS	8	8	0	150	0	150	1-5
MB-4	PRICE	DDS	6	6	0	90	0	90	1-5

REMARKS:
1) THE MIXING BOX SHALL BE CONSTANT VOLUME TO ENSURE PROPER VENTILATION TO ALL SPACES. AS COOLING CFM INCREASES, HEAT CFM DECREASES AND VICE VERSA.
2) DIGITAL CONTROLS BY CONTRACTOR, MANUFACTURER SHALL FURNISH NEMA 1 CONTROLS ENCLOSURE ON BOX.
3) 1" FOIL FACED INSULATION
4) AIRFLOW SENSOR GAUGE TAPS
5) MULTI-POINT FLOW SENSOR ON INLETS AND OUTLET OF BOX BY MANUFACTURER

ALTERNATE MANUFACTURERS: TITUS, NAILER

AIR DEVICE SCHEDULE

TAG	MANUFACTURER	MODEL	SIZE	MATERIAL	REMARKS
S-1	PRICE	SPD	24"X24"	STEEL	1-3
R-1	PRICE	530	24"X24"	STEEL	1-4

REMARKS:
1) WHITE
2) INSULATED BACKPAN
3) LAY - IN MOUNT
4) SQUARE TO ROUND ADAPTER

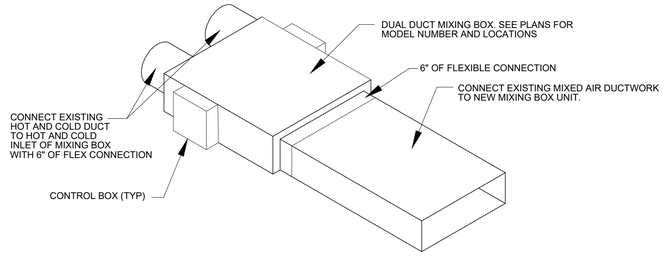
ALTERNATE MANUFACTURERS: TITUS, NAILER

VAV ## VAV BOX SCHEDULE

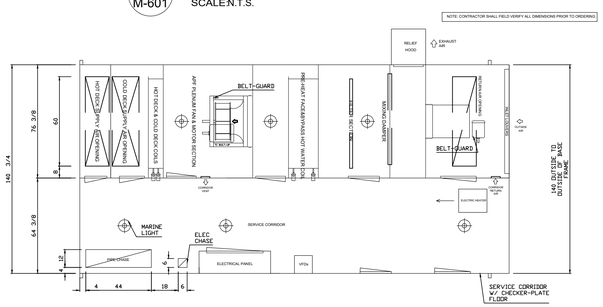
TAG	MANUFACTURER	MODEL	INLET SIZE	CFM	REMARKS
VAV-1	PRICE	SDV	8	400	1-5

REMARKS:
1) BID ALTERNATE #1.
2) DIGITAL CONTROLS BY CONTRACTOR, MANUFACTURER SHALL FURNISH NEMA 1 CONTROLS ENCLOSURE ON BOX.
3) 1" FOIL FACED INSULATION.
4) AIRFLOW SENSOR GAUGE TAPS
5) MULTI-POINT FLOW SENSOR ON OUTLET OF BOX BY MANUFACTURER

ALTERNATE MANUFACTURERS: TITUS, NAILER



1 M-601 MIXING BOX DETAIL
SCALE:N.T.S.



2 M-601 AIR HANDLING UNIT DETAIL
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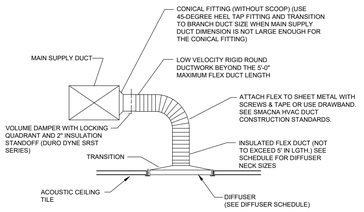
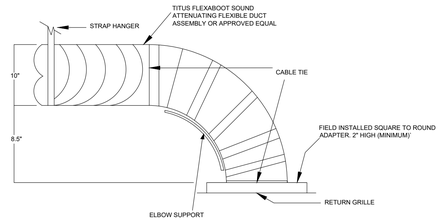
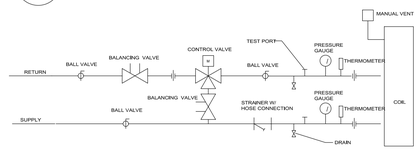


4 M-601 SUPPLY AIR TAKE OFF TO DIFFUSER
SCALE:N.T.S.



5 M-601 DUCTED RETURN AIR BOOT
SCALE:N.T.S.



3 M-601 TYPICAL COIL CONNECTION
SCALE:N.T.S.

STATE OF MISSOURI
MICHAEL L. PARSON, GOVERNOR

THOMAS M. GRASSI
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09/18/23

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DEPARTMENT OF PUBLIC SAFETY

MISSOURI STATE HIGHWAY PATROL

ANNEX BUILDING, UPGRADE HVAC SYSTEM

MSHP GENERAL HEADQUARTERS ANNEX
1510 EAST ELM,
JEFFERSON CITY, MO 65101

PROJECT # R2314-01
SITE # 6001
FACILITY # 8136001002

REVISION:
DATE:
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: 09/18/2023

CAD DWG FILE:
DRAWN BY: RCB
CHECKED BY: TMG
DESIGNED BY: RCB

SHEET TITLE:

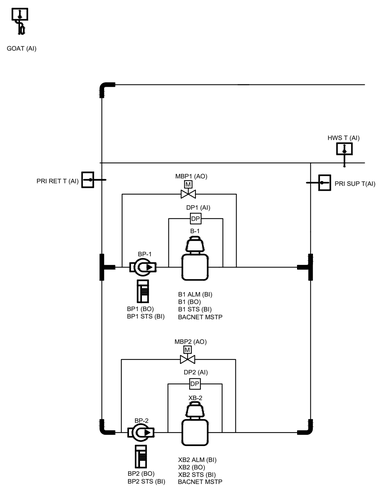
MECHANICAL SCHEDULES & DETAILS

SHEET NUMBER:

M-601

10 OF 14 SHEETS
09/18/2023

Flow Diagram: BOILER AND BOILER PUMPS



Sequence of Operation: BOILER AND BOILER PUMPS

Heating System Enable/Disable:

The heating system shall be enabled by the BAS when there is a demand for heat anywhere in the system as determined by the BAS. If there is no demand for heating for 10 minutes (adj), heating system, including all boilers and pumps, shall be disable.

Boiler Control:

Boilers have factory integral controller that will modulate boilers to run plant at their top efficiency. With Lochinvar as the basis of design, this operation is called "Cascade Operation." For other manufacturer's, contact the manufacturer and their representative to allow communication between the new and the existing boiler. See boiler IOM for more details. BAS shall provide a primary loop supply temperature setpoint to integral controller.

Boiler Pump Control:

Boiler circulation pump speed shall be controlled by 0-10 VDC outputs from its respective boiler. Pump speed shall be controlled by boilers integral pump control.

When heating demand is lower than boiler minimum flow rate, the motorized bypass valve associated with the boiler shall modulate to ensure that minimum flow is kept through the boiler. The BAS shall modulate the control valve to maintain a differential pressure setpoint across the boiler. The setpoint shall be the manufacturer's differential pressure at minimum flow plus 5 psi (adj) to allow for a buffer.

Boiler Pump Enable/Disable:

The system shall enable/disable boiler pumps when heating system is enabled.

Boiler Pump Status:

The system shall detect boiler circulation pump run status by a current switch.

Boiler Pump Failure:

If the boiler pump is enabled and the current switch status is off for more than 30 seconds (adj.), the BAS shall annunciate a boiler pump failure alarm. When alarm is activated, the associated boiler to the failed pump shall be disabled. .

