

# CITY OF ANN ARBOR, MICHIGAN

## WTP HVAC IMPROVEMENTS - PHASE II

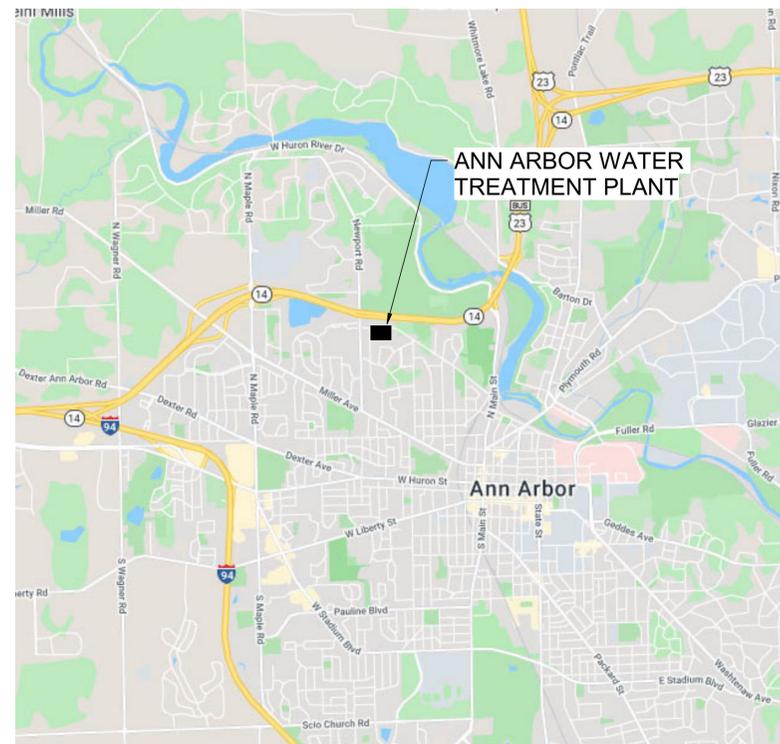
### RFP No. 22-34

710 AVIS DRIVE, SUITE #100  
ANN ARBOR, MI 48108  
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**PROJECT LOCATION:**

919 SUNSET ROAD  
ANN ARBOR, MI 48103

**CLIENT INFORMATION:**

CITY OF ANN ARBOR, MICHIGAN  
ANN ARBOR, MI 48103

**Tt PROJECT No.:**

200-31537-21005

**CLIENT PROJECT No.:**

22002

**PROJECT DESCRIPTION / NOTES:**

REPLACEMENT OF AIR HANDLING UNITS SERVING ADMINISTRATION BUILDING ENVIRONMENTAL LAB, CHEMICAL BUILDING, OZONE BUILDING, AND OTHER ASSOCIATED SYSTEMS

**ISSUED:**

ISSUED FOR BID - NOT FOR CONSTRUCTION - 04/07/2022

SUGGESTED CRANE LOCATION. CONTRACTOR TO PROVIDE LIFTING PLAN SUBMITTAL. SCHEDULE CRANE ACTIVITIES WITH OWNER. CRANE OPERATOR SHALL PROTECT EXISTING PAVEMENT. ANY DAMAGE TO LANDSCAPING SHALL BE REPAIRED (LEVELED, SEEDED, ETC.) REMOVAL OF PARKING SIGNS OR LANDSCAPING LIGHTING SHALL BE REPLACED.