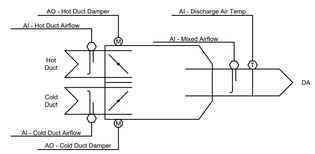
Primary Supply Loop Temperature Setpoint Reset:

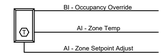
Primary supply loop temperature setpoint shall modulate between 180 deg. F (adj) and 140 deg. F (adj). Setpoint shall modulate based on outside air temperature. When the outside air is equal to 50 deg F (adj) or less, setpoint shall be 180 deg F. When the outside air temperature is between 50 deg F (adj) and 65 deg F (adj), the setpoint shall modulate proportionally to the change in outside temperature. When the outside air temperature is at 65 deg F (adj) or more, the setpoint shall be 140 deg F (adj).

Points List: BOILER AND BOILER PUMPS

System Point Description	Points									Alarms				
	GRAPHIC	ANALOG HARDWARE INPUT (AI)	BINARY HARDWARE INPUT (BI)	ANALOG HARDWARE OUTPUT (AO)	BINARY HARDWARE OUTPUT (BO)	SOFTWARE POINT (SFT)	HARDWARE INTERLOCK (HDW)	TREND DATA	NETWORK (NET)	HIGH ANALOG LIMIT	LOW ANALOG LIMIT	BINARY	LATCH DIAGNOSTIC	SENSOR FAIL	COMMUNICATION FAIL
BOILER 1 ALARM B1 ALM	X		X									X			
BOILER 1 ENABLE/DISABLE COMMAND B1	X				X										
BOILER 1 STATUS B1 STS	X		X					X							
EXISTING BOILER 2 ALARM XB2 ALM	X		X									X			
EXISTING BOILER 2 ENABLE/DISABLE COMMAND XB2	X				X										
EXISTING BOILER 2 STATUS XB2 STS	X		X					X							
PRIMARY LOOP SUPPLY TEMPERATURE LOCAL PRI SUP T	X	X						X		X	X			X	
PRIMARY LOOP SUPPLY TEMPERATURE LOCAL SETPOINT PRI SUP T SETPOINT	X			X											
PRIMARY LOOP RETURN TEMPERATURE LOCAL PRI RET T	X	X						X		X	X			X	
BOILER PUMP 1 ENABLE/DISABLE BP1	X				X			X							
BOILER PUMP 1 STATUS BP1 STS	X		X												
BOILER PUMP 2 ENABLE/DISABLE BP2	X				X			X							
BOILER PUMP 2 STATUS BP2 STS	X		X												
HOT WATER SUPPLY TEMPERATURE LOCAL HWS T	X	X						X		X	X				
GLOBAL OUTDOOR AIR TEMPERATURE GOAT	X	X						X						X	
MOTORIZED BYPASS VALVE 1 MBP1	X			X											
MOTORIZED BYPASS VALVE 2 MBP2	X			X											
BOILER DIFFERENTIAL PRESSURE 1 DP1	X	X										X			
BOILER DIFFERENTIAL PRESSURE 2 DP2	X	X										X			

Flow Diagram: Mixing Box





Sequence of Operations: Mixing Box

MIXING BOXES ARE DUAL DUCT PRESSURE INDEPENDENT WITH AIR FLOW SENSORS ON THE HOT AND COLD INLETS AND THE OUTLET. CONTROLS SHALL ALLOW INDEPENDENT HEATING AND COOLING MINIMUM AND MAXIMUM AIRFLOW CFM SETPOINTS.

THE ZONE CONTROLLER SHALL INDIVIDUALLY MODULATE THE HOT DECK AND COLD DECK DAMPERS OF THE ZONE'S MIXING BOX TERMINAL UNIT IN ORDER TO MAINTAIN THE ZONE TEMPERATURE SETPOINT. THE CONTROLLER SHALL MAINTAIN ZONE SETPOINTS BY CONTROLLING THE HOT AND COLD DECK AIRFLOW THROUGH EACH OF THE FOLLOWING:

- WHEN ZONE TEMPERATURE IS GREATER THAN ITS COOLING SETPOINT, THE HOT DUCT DAMPER SHALL CLOSE AND THE COLD DUCT DAMPER SHALL MODULATE FROM CLOSED TO MAXIMUM COOLING AIRFLOW (ADJ.) UNTIL THE ZONE IS SATISFIED. TOTAL AIRFLOW SHALL REMAIN CONSTANT.
- WHEN THE ZONE TEMPERATURE IS BETWEEN THE COOLING SETPOINT AND HEATING SETPOINT, THE BOX SHALL MIX COLD AND HOT AIR STREAMS, WITH THE DAMPERS ACTING INVERSELY. TOTAL AIR FLOW SHALL REMAIN CONSTANT.
- WHEN ZONE TEMPERATURE IS LESS THAN ITS HEATING SETPOINT, THE HOT DUCT DAMPER SHALL MODULATE UP TO THE MAXIMUM HEATING AIRFLOW (ADJ.) UNTIL THE ZONE IS SATISFIED WITH THE COLD DUCT DAMPER CLOSED. TOTAL AIR FLOW SHALL REMAIN CONSTANT.
- REFER TO MIXING BOX AIRFLOW DIAGRAM FOR ADDITIONAL INFORMATION.

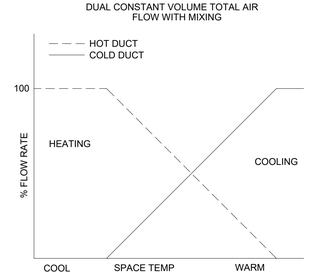
THE CONTROLLER SHALL MONITOR THE DISCHARGE AIR TEMPERATURE AND AIRFLOW.

ALARMS SHALL BE PROVIDED IF THE DISCHARGE AIR TEMPERATURE IS LESS THAN 45°F.

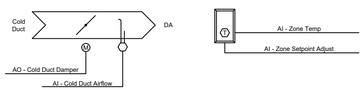
A LOW SIGNAL SELECTOR ROUTINE, RESIDENT IN THE CONTROLLER SHALL MONITOR THE CONTROL SIGNALS FROM EACH ZONE CONTROLLER AND PROVIDE A HIGHEST HEATING TO THE AHU FMS PANEL FOR USE IN THE DISCHARGE TEMPERATURE SETPOINT ALGORITHM. LIKEWISE, A HIGH SIGNAL SELECTOR ROUTINE WILL PROVIDE A COOLING ENABLE COMMAND TO THE FMS PANEL WHENEVER ANY OF THE ZONES CALL FOR COOLING.

Points List: Mixing Box

System Point Description	Points									Alarms				
	GRAPHIC	ANALOG HARDWARE INPUT (AI)	BINARY HARDWARE INPUT (BI)	ANALOG HARDWARE OUTPUT (AO)	BINARY HARDWARE OUTPUT (BO)	SOFTWARE POINT (SFT)	HARDWARE INTERLOCK (HDW)	TREND DATA	NETWORK (NET)	HIGH ANALOG LIMIT	LOW ANALOG LIMIT	LATCH DIAGNOSTIC	SENSOR FAIL	COMMUNICATION FAIL
COLD DUCT AIRFLOW	X	X						X						
COLD DUCT DAMPER	X			X				X						
HOT DUCT AIRFLOW	X	X						X						
HOT DUCT DAMPER	X			X				X						
COLD DUCT AIRFLOW SETPOINT	X			X				X						
HOT DUCT AIRFLOW SETPOINT	X			X				X						
MIXED AIRFLOW	X	X						X						
ZONE TEMPERATURE	X	X						X		X	X		X	
ZONE TEMPERATURE SETPOINT	X			X				X					X	
OCCUPANCY OVERRIDE	X		X											
DISCHARGE AIR TEMPERATURE	X	X						X		X	X		X	
DISCHARGE AIR TEMPERATURE SETPOINT	X			X				X						



Flow Diagram: Bid Alternate #1: VAV Box



Sequence of Operations: Bid Alternate #1: VAV Box

General

VAV box is a cooling only box. It shall be the second stage of cooling within the area it serves.