**VICINITY MAP:**



**GENERAL NOTES**

- THE DRAWINGS INDICATE THE GENERAL EXTENT OF WORK. ANY WORK REQUIRED TO PROVIDE THE SCOPE OF WORK GRAPHICALLY INDICATED BY THESE DRAWINGS IS PART OF THE SCOPE OF THE CONSTRUCTION CONTRACT. IN THE EVENT ANY WORK IS INDICATED GRAPHICALLY AND NOT NOTED, THE CONSTRUCTION CONTRACTOR SHALL BE EXPECTED TO CONSTRUCT THE DESIGN USING INFORMATION AND TYPICAL OR SIMILAR DETAILS PROVIDED IN THE CONSTRUCTION DOCUMENTS.
- THE CONTRACTOR SHALL PROMPTLY REPORT TO THE ARCHITECT ANY ERRORS, INCONSISTENCIES OR OMISSIONS IN THE CONTRACT DOCUMENTS DISCOVERED BY OR MADE KNOWN TO THE CONTRACTOR PRIOR TO ORDERING OF ANY MATERIALS OR PROCEEDING WITH THE WORK AS A REQUEST FOR INFORMATION IN SUCH FORM AS THE ARCHITECT MAY REQUIRE.
- MECHANICAL, ELECTRICAL, STRUCTURAL AND PLUMBING INFORMATION ON THE ARCHITECTURAL DRAWINGS IS PROVIDED FOR CLARITY AND / OR LOCATION PURPOSES ONLY. SEE RELEVANT DISCIPLINE DRAWINGS FOR SPECIFIC INFORMATION.
- FLASHING COLOR TO MATCH ADJACENT WALL COLOR UNLESS NOTED OTHERWISE.
- BUILDING HEIGHTS AND ELEVATIONS ARE BASED UPON PROJECT FINISH ELEVATION OF 0'-0" AT FLOOR LEVEL.
- ALL WORK SHALL COMPLY WITH APPLICABLE BUILDING CODES, ORDINANCES AND REGULATORY AGENCIES. DISCREPANCIES SHALL BE BROUGHT TO THE ARCHITECT'S ATTENTION PRIOR TO PROCEEDING WITH THE WORK.
- ALL DOORS IN STUD WALLS NOT LOCATED BY DIMENSION ON PLANS OR DETAILS SHALL BE 4" (100mm) FROM FRAMING TO ADJACENT PERPENDICULAR WALL TO EDGE OF DOOR OPENING.
- ROOM AND DOOR NUMBERS SHOWN ON DRAWINGS ARE FOR CONSTRUCTION PURPOSES ONLY.
- ALL WOOD IN CONTACT WITH CONCRETE OR MASONRY SHALL BE PRESERVATIVE TREATED WOOD.
- WORK SHALL CONFORM TO APPLICABLE INDUSTRY AND MANUFACTURERS' PUBLISHED STANDARDS FOR QUALITY OF MATERIALS AND WORKMANSHIP, AS WELL AS REQUIREMENTS IN THESE DRAWINGS AND SPECIFICATIONS. ANY CONFLICTING REQUIREMENTS OF THE SOURCES LISTED ABOVE SHALL BE BROUGHT TO THE ARCHITECT'S ATTENTION PRIOR TO PROCEEDING WITH THE WORK.
- THE CONTRACTOR SHALL PROTECT EXISTING, IN-PLACE AND NEW WORK.
- THE CONTRACTOR SHALL VERIFY DIMENSIONS AND SHALL VERIFY EXISTING CONDITIONS, SHOWN ON THESE DRAWINGS, AT THE SITE. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT IN WRITING OF ANY DISCREPANCIES, OMISSIONS AND OR CONFLICTS BEFORE COMMENCEMENT OF WORK. COMMENCEMENT OF WORK SHALL CONSTITUTE ACCEPTANCE OF ALL NEW OR EXISTING CONDITIONS.
- UNLESS NOTED OTHERWISE ALL GYPSUM WALLBOARD IS TO RECEIVE ONE PRIMER COAT AND TWO COATS OF PAINT.
- NFPA 241, STANDARD FOR SAFEGUARDING CONSTRUCTION, AND ALTERATION OPERATIONS SHALL BE APPLIED TO THIS PROJECT.
- PROVIDE EXPANSION AND CONTROL JOINTS IN ALL WORK AS PER PRODUCT MANUFACTURER'S STANDARDS.
- ALL DISSIMILAR MATERIALS SHALL BE ISOLATED FROM EACH OTHER TO AVOID GALVANIC CORROSION.
- PROVIDE ACCESS PANELS AS REQUIRED BY APPLICABLE CODES AND AS REQUIRED FOR MECHANICAL EQUIPMENT AND PLUMBING WORK. ALL ACCESS PANEL LOCATIONS SHALL BE REVIEWED WITH THE ARCHITECT OR ARCHITECTS REPRESENTATIVE PRIOR TO PROCEEDING.
- PIPE DUCTS AND BUSS DUCTS THAT PENETRATE FLOOR SLABS OR WALL PARTITIONS SHALL BE INSTALLED IN A MANNER THAT WILL PRESERVE THE MOISTURE RESISTANCE, FIRE RATING, AIR AND/OR VAPOR BARRIER, AND STRUCTURAL INTEGRITY OF THE BUILDING.
- INTERIOR PARTITION MOVEMENT CONTROL: (A) VERTICAL CONTROL JOINTS FOR ANY WALL ARE TO OCCUR AT NOT MORE THAN 30'-0" O.C. IN THE HORIZONTAL DIRECTION, UNO. (B) THE TYPICAL MOVEMENT OF THE STRUCTURE DUE TO DEFLECTION AT THE HEAD OF THE WALL CONSTRUCTION RUNNING TO THE UNDERSIDE OF THE STRUCTURE SHALL BE +/- 1/2".
- ALL CONCEALED WOOD FRAMING, AND PLYWOOD SHALL BE FIRE RETARDANT TREATED (FRT) EXCEPT THAT NON-FRT BLOCKING, NAILERS AND FURRING MAY BE USED WHERE INSTALLED IN ACCORD WITH IBC 718 (INCLUDING DIMENSIONAL WOOD BLOCKING, FIRE BLOCKING, REQUIREMENTS, ETC.). WOOD BLOCKING INSTALLED IN ACCORD WITH IBC SECTION 603 FOR HANDRAILS, MILLWORK, CABINETS, WINDOWS AND DOORS IS NOT REQUIRED TO BE FRT. AT COPINGS AND ROOFING TERMINATIONS ALL BLOCKING SHALL BE PRESSURE TREATED (PT).
- VERIFY ALL ROUGH OPENING REQUIREMENTS FOR PLUMBING FIXTURES PRIOR TO FRAMING WALLS.
- UNLESS NOTED OTHERWISE EXTEND ALL METAL STUD FRAMING TO BOTTOM CORD OF STEEL JOISTS ABOVE. CONTINUE SOUND ATTENUATING INSULATION AND GWB EA SIDE FOR SOUND CONTROL BETWEEN ADJACENT SPACES.
- PROVIDE FLASHING AND ENCLOSURES AS REQUIRED AT NEW MECHANICAL AND ELECTRICAL EXTERIOR WALL PENETRATIONS TO MAINTAIN WATER/WEATHER TIGHT SEAL AT WALL NEW PENETRATIONS. MATCH ADJACENT WALL MATERIAL FINISH AND COLOR.
- PROVIDE CONTROL JOINTS (C.J.) IN GYPSUM BOARD WALL CONSTRUCTION AS INDICATED. WHERE NOT SHOWN, PROVIDE MAXIMUM SPACING BETWEEN JOINTS OF 30'-0." VERIFY FINAL CONTROL JOINT LOCATIONS WHETHER OR NOT INDICATED ON THE DRAWINGS WITH ARCHITECT PRIOR TO STARTING WORK.
- INTERIOR STUD SPACING SHALL BE MINIMUM 16" ON CENTER UNLESS NOTED OTHERWISE.
- PROVIDE MOISTURE AND MOLD -RESISTANT GYPSUM BOARD ON WALLS WITH OPERABLE PLUMBING FIXTURES AND WITHIN 4'-0" OF DRINKING FOUNTAINS OR WATER COOLERS.
- PROVIDE FINISHED END PANELS, FILLERS, SUPPORTS, ETC. REQUIRED FOR A COMPLETE CABINETRY INSTALLATION. PROVIDE CUTOUTS, ACCESS PANELS AND REMOVABLE COMPONENTS AS REQUIRED BY NEW OR EXISTING CONDITIONS SUCH AS ELECTRICAL OUTLETS, JUNCTION BOXES, CLEANOUTS, ETC.
- VERIFY MOUNTING HEIGHTS OF ACCESSORIES, EQUIPMENT, DOOR HARDWARE, CASEWORK, ETC., AND PROVIDE SOLID BLOCKING BEHIND ITEMS REQUIRING ANCHORAGE. PROVIDE FIRE-TREATED WOOD BLOCKING OR METAL STRAPS BETWEEN FRAMING MEMBERS AS REQUIRED TO SUPPORT WEIGHT AND USE OF ITEMS TO BE SUPPORTED. WHERE MOUNTING HEIGHTS ARE NOT INDICATED, MOUNT ITEMS IN ACCORDANCE WITH RECOGNIZED INDUSTRY STANDARDS. COORDINATE LOCATIONS WITH MANUFACTURER OR SUPPLIER AND REFER MOUNTING HEIGHT QUESTIONS TO ARCHITECT FOR INTERPRETATION.
- PROVIDE SEALANT BETWEEN HOLLOW METAL FRAME PERIMETERS AND SURROUNDING WALL CONSTRUCTION UNLESS OTHERWISE INDICATED.
- PROVIDE SEALANT BETWEEN INTERIOR AND EXTERIOR WINDOW AND STOREFRONT FRAME PERIMETERS AND SURROUNDING CONSTRUCTION UNLESS OTHERWISE INDICATED.
- PROVIDE SEALANT BETWEEN DISSIMILAR MATERIALS SUCH AS GYPSUM BOARD AND MASONRY, MASONRY AND CONCRETE, COUNTERTOPS AND WALLS, ETC.
- DO NOT BEGIN WORK THAT MAY REQUIRE COORDINATION, SUCH AS CEILING INSTALLATION, PRIOR TO FINAL SUBMITTAL OF MECHANICAL AND ELECTRICAL COORDINATION DRAWINGS TO ARCHITECT NOR PRIOR TO RESOLUTION AND APPROVAL OF COORDINATION ISSUES.
- CONFIRM QUANTITY, TYPE AND PLACEMENT OF ALL FIRE EXTINGUISHERS WITH THE FIRE MARSHAL. COORDINATE FINAL LOCATIONS WITH THE ARCHITECT PRIOR TO PLACEMENT. FIRE EXTINGUISHER BASIS OF DESIGN: LARSEN SURFACE MOUNTED OR APPROVED EQUAL.
- MANUFACTURERS ARE REFERENCED TO ESTABLISH STYLE, SIZE, COLOR AND MATERIAL CHARACTERISTICS.
- "ALIGN" AS USED IN THESE DOCUMENTS SHALL MEAN TO ACCURATELY LOCATE FINISHED FACES IN THE SAME PLANE AND/OR TO INSTALL NEW CONSTRUCTION ADJACENT TO EXISTING CONSTRUCTION WITHOUT ANY VISIBLE JOINTS OR SURFACE IRREGULARITIES.
- "CLEAR" AS USED IN THESE DOCUMENTS SHALL MEAN THAT THE CONDITION IS NOT ADJUSTABLE WITHOUT APPROVAL OF THE ARCHITECT. CLEAR DIMENSIONS ARE TYPICAL.
- "MAXIMUM" OR "MAX" AS USED IN THESE DOCUMENTS SHALL MEAN THAT THE CONDITION IS SLIGHTLY ADJUSTABLE BUT MAY NOT VARY TO A DIMENSION OR QUANTITY GREATER THAN THAT SHOWN WITHOUT APPROVAL OF THE ARCHITECT.
- "MINIMUM" OR "MIN" AS USED IN THESE DOCUMENTS SHALL MEAN THAT THE CONDITION IS SLIGHTLY ADJUSTABLE BUT MAY NOT VARY TO A DIMENSION OR QUANTITY LESS THAN THAT SHOWN WITHOUT APPROVAL OF THE ARCHITECT.
- "TYPICAL" AS USED IN THESE DOCUMENTS SHALL MEAN THAT THE CONDITION OR DIMENSION IS THE SAME OR REPRESENTATIVE FOR SIMILAR CONDITIONS THROUGHOUT.
- "+/-" AS USED IN THESE DOCUMENTS SHALL MEAN THAT THE DIMENSION OR QUALITY IS SLIGHTLY ADJUSTABLE TO ACCOMMODATE ACTUAL CONDITIONS, FIELD VERIFICATION AND COORDINATION WITH OTHER ELEMENTS AS MIGHT BE NECESSARY.
- PATCH AND REPAIR WALLS/FLOORS/ROOFS AT ALL AREAS ADJACENT TO DEMOLITION OR DAMAGED DURING DEMOLITION/CONSTRUCTION. ALL TO MATCH EXISTING ADJACENT SURFACES.
- ALL NEW PENETRATIONS AND/OR OPENINGS SHALL ONLY BE SAW-CUT OR CORED.

**GRAPHIC SYMBOLS**

**BUILDING WALL SECTION SYMBOL**  
 LETTER OR NUMBER INDICATES SECTION  
 SHEET NUMBER WHERE SECTION IS DRAWN

**DETAIL SYMBOL**  
 LETTER OR NUMBER INDICATES SECTION  
 SHEET NUMBER WHERE SECTION IS DRAWN

**INTERIOR ELEVATION SYMBOL**  
 NUMBER INDICATES INTERIOR ELEVATION  
 COMPASS POINT INDICATES WHICH ELEVATIONS ARE DRAWN  
 SHEET NUMBER WHERE EXTERIOR ELEVATION IS DRAWN

**EXTERIOR ELEVATION SYMBOL**  
 NUMBER INDICATES EXTERIOR ELEVATION  
 COMPASS POINT INDICATES WHICH ELEVATIONS ARE DRAWN  
 SHEET NUMBER WHERE EXTERIOR ELEVATION IS DRAWN

**VIEW NAME**  
 TYPICAL VIEW TITLE STRING WITH REF. BUBBLE  
 SCALE: NTS

**VIEW NAME**  
 TYPICAL VIEW TITLE STRING WITHOUT REF. BUBBLE  
 SCALE: NTS

**ROOM NAME**  
 ROOM NAME AND NUMBER

**WALL TYPE IDENTIFICATION**

**WINDOW IDENTIFICATION**

**STOREFRONT IDENTIFICATION**

**REVISION IDENTIFICATION**

**DOOR IDENTIFICATION**

**KEYED NOTE IDENTIFICATION**

**ACCESSORY TAG**

**SIGNAGE TAG**

**CASEWORK TAG**

**CEILING TAG W/ HEIGHT**

**SPOT ELEVATION**

**REVISION CLOUD**

**CONSTRUCTION GRID LINE IDENTIFICATION**

**FLOOR FINISH TRANSITION**

**VERTICAL OR SPOT ELEVATION**

**GRAPHIC SCALE**  
 SCALE: 1/4" = 1'-0"

**NORTH ARROW**



LOCATION OF ADMINISTRATION BUILDING ROOF

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MARK	DATE	DESCRIPTION
1	04/07/22	ISSUED FOR BID

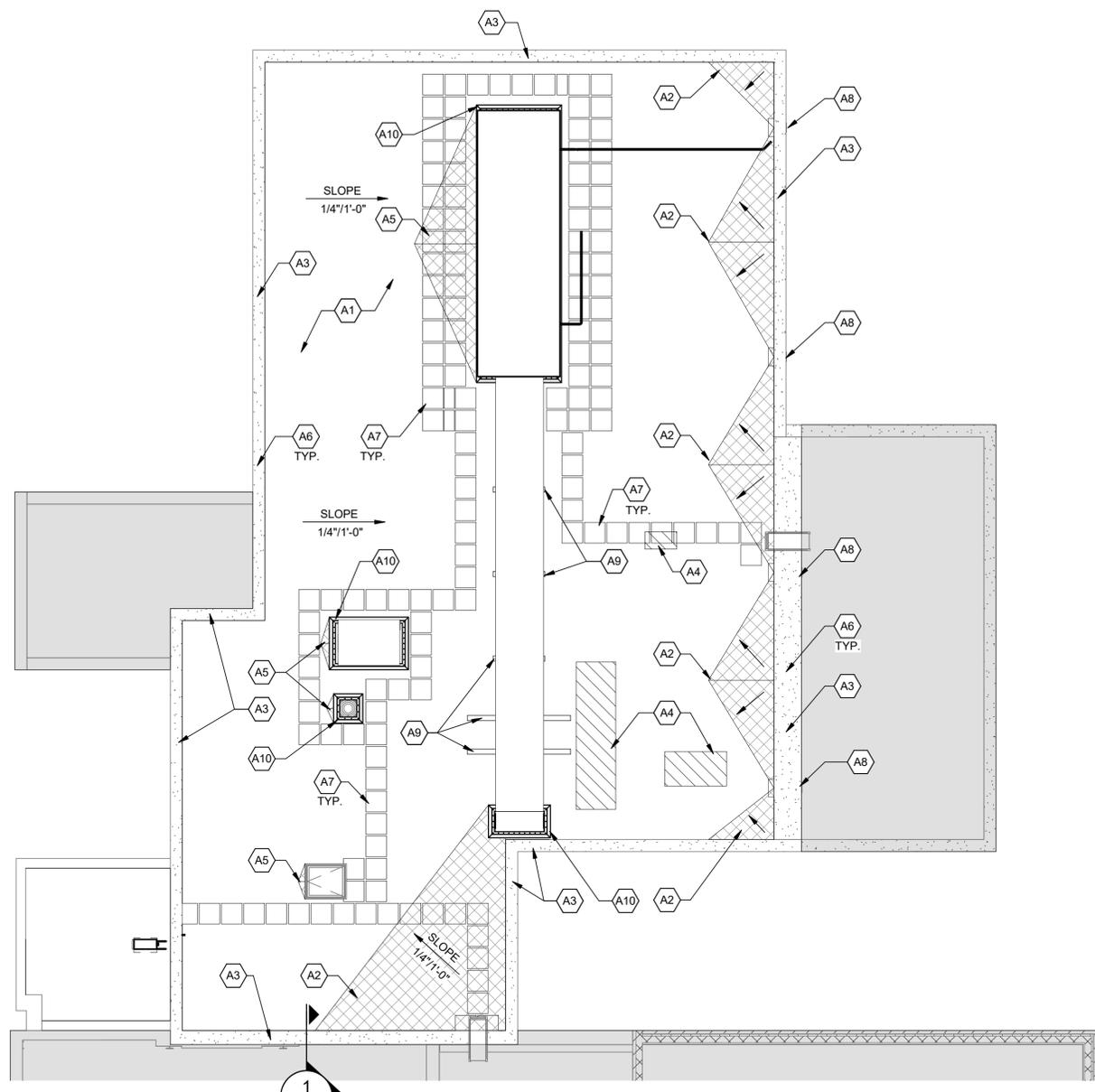
CITY OF ANN ARBOR, MICHIGAN  
 WTP HVAC IMPROVEMENTS - PHASE II  
 ARCHITECTURAL ABBREVIATIONS AND GENERAL NOTES

PROJ:	200-31537-21005
DESN:	SEC
DRWN:	SEC
CHKD:	ADT

**A-001**

1 2 3 4 5 6 7

F  
E  
D  
C  
B  
A



**ROOF PLAN**  
SCALE: 1/8" = 1'-0"

GENERAL NOTES - ROOFING	
A	REPAIR AND REPLACE ROOFING SYSTEM OR STRUCTURE DAMAGED BY IMPROPER STORAGE, CONSTRUCTION ACTIVITIES, OR LACK OF ADEQUATE TEMPORARY PROTECTION. THIS ALSO INCLUDES INTERIOR DAMAGE TO FINISHES, EQUIPMENT, FURNISHINGS, ETC. THIS INCLUDES DAMAGES RESULTING FROM LEAKS.
B	VERIFY SIZE, LOCATION, AND NUMBER OF ROOF PENETRATIONS INCLUDING VENTS, PIPES, CURBS, ROOF DRAINS, CONDUITS, ETC. PRIOR TO FLASHING. SEAL ALL PENETRATIONS WHETHER OR NOT INDICATED ON THE DRAWINGS.
C	PROVIDE TAPERED "CRICKETS" WITH A MIN. 1/4" PER FOOT. AT ALL EQUIPMENT CURBS TO ENSURE ADEQUATE DRAINAGE.
D	THE OWNER HAS THE RIGHT TO RETAIN ANY EXISTING MATERIALS SCHEDULED FOR REMOVAL. CHECK WITH THE OWNER'S REPRESENTATIVE PRIOR TO REMOVING ANY MATERIALS FROM THE SITE.
E	REPAIR AND REFINISH AREAS THAT HAVE BEEN DAMAGED OR DISTURBED TO MATCH ADJACENT SURFACES.