Setpoint

The setpoint to operate the VAV shall sent to the VAV via the BAS. The temperature setpoint of the VAV shall be based upon the temperature setpoint of the RTU that serves the same zone. The VAV's cooling setpoint shall be 4 deg F (adj) higher than that of the RTU. (i.e. If the RTU space temperature setpoint is 72 deg F, the VAV setpoint shall be 76 deg F.) This shall allow the VAV to be enabled only when the RTU cannot keep the zone temperature setpoint.

Operation

When the space temperature reaches the zone temperature setpoint, the VAV shall open to 100%. The VAV box shall remain open until the space temperature falls 2 deg F (adj) below the VAV setpoint zone temperature.

Points List: Bid Alternate #1: VAV Box

System Point Description	Points									Alarms				
	GRAPHIC	ANALOG HARDWARE INPUT (AI)	BINARY HARDWARE INPUT (BI)	ANALOG HARDWARE OUTPUT (AO)	BINARY HARDWARE OUTPUT (BO)	SOFTWARE POINT (SFT)	HARDWARE INTERLOCK (HDW)	TREND DATA	NETWORK (NET)	HIGH ANALOG LIMIT	LOW ANALOG LIMIT	LATCH DIAGNOSTIC	SENSOR FAIL	COMMUNICATION FAIL
COLD DUCT AIRFLOW	X	X						X						
COLD DUCT DAMPER	X			X				X						
COLD DUCT AIRFLOW SETPOINT	X			X				X						
ZONE TEMPERATURE	X	X						X		X	X		X	
ZONE TEMPERATURE SETPOINT	X			X				X					X	

STATE OF MISSOURI
MICHAEL L. PARSON, GOVERNOR

THOMAS M. GRASSI
NUMBER PE-23938
PROFESSIONAL ENGINEER
09/18/23

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DEPARTMENT OF PUBLIC SAFETY

MISSOURI STATE HIGHWAY PATROL

ANNEX BUILDING, UPGRADE HVAC SYSTEM

MSHP GENERAL HEADQUARTERS ANNEX
1510 EAST ELM,
JEFFERSON CITY, MO 65101

PROJECT # R2314-01
SITE # 6001
FACILITY # 8136001002

REVISION:
DATE:
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: 09/18/2023

CAD DWG FILE:
DRAWN BY: RCB
CHECKED BY: TMG
DESIGNED BY: RCB

SHEET TITLE:

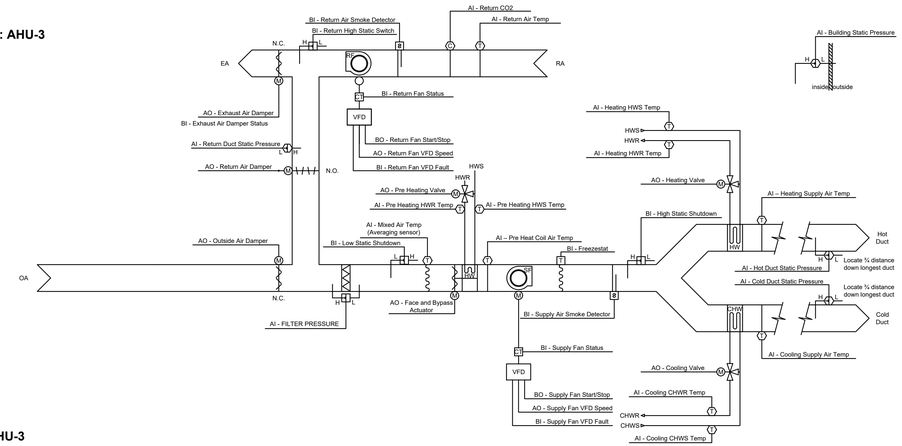
MECHANICAL CONTROLS

SHEET NUMBER:

M-602

11 OF 14 SHEETS
09/18/2023

Flow Diagram: AHU-3



Sequence of Operation: AHU-3

START/STOP

THE AHU WILL BE STARTED AND STOPPED FROM A SINGLE COMMAND. WHEN THE UNIT IS STARTED, THE SUPPLY AND RETURN FANS WILL BE ENERGIZED AND EACH OF THE CONTROL ROUTINES OUTLINED BELOW WILL BE ENABLED. UPON A COMMAND TO SHUT DOWN, THE FAN WILL BE DE-ENERGIZED AND THE DAMPERS AND CONTROL VALVES WILL RETURN TO THEIR NORMAL POSITIONS. IF PROOF OF RUN IS NOT SATISFIED WITHIN 30 SECONDS AFTER A COMMAND TO START, THE AHU WILL BE SHUT DOWN AND AN ALARM WILL BE GENERATED AT THE BAS PANEL.

A NETWORK CLOCK WILL DETERMINE THE OCCUPIED/UNOCCUPIED OPERATION. OCCUPIED/UNOCCUPIED OPERATION WILL BE SCHEDULED ON TIME OF DAY, DAY OF WEEK, AND MONTH OF YEAR. THE CLOCK WILL AUTOMATICALLY ADJUST FOR DAYLIGHT SAVINGS, SCHEDULED HOLIDAYS, AND PERFORM A SUMMER/WINTER OPTIMAL STARTUP ROUTINE.

NIGHT SETBACK/SETUP

DURING UNOCCUPIED MODE AS DETERMINED BY THE NETWORK CLOCK, THE AHU SHALL BE SHUTDOWN. THE FANS SHALL STOP AND DAMPERS AND VALVES WILL RETURN TO THEIR NORMAL POSITIONS. OUTSIDE AIR DAMPERS SHALL CLOSE.

WHEN THE SPACE TEMPERATURE FALLS BELOW 60°F (ADJ.) IN 2 (ADJ.) ZONES, THE FANS SHALL BE STARTED. THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED AND THE HEATING COIL AND COOLING COIL CONTROL VALVES SHALL OPERATE AS DESCRIBED IN THE OCCUPIED MODE. WHEN SPACE TEMPERATURE RISES ABOVE 67°F (ADJ.) THE AHU SHALL SHUT DOWN AND RETURN TO UNOCCUPIED MODE.

WHEN THE SPACE TEMPERATURE RISES ABOVE 85°F (ADJ.) IN 2 (ADJ.) ZONES, THE FANS SHALL BE STARTED. THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED AND THE HEATING COIL AND COOLING COIL CONTROL VALVES SHALL OPERATE AS DESCRIBED IN THE OCCUPIED MODE. WHEN SPACE TEMPERATURE FALLS BELOW 78°F (ADJ.) THE AHU SHALL SHUT DOWN AND RETURN TO UNOCCUPIED MODE.

MORNING WARM-UP/COOL-DOWN

MORNING WARM-UP/COOL-DOWN SHALL AUTOMATICALLY START TO SPACE TEMPERATURES WILL BE AT THEIR RESPECTIVE OCCUPIED SETPOINTS BY THE START OF THE OCCUPIED MODE. DURING MORNING WARM-UP, THE FANS SHALL BE STARTED AND THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED UNTIL THE START OF THE OCCUPIED MODE.

SUPPLY FAN:
THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES.
ALARMS SHALL BE PROVIDED AS FOLLOWS:

- SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

SUPPLY AIR DUCT STATIC PRESSURE CONTROL:
THE CONTROLLER SHALL TAKE THE LOWEST OF THE TWO DUCT STATIC PRESSURE READINGS FROM THE COLD AND HOT DUCTS AND SHALL MODULATE THE SUPPLY FAN VFD SPEED TO MAINTAIN A DUCT STATIC PRESSURE SETPOINT. THE SPEED SHALL NOT DROP BELOW 30% (ADJ.). THE STATIC PRESSURE SETPOINT SHALL BE RESET BASED ON ZONE COOLING REQUIREMENTS.

- THE INITIAL DUCT STATIC PRESSURE SETPOINT SHALL BE 1.5 IN H2O (ADJ.).
- AS COOLING DEMAND INCREASES, THE SETPOINT SHALL INCREMENTALLY RESET UP TO A MAXIMUM OF 2.0 IN H2O (ADJ.).
- AS COOLING DEMAND DECREASES, THE SETPOINT SHALL INCREMENTALLY RESET DOWN TO A MINIMUM OF 1.0 IN H2O (ADJ.).