KEYNOTE LEGEND - NEW WORK	
KEY ID	DESCRIPTION
A1	INSTALL 60-MIL NON-REINFORCED BLACK EPDM ROOF MEMBRANE OVERTOP TYPE 2, CLASS 1, GRADE 3 ROOFING INSULATION. INSTALL USING MANUFACTURER RECOMMENDED FASTENERS, BONDING ADHESIVE, SEALER, AND PENETRATION SEALS. INSTALL NEW MEMBRANE UP PARAPET WALLS TO UNDERSIDE OF STONE COPING, AND INSTALL MANUFACTURER RECOMMENDED FLASHING AND TERMINATION BARS.
A2	INSTALL SADDLE/TAPERED ROOFING INSULATION. 1/4"/1'-0" SLOPE IN TAPERED INSULATION, AS INDICATED ON DRAWING.
A3	REPOINT ALL FAILED MORTAR JOINTS WITHIN LIMESTONE CAP SYSTEM, AND INSIDE FACE OF PARAPET WALL. REPOINTING TO INCLUDE JOINTS BETWEEN ADJACENT LIMESTONE CAPS, AS WELL AS JOINTS BETWEEN LIMESTONE CAP AND EXTERIOR FINISH MASONRY. FOR LIMESTONE HEAD AND BED JOINTS, LEAVE MORTAR RECESSED 1/2-INCH AND INSTALL BOND-BREAKER TAPE AND INSTALL SEALANT.
A4	INFILL ROOF DECKING AT INSTANCES WHERE CURBS, EQUIPMENT, OR OTHER PENETRATIONS WERE REMOVED. INFILL PER METAL DECKING DETAIL ON A-501.
A5	INSTALL SADDLE/TAPERED INSULATION AT HIGH SIDE OF ALL EQUIPMENT CURBS, TO ENCOURAGE POSITIVE WATER DRAINAGE. REFER TO DETAIL ON A-501.
A6	POWERWASH/CLEAN EXISTING LIMESTONE CAP.
A7	EPDM ROOF WALKWAY PADS. TYPICAL PADS 24" X 24". MATCH EPDM MEMBRANE COLOR AND INSTALL PER MANUFACTURER AS TO COMPLY WITH ROOF WARRANTY. INSTALL PER WALKWAY PAD LAYOUT ON DRAWINGS TO PROVIDE A CLEAR PATH FROM ACCESS LADDERS, ROOF HATCHES, AND AROUND ALL MAINTAINABLE MECHANICAL EQUIPMENT.
A8	UPON MEMBRANE DEMOLITION, REPOINT MASONRY WALL (OUTSIDE AND INSIDE FACE) ADJACENT TO SCUPPERS. APPROXIMATELY 200 LF OF REPOINTING ANTICIPATED.
A9	INSTALL EQUIPMENT SUPPORT RAIL/CURB(S) SIZED AS REQUIRED PER MECHANICAL DRAWINGS.
A10	INSTALL ROOF CURB. REFER TO MECHANICAL DRAWINGS FOR LOCATION AND TYPE OF EQUIPMENT.

**ROOF LEGEND**

	TAPERED INSULATION FOR CRICKET
	AREA OF NO WORK
	ROOF DECK REPAIR

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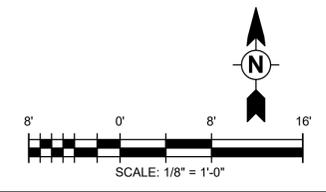


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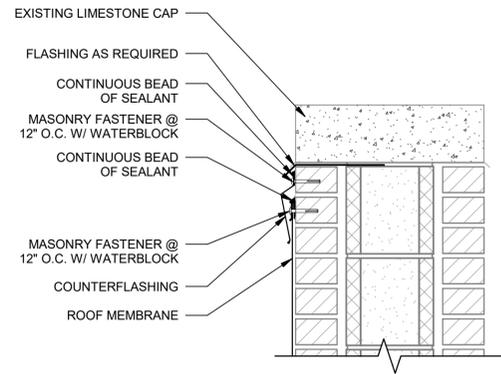
CITY OF ANN ARBOR, MICHIGAN  
WTP HVAC IMPROVEMENTS - PHASE II  
**ROOF PLAN**

PROJ:	200-31537-21005
DESN:	SEC
DRWN:	SEC
CHKD:	ADT

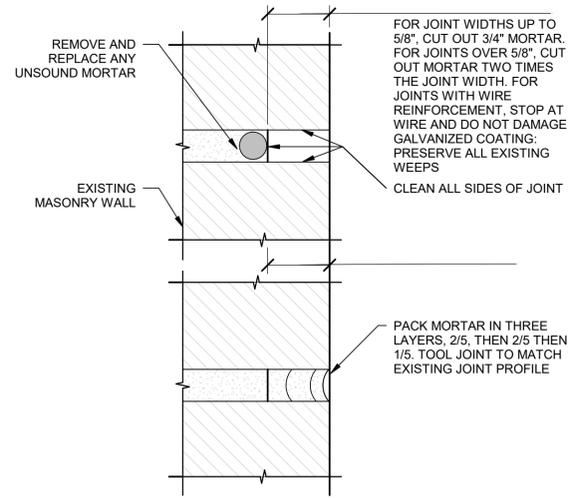
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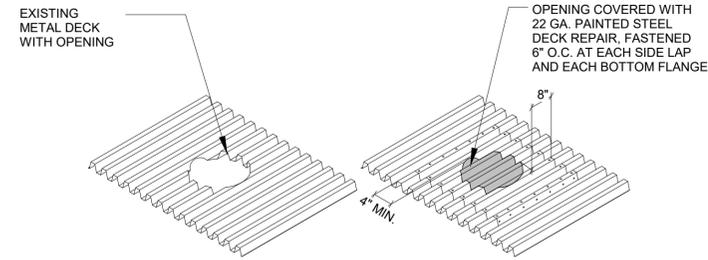
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**1 SECTION AT FLASHING TIE IN**  
A-501 SCALE: 1 1/2" = 1'-0"

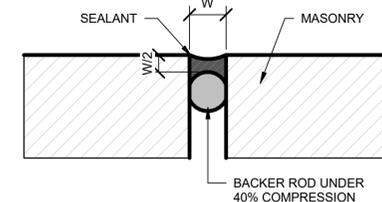


**2 REPOINTING DETAIL**  
A-501 SCALE: NTS



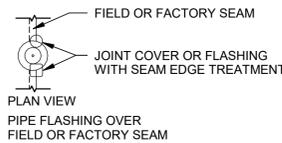
NOTE:  
REMOVE ABANDONED ROOF PENETRATIONS AND ROOF CURBS. CUT AND REMOVE ROOF PENETRATIONS BELOW DECK AND/OR AS NECESSARY TO INSTALL NEW DECK REPAIR. INSTALL METAL DECK REPAIR OVER RESULTANT DECK OPENINGS AND ALL OPENINGS IDENTIFIED ON THE ROOF PLAN.

**3 METAL DECK REPAIR DETAIL**  
A-501 SCALE: NTS

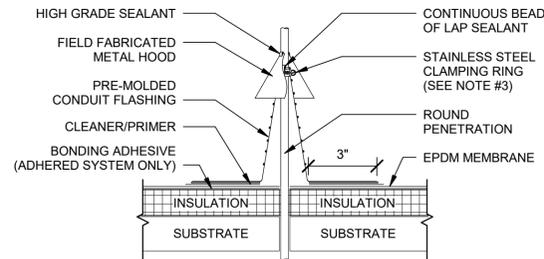


- SEALANT DEPTH = 1/2 WIDTH OF JOINT
- MINIMUM SEALANT DEPTH IS 1/4" (6mm)
- MAXIMUM SEALANT DEPTH IS 1/2" (12.5mm)

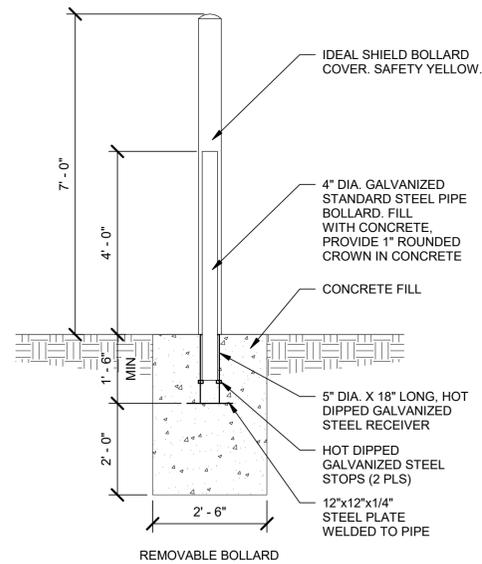
**4 CONTROL JOINT DETAIL**  
A-501 SCALE: NTS



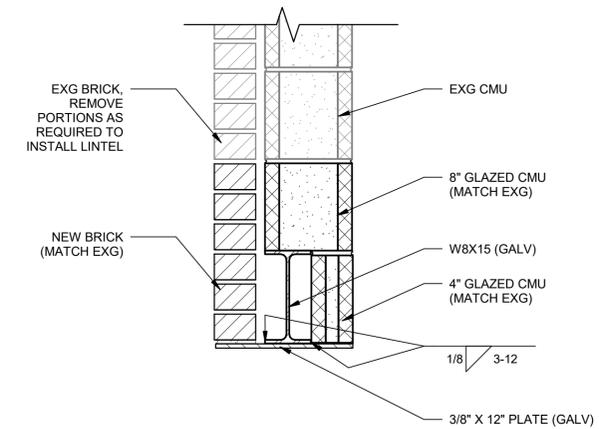
- NOTES:
- REMOVE ALL EXISTING FLASHING, LEAD, ETC. PIPE SURFACE MUST BE FREE OF ALL RUST, GREASE, INSULATION, ETC.
  - PIPE MUST BE ANCHORED TO ENSURE STABILITY.
  - PRE-MOLDED PIPE FLASHING MAY BE CUT TO HEIGHT, BUT NO LOWER THAN REINFORCING RING (NO WRINKLES OR FOLDS UNDER CLAMPING RING).
  - APPLY LAP SEALANT BETWEEN PENETRATION AND PRE-MOLDED PIPE FLASHING PRIOR TO INSTALLATION OF CLAMPING RING.
  - DO NOT USE WHEN SERVICE LINE TEMP. EXCEEDS 180°F.



**5 CONDUIT ROOF PENETRATION**  
A-501 SCALE: NTS



**6 REMOVABLE BOLLARD DETAIL**  
A-501 SCALE: 1/2" = 1'-0"



**7 STEEL LINTEL DETAIL AT NEW LOUVER IN MASONRY WALL**  
A-501 SCALE: 1 1/2" = 1'-0"



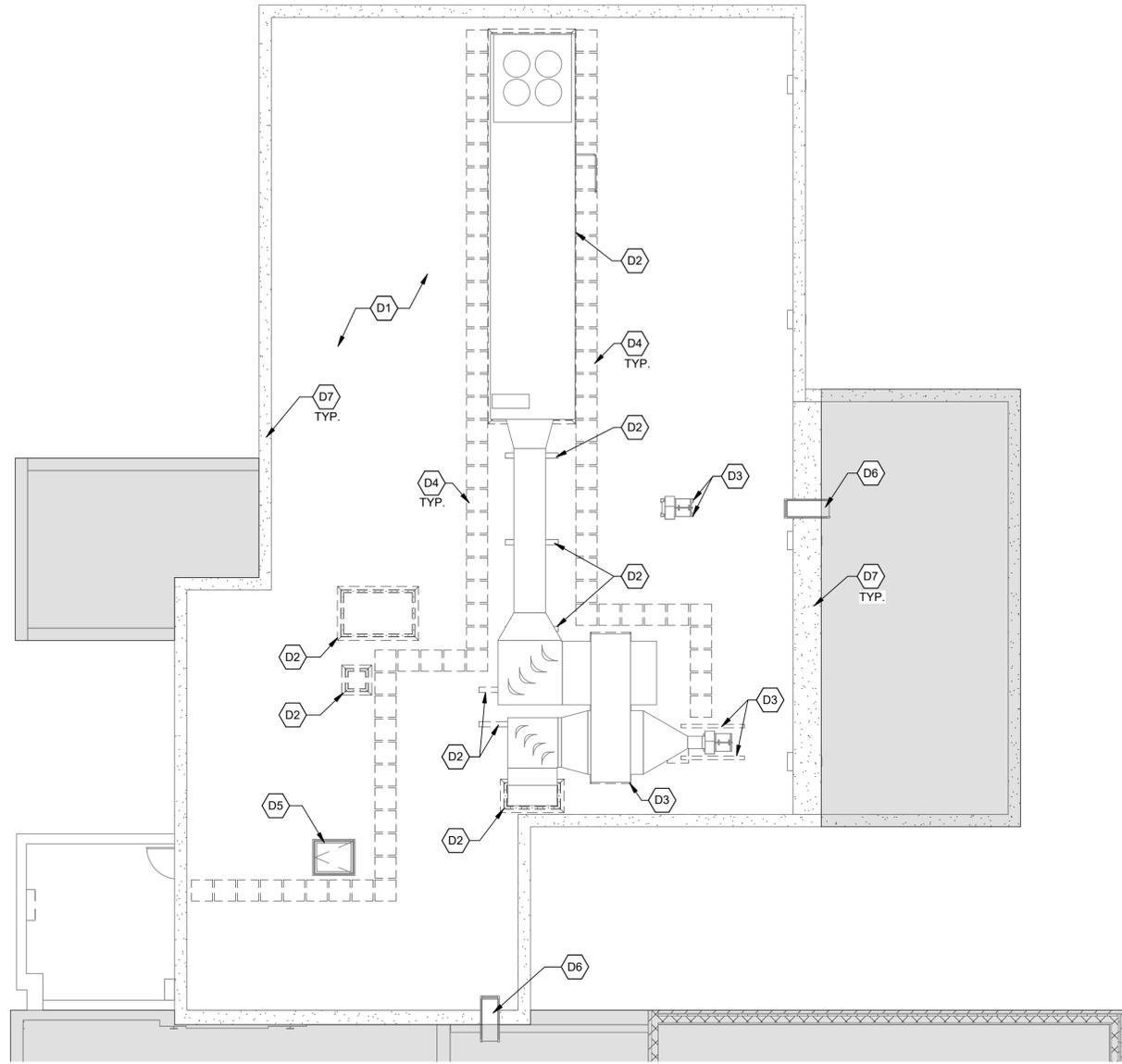
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MARK	DATE	DESCRIPTION
1	04/07/22	ISSUED FOR BID