THE CONTROLLER SHALL TAKE THE HIGHEST OF THE TWO DUCT STATIC PRESSURE READINGS FROM THE COLD AND HOT DUCTS AND SHALL LIMIT THE SUPPLY FAN VFD SPEED TO MAINTAIN A MAXIMUM DUCT STATIC PRESSURE SETPOINT OF 2.5 IN H20 (ADJ.).

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH SUPPLY AIR STATIC PRESSURE: IF THE SUPPLY AIR STATIC PRESSURE IS 25% (ADJ.) GREATER THAN SETPOINT.
- LOW SUPPLY AIR STATIC PRESSURE: IF THE SUPPLY AIR STATIC PRESSURE IS 25% (ADJ.) LESS THAN SETPOINT.
- SUPPLY FAN VFD FAULT.

RETURN FAN:
THE RETURN FAN SHALL RUN WHENEVER THE SUPPLY FAN RUNS, UNLESS SHUTDOWN ON SAFETIES.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- RETURN FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- RETURN FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

RETURN FAN STATIC PRESSURE CONTROL:
RETURN FAN SPEED SHALL MODULATE TO MAINTAIN A DUCT STATIC PRESSURE SETPOINT OF 0.20" (ADJ.) IN THE DISCHARGE PLENUM.
THE SPEED SHALL NOT DROP BELOW 30% (ADJ.).

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH RETURN AIR STATIC PRESSURE: IF THE RETURN AIR STATIC PRESSURE IS 25% (ADJ.) GREATER THAN SETPOINT.
- LOW SUPPLY AIR STATIC PRESSURE: IF THE SUPPLY AIR STATIC PRESSURE IS 25% (ADJ.) LESS THAN SETPOINT.
- RETURN FAN VFD FAULT.

ECONOMIZER OPERATION

THE CONTROLLER SHALL BE CAPABLE OF CONTROLLING EACH OF THE OA, RA, AND EA DAMPERS INDEPENDENTLY.

WHEN FREE COOLING IS AVAILABLE (OUTSIDE AIR TEMPERATURE IS BELOW 55°F (ADJ.)), THE OUTSIDE AIR DAMPERS AND RETURN AIR DAMPERS WILL MODULATE IN UNISON TO MAINTAIN A MIXED AIR TEMPERATURE SETPOINT EQUAL TO THE COOLING COIL DISCHARGE AIR SETPOINT. THE EXHAUST AIR DAMPER SHALL MODULATE TO MAINTAIN BUILDING STATIC PRESSURE OF 0.10 IN H20 (ADJ). THE CONTROLLER SHALL MODULATE THE EXHAUST DAMPER OPEN AS THE RETURN AIR DAMPER CLOSES BELOW 50% TO PREVENT THE RETURN FAN FROM DEADHEADING.

WHEN FREE COOLING IS NOT AVAILABLE (OUTSIDE AIR TEMPERATURE IS ABOVE 58°F ADJ.), THE EXHAUST AIR DAMPER SHALL CLOSE, THE RETURN AIR DAMPERS WILL OPEN 100% AND THE OUTSIDE AIR DAMPERS WILL MODULATE TO A MINIMUM POSITION OF 15% OPEN (ADJ.). COORDINATE MINIMUM OUTSIDE AIR DAMPER POSITION WITH THE TEST AND BALANCE CONTRACTOR.

DEMAND CONTROL VENTILATION (DCV)

THE MINIMUM OUTSIDE AIR DAMPER POSITION SHALL BE INCREMENTALLY RESET DOWNWARD FROM THE MAX VENTILATION POSITION DCV-MAX TO THE MINIMUM VENTILATION POSITION DCV-MIN AS RETURN AIR CO2 LEVELS FALL FROM 1200 PPM TO 600 PPM. ALL SETPOINTS SHALL BE ADJUSTABLE. IF CO2 LEVELS RISE ABOVE 1200 PPM THE OUTSIDE AIR DAMPER SHALL REMAIN AT DCV-MAX POSITION. FINAL DAMPER POSITIONS ASSOCIATED WITH DCV-MAX AND DCV-MIN SHALL BE ESTABLISHED BY THE BALANCING CONTRACTOR.

PREHEAT COIL; AHU-3

THE PREHEAT COIL IS AN INTERNAL FACE AND BYPASS COIL. WHEN THE OUTSIDE AMBIENT TEMPERATURES DO NOT ALLOW THE MIXED AIR TEMPERATURE TO MAINTAIN THE LEAVING COOLING COIL AIR TEMPERATURE SETPOINT, THE VALVE FOR THE COIL SHALL BE ENABLED. THE VALVE SHALL OPEN FULLY, THE FACE AND BYPASS ACTUATOR SHALL MODULATE TO MAINTAIN A A 55 DEG F DISCHARGE AIR SETPOINT. (ADJ)

COOLING COIL; AHU-3

CHILLED WATER COOLING WILL BE ENABLED WHENEVER THE OUTSIDE AIR TEMPERATURE IS ABOVE 55°F (ADJ.) AND THERE IS A CALL FOR COOING FROM ANY OF THE ZONES. THE DISCHARGE AIR SETPOINT SHALL BE 55°F (ADJ.) AND SHALL BE RESET UPWARD TO 60°F (ADJ.) AS AMBIENT TEMPERATURE VARIES FROM 75°F TO 55°F (BOTH ADJ.).

THE BMS WILL MONITOR THE COOLING COIL'S DISCHARGE AIR TEMPERATURE AND SHALL CLOSE THE CONTROL VALVE AND ANNUNCIATE AN ALARM CONDITION WHENEVER THE DISCHARGE AIR TEMPERATURE DROPS BELOW 40°F (ADJ.).

HEATING COIL; AHU-3

THE HEATING COIL CONTROL VALVE WILL MODULATE TO MAINTAIN A DISCHARGE AIR TEMPERATURE SETPOINT AS MEASURED BY THE HOT WATER HEATING COIL TEMPERATURE SENSOR. THE DISCHARGE AIR SETPOINT SHALL BE 120°F (ADJ.) AND SHALL BE RESET DOWNWARD TO 90°F (ADJ.) AS AMBIENT TEMPERATURE VARIES FROM 40°F TO 65°F (BOTH ADJ.). HEATING SHALL BE DISABLED ABOVE 85°F (ADJ.) AMBIENT.

FREEZE PROTECTION

WHEN A FREEZE CONDITION IS SENSED BY THE LOW TEMPERATURE SWITCH, THE SUPPLY AND RETURN FANS WILL SHUT DOWN. THE COOLING CONTROL VALVE, THE PREHEAT CONTROL VALVE, AND THE HEATING CONTROL VALVE WILL OPEN (VALVES SHALL FAIL IN THE OPEN POSITION). FACE AND BYPASS SHALL ALLOW ALL AIR TO PASS OVER THE HOT COILS. THE OUTSIDE AIR CONTROL DAMPER WILL RETURN TO ITS NORMALLY CLOSED POSITION AND AN ALARM WILL BE GENERATED AT THE BMS PANEL AND AT THE OPERATOR WORKSTATION.

SMOKE ALARM

WHEN THE SUPPLY OR RETURN AIR SMOKE DETECTOR IS TRIPPED, THE SUPPLY FANS AND RETURN FANS WILL SHUT DOWN. THE MIXED AIR DAMPERS WILL RETURN TO THEIR NORMAL POSITIONS AND AN ALARM WILL BE GENERATED AT THE BMS PANEL.