1 2 3 4 5 6 7

F  
E  
D  
C  
B  
A



**DEMOLITION ROOF PLAN**  
SCALE: 1/8" = 1'-0"

GENERAL NOTES - DEMOLITION	
A	ALL AREAS DESIGNATED BY DASHED LINES ARE TO BE REMOVED.
B	ALL AREAS AND PARTITIONS NOT DASHED OR NOTED TO BE REMOVED SHALL REMAIN INTACT. PATCH AND REPAIR EXISTING ADJACENT SURFACES AS REQUIRED AFTER DEMOLITION TO MATCH EXISTING OR IN ACCORDANCE WITH PROPOSED RENOVATIONS.
C	PROVIDE INTERIOR AND EXTERIOR SHORING, BRACING, OR OTHER SUPPORT TO PREVENT MOVEMENT, SETTLEMENT, OR COLLAPSE OF ELEMENTS TO BE DEMOLISHED AND ADJACENT EXISTING ELEMENTS TO REMAIN.
D	LOCATE AND IDENTIFY EXISTING UTILITIES, INCLUDING SANITARY SEWER SYSTEM, AND ASCERTAIN THEIR CONDITION TO ENSURE ADEQUATE PERFORMANCE OF ALL UTILITIES IN NEW CONSTRUCTION. PROTECT UTILITY LINES AND HARDWARE DURING DEMOLITION AND CONSTRUCTION PHASES.
E	COORDINATE ALL DEMOLITION WITH OWNER AND OTHER TRADES.
F	VERIFY DIMENSIONS AND LOCATIONS. IT IS ANTICIPATED THAT EXISTING CONDITIONS SHALL REQUIRE SLIGHT ADJUSTMENTS.

KEYNOTE LEGEND - DEMOLITION	
D#	DESCRIPTION
D1	REMOVE ROOF MEMBRANE AND ASSOCIATED COMPONENTS INCLUDING BUT NOT LIMITED TO: INSULATION, FASTENERS, AND FLASHING.
D2	REMOVE EQUIPMENT CURB/RAIL IN ITS ENTIRETY, INCLUDING BUT NOT LIMITED TO: ASSOCIATED MEMBRANE, FLASHING, AND INSULATION. PREPARE SURROUNDING AREA TO REPLACE WITH NEW EQUIPMENT CURB.
D3	REMOVE EQUIPMENT CURB/RAIL IN ITS ENTIRETY, INCLUDING BUT NOT LIMITED TO: ASSOCIATED MEMBRANE, FLASHING, AND INSULATION. PREPARE SURROUNDING AREA TO INFILL ROOF DECKING.
D4	REMOVE AND SALVAGE ALL EXISTING CONCRETE WALKWAY PADS AND TURN OVER TO OWNER.
D5	ROOF HATCH TO REMAIN. UPON ROOFING MEMBRANE DEMOLITION, IF HATCH CURB IS OBSERVED TO BE DAMAGED, REMOVE AND REPLACE CURB IN KIND (TO BE PAID FROM THE MISCELLANEOUS ALLOWANCE).
D6	EXISTING STEEL ROOF ACCESS LADDER TO REMAIN.
D7	EXISTING STONE COPING CAPS TO REMAIN.

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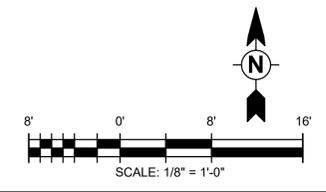


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1	04/07/22	ISSUED FOR BID	ADT

CITY OF ANN ARBOR, MICHIGAN  
WTP HVAC IMPROVEMENTS - PHASE II  
**DEMOLITION ROOF PLAN**

PROJ:	200-31537-21005
DESN:	SEC
DRWN:	SEC
CHKD:	ADT

**AD101**



Bar measures 1 inch, otherwise drawing is not to scale

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### MECHANICAL LEGEND

- DUCT SIZE & SYSTEM ABBREVIATION  
FIRST FIGURE IS DIMENSION SHOWN ON PLAN
- DUCT SECTION, POSITIVE PRESSURE
- DUCT SECTION, NEGATIVE PRESSURE
- NEW DUCTWORK
- FLEXIBLE DUCTWORK
- DUCT TRANSITION
- RECT. TO ROUND TRANSITION
- BRANCH DUCTWORK
- TURNING VANES
- CEILING DIFFUSER - SUPPLY
- CEILING DIFFUSER - RETURN
- CEILING DIFFUSER - EXHAUST
- CEILING DIFFUSER - ROUND
- LOUVER AND SCREEN
- FIRE DAMPER, PROVIDE ACCESS DOOR
- VOLUME DAMPER
- SUPPLY/INTAKE AIRFLOW DIRECTION
- EXHAUST AIRFLOW DIRECTION
- GRILLE OR REGISTER, SIDEWALL
- PIPE CAP
- PIPE CONNECTION, BOTTOM
- PIPE CONNECTION, TOP
- PIPE ELBOW, TURNED UP
- PIPE ELBOW, TURNED DOWN
- PIPE TEE
- ANCHOR, INTERMEDIATE
- BUTTERFLY VALVE
- GATE VALVE
- BALL VALVE
- CHECK VALVE
- STRAINER VALVE
- PRESSURE GAUGE
- THERMOSTAT
- MOTORIZED DAMPER
- DUCT SMOKE DETECTOR

NOTES:  
 1. THIS LEGEND IS FOR REFERENCE ONLY  
 2. ALL SYMBOLS WHICH APPEAR WITHIN THE LEGEND MAY NOT APPLY TO THIS PROJECT.

### MECHANICAL ABBREVIATIONS

- |        |                                |       |                            |
|--------|--------------------------------|-------|----------------------------|
| AD     | ACCESS DOOR                    | SG    | SUPPLY AIR GRILLE          |
| ADJ    | ADJUSTABLE                     | SNK   | EXHAUST EXTRACTION SNORKEL |
| AFF    | ABOVE FINISHED FLOOR           | SPEC  | SPECIFICATION              |
| AFG    | ABOVE FINISHED GRADE           | STD   | STANDARD                   |
| AHU    | AIR HANDLING UNIT              | T     | THERMOMETER                |
| AP     | ACCESS PANEL                   | TA    | TRANSFER AIR               |
| APD    | AIR PRESSURE DROP              | TBD   | TO BE DETERMINED           |
| APPROX | APPROXIMATE                    | TEMP  | TEMPERATURE                |
| BHP    | BREAK HORSEPOWER               | TSP   | TOTAL STATIC PRESSURE      |
| CAP    | CAPACITY                       | TSTAT | THERMOSTAT                 |
| CONC   | CONCRETE                       | TYP   | TYPICAL                    |
| COND   | CONDENSATE                     | UH    | UNIT HEATER                |
| CONN   | CONNECTION                     | VAV   | VARIABLE AIR VOLUME        |
| CONT   | CONTINUATION                   | VFD   | VARIABLE FREQUENCY DRIVE   |
| CP-1   | CONTROL PANEL WITH DESIGNATION | VIF   | VERIFY IN FIELD            |
| CU     | CONDENSING UNIT                | W     | WATT                       |
| DB     | DRY BULB                       | WB    | WET BULB                   |
| DEG    | DEGREES                        | WMS   | WIRE MESH SCREEN           |
| DEMO   | DEMOLITION                     | WS    | WASTE STACK                |
| DIA    | DIAMETER                       | Ø     | DIAMETER                   |
| DN     | DOWN                           |       |                            |
| DWG    | DRAWING                        |       |                            |
| EA     | EXHAUST AIR                    |       |                            |
| EAT    | ENTERING AIR TEMPERATURE       |       |                            |
| EF     | EXHAUST FAN                    |       |                            |
| EG     | EXHAUST AIR GRILLE             |       |                            |
| ENT    | ENTERING                       |       |                            |
| ESP    | EXTERNAL STATIC PRESSURE       |       |                            |
| EXH    | EXHAUST                        |       |                            |
| F      | FAHRENHEIT                     |       |                            |
| FCU    | FAN COIL UNIT                  |       |                            |
| FD     | FIRE DAMPER                    |       |                            |
| FLEX   | FLEXIBLE                       |       |                            |
| FPM    | FEET PER MINUTE                |       |                            |
| GAL    | GALLONS                        |       |                            |
| GH     | GRAVITY HOOD                   |       |                            |
| GM     | GAS METER                      |       |                            |
| GPM    | GALLONS PER MINUTE             |       |                            |
| HP     | HORSEPOWER                     |       |                            |
| ID     | INSIDE DIAMETER/DIMENSION      |       |                            |
| IN     | INCH                           |       |                            |
| L      | LOUVER                         |       |                            |
| LAT    | LEAVING AIR TEMPERATURE        |       |                            |
| LPS    | LOW PRESSURE STEAM             |       |                            |
| LVL    | LEVEL                          |       |                            |
| M      | METER                          |       |                            |
| MAX    | MAXIMUM                        |       |                            |
| MEZZ   | MEZZANINE                      |       |                            |
| MFR    | MANUFACTURER                   |       |                            |
| MIN    | MINIMUM                        |       |                            |
| MISC   | MISCELLANEOUS                  |       |                            |
| N/A    | NOT APPLICABLE                 |       |                            |
| NG     | NATURAL GAS                    |       |                            |
| NTS    | NOT TO SCALE                   |       |                            |
| OA     | OUTDOOR AIR                    |       |                            |
| OD     | OUTSIDE DIAMETER               |       |                            |
| PD     | PRESSURE DROP                  |       |                            |
| PSI    | POUNDS PER SQUARE INCH         |       |                            |
| R      | RADIUS                         |       |                            |
| RA     | RETURN AIR                     |       |                            |
| REFRIG | REFRIGERANT                    |       |                            |
| RG     | RETURN AIR GRILLE              |       |                            |
| RL     | REFRIGERANT LIQUID LINE        |       |                            |
| RPM    | REVOLUTIONS PER MINUTE         |       |                            |
| RS     | REFRIGERANT SUCTION LINE       |       |                            |
| RTU    | ROOF TOP UNIT                  |       |                            |
| SA     | SUPPLY AIR                     |       |                            |
| SB     | SECURITY BARS                  |       |                            |