SAFETY CONTROL

THE SAFETIES FOR THIS UNIT CONSIST OF THE FOLLOWING:

- MIXED AIR TEMPERATURE LOW LIMIT
- RETURN AIR SMOKE DETECTOR
- SUPPLY AIR SMOKE DETECTOR
- SUPPLY FAN HIGH STATIC PRESSURE SWITCH
- SUPPLY FAN LOW STATIC PRESSURE SWITCH
- RETURN FAN HIGH STATIC PRESSURE SWITCH
- FREEZESTAT

WHEN ANY OF THE SAFETIES ARE ACTIVATED, THE FOLLOWING WILL OCCUR:

- AN ALARM WILL OCCUR AT THE BMS CONTROLLER
- THE SUPPLY AND RETURN FANS WILL BE STOPPED
- THE COIL CONTROL VALVE WILL BE COMMANDED OPEN.
- THE OUTSIDE AND EXHAUST AIR DAMPERS WILL SPRING CLOSE AND THE RETURN AIR DAMPER WILL SPRING OPEN.

ALARMS

INDICATION OF ALARM CONDITIONS WILL BE PROVIDED LOCALLY AT THE BMS PANEL AS WELL AS AT THE NETWORK'S OPERATOR WORKSTATION. ALARM INDICATION AND MESSAGING WILL BE ANNUNCIATED FOR ANY OF THE FOLLOWING CONDITIONS:

- MIXED AIR LOW TEMPERATURE ALARM
- HOT AND COLD DECK HIGH/LOW TEMPERATURE ALARMS
- FAN FAILURE TO RUN ALARM
- SMOKE DETECTOR ALARM
- FAN STATIC PRESSURE SAFETY SWITCHES
- ZONE HIGH/LOW TEMPERATURE ALARM

Points List: AHU-3

System Point Description	Points									Alarms					
	GRAPHIC	ANALOG HARDWARE INPUT (AI)	BINARY HARDWARE INPUT (BI)	ANALOG HARDWARE OUTPUT (AO)	BINARY HARDWARE OUTPUT (BO)	SOFTWARE POINT (SFT)	HARDWARE INTERLOCK (HDW)	TREND DATA	NETWORK (NET)	HIGH ANALOG LIMIT	LOW ANALOG LIMIT	LATCH DIAGNOSTIC	SENSOR FAIL	COMMUNICATION FAIL
BUILDING STATIC PRESSURE	X	X						X						
RETURN AIR TEMPERATURE	X	X						X						
RETURN AIR CO2	X	X						X						
RETURN FAN START/STOP	X				X			X						
RETURN FAN VFD SPEED	X			X				X						
RETURN FAN VFD FAULT	X		X											X
EXHAUST AIR DAMPER	X			X				X						
EXHAUST AIR DAMPER STATUS	X		X					X					X	
RETURN DUCT STATIC PRESSURE	X	X						X		X	X		X	
RETURN FAN STATUS	X		X										X	X
RETURN AIR DAMPER	X			X				X						X
OUTSIDE AIR DAMPER	X			X				X						X
FILTER PRESSURE	X	X								X				
MIXED AIR TEMPERATURE	X	X						X		X	X		X	X
PREHEATING VALVE	X			X				X						X
PREHEAT COIL AIR TEMPERATURE	X	X						X					X	
PREHEAT COIL AIR TEMPERATURE SETPOINT	X			X				X						
SUPPLY FAN STATUS	X		X										X	X
SUPPLY FAN START/STOP	X				X			X						
SUPPLY FAN VFD SPEED	X			X				X						
SUPPLY FAN VFD FAULT	X		X											X
HEATING VALVE	X			X				X						X
HEATING SUPPLY AIR TEMPERATURE	X	X						X		X	X		X	
HEATING SUPPLY AIR TEMPERATURE SETPOINT	X			X				X						
HOT DUCT STATIC PRESSURE	X	X						X		X			X	X
HOT DUCT STATIC PRESSURE SETPOINT	X			X				X						
COOLING VALVE	X			X				X						X
COOLING SUPPLY AIR TEMPERATURE	X	X						X		X	X		X	
COOLING SUPPLY AIR TEMPERATURE SETPOINT	X			X				X						
COLD DUCT STATIC PRESSURE	X	X						X		X			X	X
COLD DUCT STATIC PRESSURE SETPOINT	X			X				X						
PREHEATING HWR TEMPERATURE	X	X						X			X		X	
PREHEATING HWS TEMPERATURE	X	X						X						
HEATING HWR TEMPERATURE	X	X						X			X		X	
HEATING HWS TEMPERATURE	X	X						X						
COOLING CHWR TEMPERATURE	X	X						X			X		X	
COOLING CHWS TEMPERATURE	X	X						X						
RETURN AIR SMOKE DETECTOR	X		X				X						X	X
SUPPLY AIR SMOKE DETECTOR	X		X				X						X	X
RETURN HIGH STATIC SWITCH	X		X				X						X	X
LOW STATIC SHUTDOWN	X		X				X						X	X
HIGH STATIC SHUTDOWN	X		X				X						X	X
FREEZESTAT	X		X				X						X	X
FACE AND BYPASS ACTUATOR	X			X										X

STATE OF MISSOURI
MICHAEL L. PARSON, GOVERNOR

STATE OF MISSOURI
THOMAS M. GRASSI
NUMBER PE-23938
PROFESSIONAL ENGINEER
09/18/23

THOMAS M. GRASSI
License Number: E-23938
Expiration Date: 12/31/24

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DEPARTMENT OF PUBLIC SAFETY

MISSOURI STATE HIGHWAY PATROL

ANNEX BUILDING, UPGRADE HVAC SYSTEM

MSHP GENERAL HEADQUARTERS ANNEX
1510 EAST ELM,
JEFFERSON CITY, MO 65101

PROJECT # R2314-01
SITE # 6001
FACILITY # 8136001002

REVISION:
DATE:
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: 09/18/2023

CAD DWG FILE:
DRAWN BY: RCB
CHECKED BY: TMG
DESIGNED BY: RCB

SHEET TITLE:

MECHANICAL CONTROLS

SHEET NUMBER:

M-603

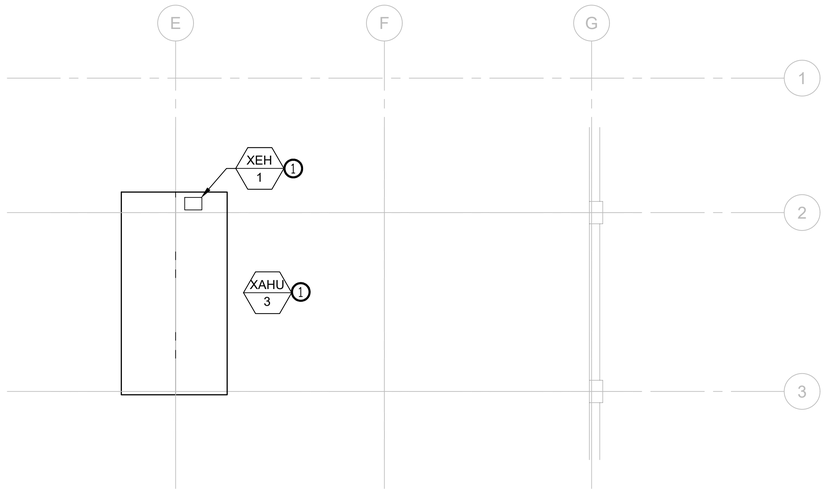
12 OF 14 SHEETS
09/18/2023

DEMO GENERAL NOTES

1. CORRDINATE DEMOLITION AND NEW WORK WITH MECHANICAL AND EXISTING CONDITIONS PRIOR TO CONSTRUCTION.
2. ALL PREVIOUSLY ABANDONED OR OBSOLETE CONDUIT AND WIRING SHALL BE REMOVED IN ITS ENTIRETY.
3. REVIEW EXISTING CONDITIONS PRIOR TO START OF DEMOLITION AND COORDINATE ANY POWER INTERRUPTIONS WITH OWNER'S REPRESENTATIVE.

(#) DEMO KEYED NOTES

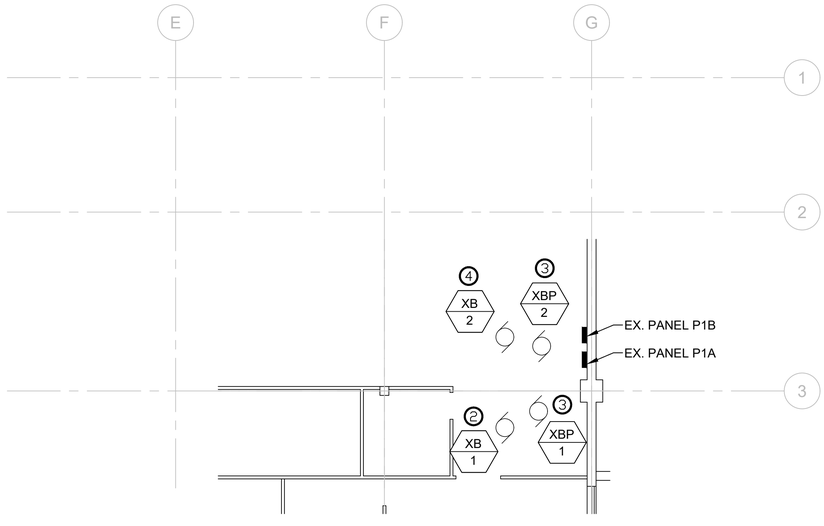
1. PRIOR TO REMOVAL OF EXISTING AHU & ELECTRIC UNIT HEATER, DISCONNECT FEEDERS, TIE-UP AND MAKE SAFE FOR REUSE. FOR NEW WORK, SEE POWER KEYED NOTE 1.
2. EXISTING BOILER TO BE REMOVED BY MC. EC TO DISCONNECT FEEDER, TIE-UP AND MAKE SAFE FOR REUSE. FOR NEW WORK, SEE POWER NOTE 2.
3. PRIOR TO REMOVAL OF BOILER PUMP, EC TO DISCONNECT FEEDER, TIE-UP AND MAKE SAFE FOR REUSE. FOR NEW WORK, SEE POWER NOTE 3.
4. EXISTING BOILER TO REMAIN IN-PLACE AND CONNECTED.



BUILDING NORTH

1 E101 DEMO ROOF PLAN

SCALE: 1/8" = 1'-0"



BUILDING NORTH

2 E101 DEMO MECHANICAL ROOM PLAN

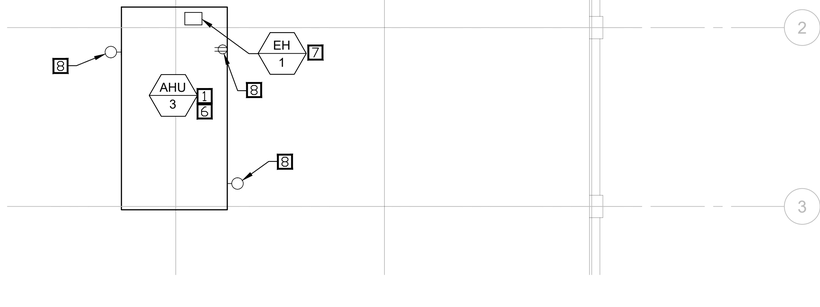
SCALE: 1/8" = 1'-0"

POWER GENERAL NOTES

A. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE APPLICABLE BUILDING CODE, NEC AND ANY OTHER LOCAL CODES AND ORDINANCES.
B. WORKMANSHIP SHALL BE FIRST QUALITY AND IN ACCORDANCE WITH BEST PRACTICES FOR THE TRADE BY SKILLED WORKERS.
C. ALL MATERIALS SHALL BE NEW, WITH "UL" APPROVED LABELS.
D. SUPPLY AND INSTALL NEW ELECTRICAL DEVICES AS SHOWN.
E. ALL WIRING SHALL BE AS SPECIFIED UNDER ELECTRICAL SPEC SECTION.
F. CONTROL WIRING FOR BOILER, BOILER PUMP, AHU WILL BE FURNISHED, INSTALLED AND CONNECTED BY MC, MC TO COORDINATE ANY ELECTRICAL WORK REQUIRED BY EC.
G. ALL CONDUIT SHALL BE EMT, UNO.

(#) POWER KEYED NOTES

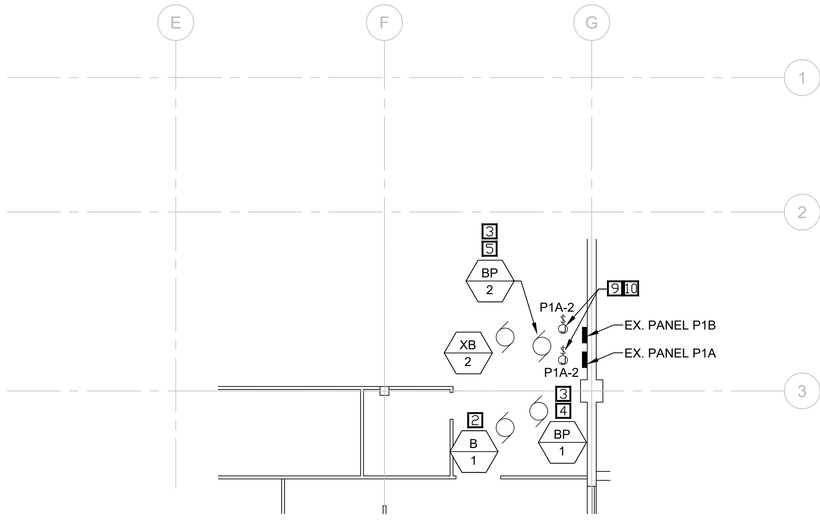
1. AFTER NEW AHU IS IN-PLACE, RECONNECT FEEDER TIED-UP DURING DEMO WORK. DISCONNECT FURNISHED WITH UNIT.
2. AFTER NEW BOILER IS IN-PLACE, RECONNECT FEEDER AS REQUIRED TIED-UP DURING DEMO WORK.
3. AFTER NEW BOILER PUMP IS IN-PLACE, RECONNECT FEEDER AS REQUIRED TIED-UP DURING DEMO WORK.
4. EXISTING 3-POLE C/B 19,21,23 IN EXISTING PANEL P1A SERVING EXISTING BOILER PUMP BP-1 (208V-1P) TO BE REUSED FOR NEW BOILER PUMP BP-1, 3/4HP-208V-1PH. ALTHOUGH THE 3-POLE C/B SEEMS TO SERVE THE CURRENT 2-POLE BP-1 PUMP MOTOR, THE 3RD POLE OF THE C/B APPEARS TO BE INACTIVE. EC TO FIELD VERIFY.
5. EXISTING 3-POLE C/B 25,27,29 IN EXISTING PANEL P1A SERVING EXISTING BOILER PUMP BP-2 (208V-3P) TO BE REUSED FOR NEW BOILER PUMP BP-2, 2HP-208V-1PH. REUSE 3-POLE C/B, UTILIZING 2-POLE ON C/B FOR BP-2 2-POLE PUMP MOTOR. REMOVE & DISCARD WIRING TO THE 3RD POLE OF THE C/B AND MAKE INACTIVE.
6. UNIT CONTACT SWITCH FURNISHED BY MC, INSTALLED BY EC.
7. NEW ELECTRIC UNIT HEATER WITHIN AHU-3 IS SINGLE POINT CONNECTION WITH AHU SERVICE FEEDERS.
8. FACTORY INSTALLED DUPLEX OUTLET IN SERVICE CORRIDOR AND MARINE LIGHTS ON UNIT ARE POWERED FROM UNIT SUPPLY. MC TO COORDINATE ANY ELECTRICAL WORK REQUIRED BY EC.
9. PROVIDE JUNCTION BOX WITH 120V-20A-1P TOGGLE TYPE DISCONNECT SWITCH AND 120/24V CONTROL TRANSFORMER FOR MOTORIZED VALVE. TRANSFORMER: SQUARE-D 9070T75D13, 75VA-1PH-120V/24V OR APPROVED EQUAL WITH PRIMARY FUSE ACCESSORY FURNISHED AND INSTALLED BY EC. COORDINATE WORK WITH MC.
10. CONNECT TO UNUSED 20A-1P C/B.