NOTES:  
 1. THIS ABBREVIATION LIST IS FOR REFERENCE ONLY  
 2. ALL ABBREVIATIONS THAT APPEAR WITHIN THE LIST MAY NOT APPLY TO THIS PROJECT.

### SYMBOLS AND TAGS

- HVAC - # EQUIPMENT TAG
- BOD: 4' - 7" BOTTOM OF DUCT ELEVATION TAG
- LIMIT OF DEMOLITION
- CONNECT TO EXISTING
- KEYNOTE
- SAD - # AIR TERMINAL AND AIRFLOW TAG
- CD - A ### AIR QUANTITY DELIVERED BY DEVICE IN CFM
- AIR TERMINAL MARK AS INDICATED IN SCHEDULE
- AREA OUT OF SCOPE
- AREA OF DEMOLITION

### GENERAL MECHANICAL NOTES

- ALL MECHANICAL WORK SHALL BE IN STRICT COMPLIANCE WITH THE LATEST APPLICABLE EDITION OF THE MICHIGAN MECHANICAL AND PLUMBING CODE AND APPLICABLE PROVISIONS OF THE INTERNATIONAL FUEL GAS CODE (IFGC).
- THESE DRAWINGS ARE SCHEMATIC IN NATURE AND ARE NOT INTENDED TO SHOW ALL POSSIBLE CONDITIONS. IT IS INTENDED THAT A COMPLETE SYSTEM BE PROVIDED WITH ALL NECESSARY EQUIPMENT, APPURTENANCES, AND CONTROLS, COMPLETELY COORDINATED WITH ALL DISCIPLINES. ALL PARAMETERS GIVEN IN THESE DOCUMENTS SHALL BE STRICTLY CONFORMED WITH. ANY ITEMS AND LABOR REQUIRED FOR A COMPLETE SYSTEM IN ACCORDANCE WITH ALL APPLICABLE CODES, STANDARDS, AND THESE CONTRACT DOCUMENTS SHALL BE FURNISHED WITHOUT OCCURRING ANY ADDITIONAL COST TO THE OWNER. CAREFULLY REVIEW ALL CONTRACT DOCUMENTS AND THE DESIGN OF OTHER TRADES BEFORE PREPARING SHOP DRAWINGS.
- BOTTOM OF DUCTWORK SHALL BE MOUNTED BETWEEN 12-24 INCHES OF CEILINGS EXCEPT TO AVOID INTERFERENCES WITH OTHER CONSTRUCTION.
- COORDINATE EQUIPMENT AND PIPING WITH ALL OTHER DISCIPLINES AND TRADES. MAKE ALL OFFSETS AND TRANSITIONS TO COORDINATE WITH OTHER TRADES WITHOUT ANY ADDITIONAL EXPENSE TO THE OWNER.
- COORDINATE THE EXACT LOCATION AND SIZE OF ALL ROOF, WALL, AND SLAB PENETRATIONS WITH THE ARCHITECTURAL DRAWINGS AND EXISTING CONDITIONS IN FIELD. ALL PENETRATION OPENINGS ARE TO BE SEALED WITH FLASHING OR TRIM PLATE MOUNTED FLUSH TO MASONRY WALL TO SEAL OPENING.
- MAINTAIN PIPING A MINIMUM OF 7'-0" A.F.F. IN ALL MECHANICAL ROOMS. ALL PIPING SHALL BE LOCATED AS HIGH AS POSSIBLE.
- MOUNT THERMOSTATS WHERE INDICATED ON PLANS, 4'-0" A.F.F. UNLESS NOTED OTHERWISE.
- COORDINATE WITH ELECTRICAL CONTRACTOR TO VERIFY CONTROL VOLTAGES WITH EQUIPMENT AND PROVIDE ACCORDINGLY.

### DUCTWORK NOTES

- ALL DUCTWORK IS SHOWN AS FREE AREA INSIDE DIMENSIONS.
- USE 45 DEG. TAPS FOR ROUND TO ROUND TAKE OFF'S PROVIDE VOLUME DAMPER AT EACH TAKE OFF.
- DO NOT CONSTRUCT OR INSTALL TAPS OUT OF REDUCERS, TEES AND OR ELBOWS.
- ALLOW FOR FIELD MEASURED OFFSETS OR TRANSITIONS. ELBOWS ETC.
- SUPPORT ALL FLEXIBLE DUCTWORK AS SHOWN IN SMACNA FIGURE 3-10, 2005, BUT NOT GREATER THAN 4'0" CENTERS. TOTAL LENGTH OF FLEX DUCT SHALL BE 5'-0" OR LESS. FLEX DUCT SHALL NOT BE USED IN EXPOSED AREAS AND SHALL NOT BE USED FOR ELBOWS.
- GRILLES, REGISTERS, AND DIFFUSERS CONNECTED BY FLEXIBLE DUCT SHALL BE SUPPORTED INDEPENDENTLY OF THE FLEXIBLE DUCT.
- RECTANGULAR ELBOWS SHALL BE RADIUS FITTINGS WITH CENTERLINE RADIUS EQUAL TO 1.5 TIMES THE DUCT WIDTH WHERE SPACE PERMITS. OTHERWISE, RECTANGULAR DUCTS SHALL BE 90 DEG. ELBOWS WITH DOUBLE THICKNESS TURNING VANES. NO OTHERS WILL BE ALLOWED.
- COORDINATE FINAL LOCATION OF ALL REGISTERS, GRILLES, DIFFUSERS, ETC. WITH ARCHITECTURAL DRAWINGS AND LIGHTING PLANS.