BUILDING NORTH

3 E101 ROOF PLAN

SCALE: 1/8" = 1'-0"



BUILDING NORTH

4 E101 MECHANICAL ROOM PLAN

SCALE: 1/8" = 1'-0"

STATE OF MISSOURI
MICHAEL L. PARSON, GOVERNOR

STATE OF MISSOURI
DAVID ANTHONY TRETTER
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09/18/23

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SHEET TITLE:
ELECTRICAL MECHANICAL ROOM & ROOF PLANS

SHEET NUMBER:
E-101
09/18/23
13 OF 14 SHEETS

ELECTRICAL GENERAL NOTES:

1. REVIEW DRAWINGS OF ALL DIVISIONS OF WORK. COORDINATE THIS WORK WITH ALL OTHER DIVISIONS OF WORK AND ALL SUBCONTRACTORS. PROVIDE ALL SUBCONTRACTORS WITH A COMPLETE SET OF BID DOCUMENTS.

2. ELECTRICAL DRAWINGS ARE DIAGRAMMATIC AND REPRESENT THE GENERAL SCOPE OF THE WORK. SIZES AND LOCATION OF EQUIPMENT AND WIRING DEVICES ARE SHOWN TO SCALE WHERE POSSIBLE, BUT MAY BE DISTORTED FOR CLARITY ON THE DRAWINGS.

3. CONTRACTOR SHALL COORDINATE LOCATIONS AND ROUTING OF ALL CONDUITS. IT IS NOT WITHIN THE SCOPE OF DRAWINGS TO SHOW ALL NECESSARY BENDS, OFFSETS, PULL BOXES AND OBSTRUCTIONS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO INSTALL ALL WORK TO CONFORM TO THE STRUCTURE, PRESERVE HEADROOM AND KEEP OPENINGS AND PASSAGEWAYS CLEAN.

4. ELECTRICAL CONTRACTOR SHALL REQUEST A SET OF MECHANICAL PLANS FOR REFERENCE FROM THE GENERAL CONTRACTOR.

5. COORDINATE FOR ANY CONSTRUCTION PHASING REQUIREMENTS.

6. ALL WORK SHALL BE PERFORMED IN COMPLIANCE WITH AHJ'S ADOPTED NEC, BUILDING CODES, AND INDUSTRY STANDARDS.

7. UPON COMPLETION OF ALL ELECTRICAL WORK, ELECTRICAL CONTRACTOR SHALL ADJUST AND TEST ALL CIRCUITS, OUTLETS, MOTORS, AND OTHER ELECTRICAL ITEMS. DAMAGED ITEMS SHALL BE IMMEDIATELY REPAIRED OR REPLACED WITH ALL NEW EQUIPMENT AND THAT PART OF THE SYSTEM SHALL THEN BE RETESTED. ALL SUCH REPLACEMENT OR REPAIR SHALL BE DONE AT NO ADDITIONAL COST TO THE OWNER.

8. AFTER COMPLETION OF WORK UNDER THIS SECTION, CLEAN-UP ALL RESULTANT DEBRIS FROM THIS WORK AND REMOVE FROM THE SITE.

9. VERIFY LOCATIONS FOR ALL WIRING DEVICES AND ELECTRICAL EQUIPMENT WITH MECHANICAL DRAWINGS. IN LOCATING DEVICES, TRANSFORMERS, JUNCTION BOXES, OUTLETS, ALLOW FOR OVERHEAD PIPES, DUCTS AND MECHANICAL EQUIPMENT, VARIATIONS IN FIREPROOFING AND PLASTERING, CEILING AND ASSOCIATED CONDITIONS, AND CORRECT ANY INACCURACY RESULTING FROM FAILURE TO DO SO WITHOUT EXPENSE TO OWNER.

10. CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE WITH ALL TRADES AND ELECTRICAL REFERENCES.

11. COORDINATE ALL ELECTRICAL WORK WITH OTHER TRADES.

12. ALL PENETRATIONS THROUGH FIRE RATED WALLS, FLOORS OR PARTITIONS SHALL BE PROPERLY SEALED TO PREVENT THE SPREAD OF SMOKE AND FIRE. THE RATING OF THE PENETRATION SEAL SHALL AT A MINIMUM BE THE SAME RATING AS THAT OF THE WALL, FLOOR OR PARTITION ASSEMBLY.

13. PROVIDE A SEPARATE CODE SIZED GREEN EQUIPMENT GROUND CONDUCTOR IN ALL CONDUITS AND RACEWAYS CONTAINING LINE VOLTAGE CIRCUITS. FOR ALL 20A CIRCUITS, EQUIPMENT GROUND CONDUCTOR SIZE SHALL MATCH PHASE CONDUCTOR SIZE. FOR CIRCUITS UPSIZED FOR VOLTAGE DROP INCREASE EQUIPMENT GROUNDING CONDUCTOR SIZE PER ELECTRICAL CODE.

14. ALL WIRING SHALL BE IN RACEWAY (EMT OR RIGID). FLEXIBLE METAL CONDUIT MAY ONLY BE USED FOR FINAL CONNECTIONS FROM OUTLET BOXES TO MOTORS, APPLIANCES, ETC., MAXIMUM LENGTH 6'-0". NO 'BX', 'ROMEX', ARMORED CABLE, ETC., ALLOWED. ALL CONDUITS SHALL BE CONCEALED WHENEVER POSSIBLE.

15. EXPOSED CONDUIT SHALL BE INSTALLED IN STRAIGHT LINES, PARALLEL WITH OR AT RIGHT ANGLES TO THE BUILDING STRUCTURE. DO NOT LOOP EXCESS FLEXIBLE CONDUIT IN CEILING SPACE.

16. FLEXIBLE CONDUIT IS NOT PERMITTED WITHIN DEMISING WALLS. DO NOT LOOP EXCESS FLEXIBLE CONDUIT IN CEILING SPACE.

17. HORIZONTAL OR CROSS RUNS OF CONDUIT AND WIRING IN WALLS AND PARTITIONS IS NOT PERMITTED.

18. PASS RACEWAYS OVER WATER AND OTHER PIPING WHEN PULL BOXES ARE NOT REQUIRED. NO RACEWAY WITHIN 3" OF HOT WATER PIPES, OR APPLIANCES, EXCEPT CROSSING WHERE RACEWAY SHALL BE AT LEAST 1" FROM PIPE COVER.

19. SECURE ALL SUPPORTS TO BUILDING STRUCTURE AS REQUIRED. SUPPORT HORIZONTAL AND VERTICAL RUNS OF METALLIC RACEWAYS PER THE ELECTRICAL CODE.

20. COORDINATE FINAL CONNECTION LOCATIONS, TYPES, AND REQUIREMENTS FOR EQUIPMENT WITH GENERAL CONTRACTOR PRIOR TO ROUGH-IN.

21. COORDINATE NEUTRAL CONDUCTOR REQUIREMENTS FOR ALL EQUIPMENT. PROVIDE NEUTRAL CONDUCTOR AS REQUIRED FOR MULTI-PHASE EQUIPMENT.

22. PROVIDE NYLON BUSHINGS FOR ALL CONDUIT STUB-UP LOCATIONS TERMINATED WITHOUT A JUNCTION BOX UNLESS NOTED OTHERWISE.

23. ALL JUNCTION BOXES SHALL BE RIGIDLY ATTACHED TO STRUCTURE OR HVAC EQUIPMENT AS REQUIRED.

24. ELECTRICAL CONTRACTOR SHALL MAKE ALL FINAL ELECTRICAL CONNECTIONS. CONFIRM FINAL CONNECTION LOCATION AND REQUIREMENTS PRIOR TO ROUGH-IN.

25. PROVIDE ALL MISCELLANEOUS STEEL AS REQUIRED FOR THE PROPER INSTALLATION OF ELECTRICAL EQUIPMENT AND SYSTEMS.

26. PROVIDE ALL CONDUIT, WIRING AS REQUIRED FOR A COMPLETE INSTALLATION. REFER TO VENDOR LOW VOLTAGE PLANS FOR ADDITIONAL INFORMATION.

27. ALL LOW VOLTAGE CONDUITS SHALL BE 1" MINIMUM UNLESS NOTED OTHERWISE.

28. ENSURE INSTALLATION COMPLIANCE WITH THE LATEST NATIONAL ELECTRICAL CODE.

29. SOME PANELS WHERE NOT READILY ACCESSIBLE, THUS SOME CIRCUITS ARE SHOWN FOR WIRING AND CIRCUITING PURPOSES ONLY. FIELD VERIFY CIRCUIT AVAILABILITY. IF C/B IS NOT AVAILABLE IN PANEL, PROVIDE NEW 20A/1P C/B OR CONNECT TO AVAILABLE C/B IN NEAREST PANEL NOT CONTROLLED BY CONTACTOR OR BAS.

POWER GENERAL NOTES

A. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE APPLICABLE BUILDING CODE, NEC AND ANY OTHER LOCAL CODES AND ORDINANCES.

B. WORKMANSHIP SHALL BE FIRST QUALITY AND IN ACCORDANCE WITH BEST PRACTICES FOR THE TRADE BY SKILLED WORKERS.

C. ALL MATERIALS SHALL BE NEW, WITH "UL" APPROVED LABELS.

D. SUPPLY AND INSTALL NEW ELECTRICAL DEVICES AS SHOWN.

E. ALL WIRING SHALL BE AS SPECIFIED UNDER ELECTRICAL SPEC SECTION.

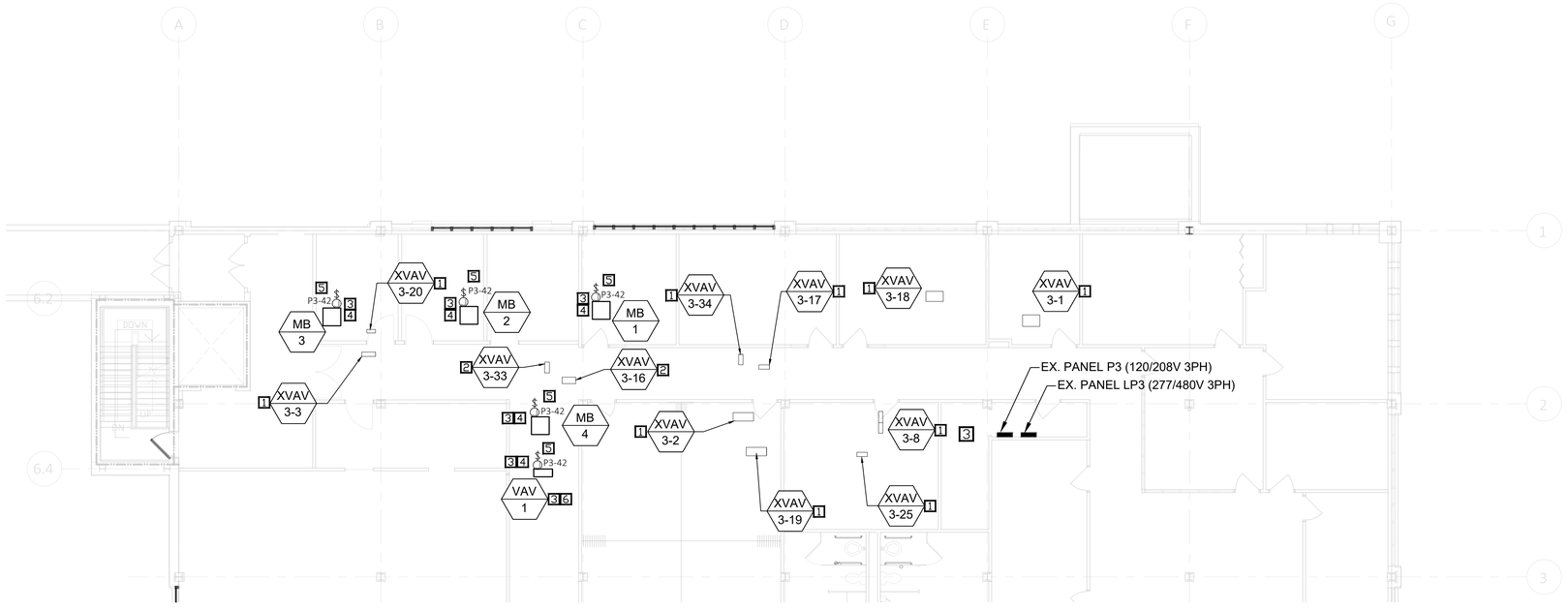
F. CONTROL WIRING FOR MECHANICAL UNITS WILL BE FURNISHED, INSTALLED AND CONNECTED BY MC, MC TO COORDINATE ANY ELECTRICAL WORK REQUIRED BY EC.

G. ALL CONDUIT SHALL BE EMT, UNO.

H. BRANCH CIRCUIT(S) IN EXCESS OF 100 FT. TO VAV/MB FROM PANEL SHALL BE #10 AWG.

POWER KEYED NOTES

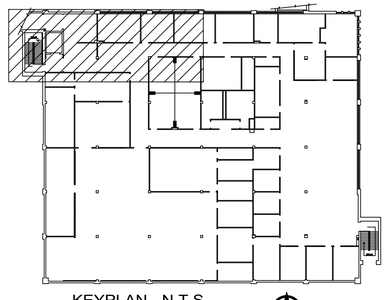
1. EXISTING UNITS TO REMAIN CONNECTED.
2. PRIOR TO REMOVAL OF VAV UNIT, DISCONNECT AND REMOVE WIRING/CONDUIT BACK TO SOURCE.
3. PROVIDE JUNCTION BOX WITH 120V-20A-1P TOGGLE TYPE DISCONNECT SWITCH AND 120/24V CONTROL TRANSFORMER FOR VAV & MIXING BOX (MB) CONTROLS. SEE NOTE 4.
4. CONTROL TRANSFORMER: SQUARE-D 9070T75D13, 75VA-1PH-120V/24V OR APPROVED EQUAL WITH PRIMARY FUSE ACCESSORY FURNISHED AND INSTALLED BY EC. COORDINATE WORK WITH MC.
5. CONNECT NEW MIXING BOX / VAV UNIT VIA UNIT TRANSFORMER (NOTE 4) TO SPARE 20A-1P C/B IN PANEL. CIRCUIT SHOWN IS FOR WIRING PURPOSE ONLY. IF C/B IS NOT AVAILABLE IN PANEL, CONNECT TO SPARE 20A/1P C/B IN NEAREST 120V PANEL NOT CONTROLLED BY CONTACTOR OR BAS. IF NEW 20A-1P C/B IS REQUIRED IN 120V PANEL, IT SHALL BE SAME MANUFACTURER AND INTERRUPTING RATING AS EXISTING C/B'S. SEE POWER GENERAL NOTE H.
6. VAV-1 AND ASSOCIATED WORK UNDER BID ALTERNATE #1.



1 / M-105 ANNEX BLDG. - THIRD FLOOR PARTIAL ELECTRICAL PLAN

SCALE: 1/8" = 1'-0"

BUILDING NORTH



KEYPLAN - N.T.S.

BUILDING NORTH

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ELECTRICAL THIRD FLOOR PLAN

SHEET NUMBER:

E-102

09/18/23
14 OF 14 SHEETS