### NATURAL GAS NOTES

- ALL NEW EXPOSED GAS PIPING SHALL BE PRIMED AND PAINTED. ALL NEW GAS PIPING WITHIN FINISHED SPACES SHALL BE PAINTED SAFETY YELLOW AND LABELED IN ACCORDANCE WITH APPLICABLE SPECIFICATIONS AND CODES. ALL EXISTING UNPAINTED GAS PIPING IS TO REMAIN UNPAINTED.
- ALL GAS PIPING SHALL BE LABELED AT BEGINNING, ALL ENDS, AND AT 6' INTERVALS DESIGNATING GAS & PRESSURE. LABELS SHALL BE PER SPECIFICATIONS.
- PROVIDE/INSTALL THROUGH WALL PIPE PENETRATIONS AS REQUIRED WHERE PIPE ENTERS BUILDING. SLEEVE AND SEAL.



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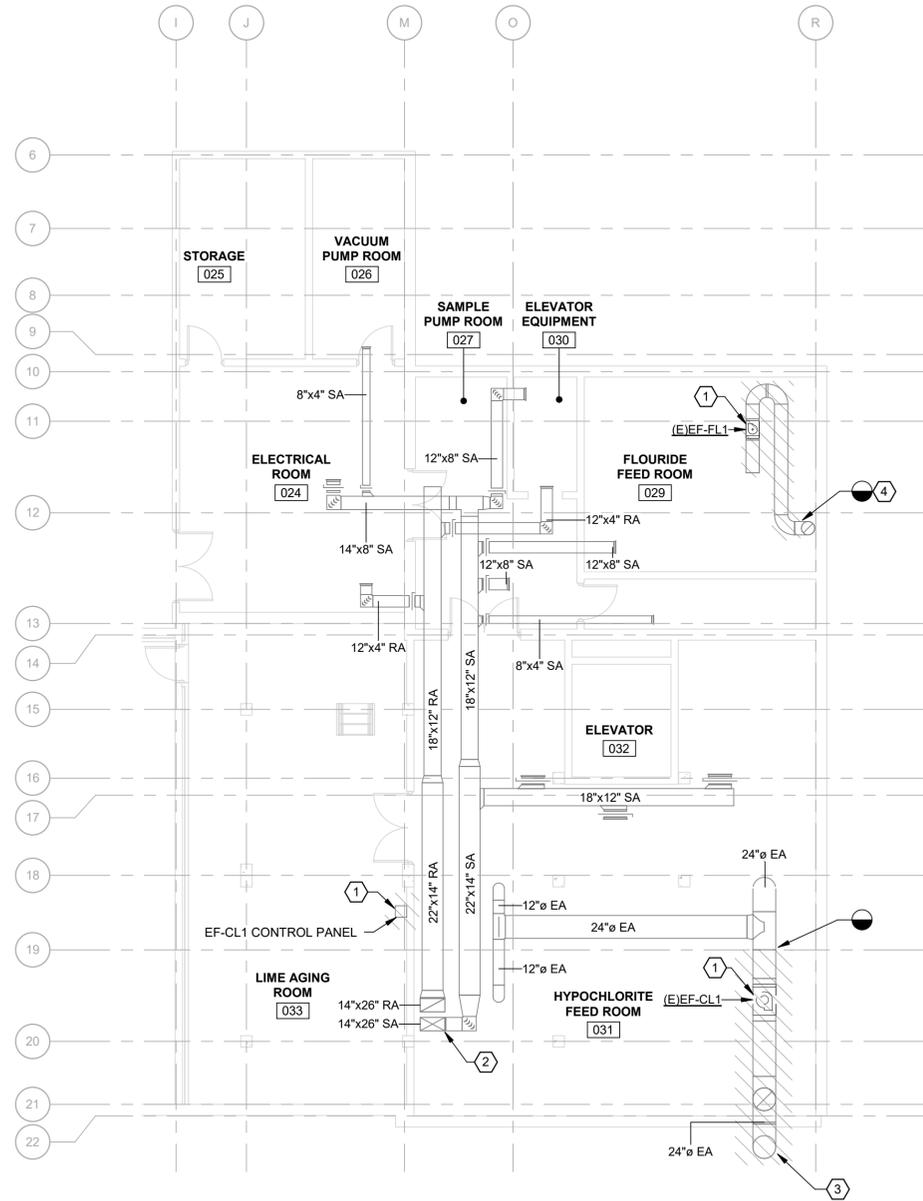
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CITY OF ANN ARBOR, MICHIGAN  
 WTP HVAC IMPROVEMENTS - PHASE II  
 HVAC ABBREVIATIONS, LEGENDS, AND NOTES

PROJ: 200-31537-21005  
 DESN: JRJ  
 DRWN: JRJ  
 CHKD: KK

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**MECHANICAL DEMOLITION - CHEMICAL FEED BUILDING - BASEMENT LEVEL**

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

**GENERAL NOTES**

- A. SIZE, QUANTITY, AND LOCATION OF DUCTWORK AND PIPING SHOWN IS APPROXIMATE. ANY SIZES INDICATED ARE TO AID CONTRACTOR IN ESTABLISHING DEMOLITION SCOPE ONLY. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING PIPING LOCATIONS AND SIZES PRIOR TO DEMOLITION. MEANS AND METHODS SHALL BE LEFT UP TO THE CONTRACTOR AT CONTRACTOR'S DISCRETION.
- B. CONTRACTOR SHALL ASSUME THERE ARE NO EXISTING ISOLATION VALVES OR THAT EXISTING ISOLATION VALVES ARE NON-FUNCTIONAL WHEN CONNECTING NEW PIPING INTO EXISTING. CONTRACTOR SHALL INCLUDE COST TO FREEZE OR HOT TAP PIPING, CUT AND PROVIDE ISOLATION VALVES SUCH THAT NEW WORK AND FUTURE MAINTENANCE CAN BE PERFORMED.
- C. CONTRACTOR SHALL COORDINATE ALL DISRUPTIVE OR "NOISY" WORK WITH OWNER AND OBTAIN OWNERS PERMISSION PRIOR TO PERFORMING DISRUPTIVE WORK. PERFORM WORK DURING OFF-HOURS IF NECESSARY. NOISY WORK MAY BE CONSIDERED, SAW CUTTING, CONCRETE DRILLING, GRINDER CUTTING, ETC. IF CONTRACTOR IS UNSURE WHAT WORK CONSTITUTES "NOISY" WORK, SUBMIT RFI TO OWNER FOR CLARIFICATION.
- D. WHEN BRANCH DUCTWORK IS REMOVED, PATCH ALL DUCT OPENINGS. PATCHES SHALL BE CONSTRUCTED OF SAME GAUGE SHEET METAL AS REMAINING DUCTWORK, SCREWED TO DUCTWORK AND SEALED WITH MASTIC.
- E. CONTRACTOR SHALL FIELD VERIFY THAT ALL EXISTING DIFFUSER BRANCH DUCTS TO REMAIN ARE EQUIPPED WITH VOLUME DAMPERS. IF OMITTED, CONTRACTOR SHALL PROVIDE AND INSTALL NEW VOLUME DAMPERS FOR PROPER SYSTEM BALANCING. PROVIDE BASE UNIT PRICING OFF LARGEST RUN OUT FOR VOLUME DAMPER INSTALL.
- F. CONTRACTOR IS TO REMOVE AND RE-INSTALL EXISTING ACOUSTIC CEILING TILES AS NEEEDED TO PERFORM MECHANICAL NEW WORK AT THEIR DISCRETION IN COORDINATION WITH CEILING PLAN. EXISTING CEILING TILES ARE TO BE SAFELY AND SECURELY STORED TO PREVENT DAMAGE DURING NEW CONSTRUCTION. ANY DAMAGED OR UNUSABLE CEILING TILES ARE TO BE REPLACED IN KIND.

**KEYNOTES**

- 1 DEMOLISH INLINE EXHAUST FAN AND ALL ASSOCIATED ACCESSORIES, AND SUPPORTS. COORDINATE WITH ELECTRICAL FOR EXTENT OF DEMOLITION OF CONTROLS AND WIRING. DEMOLISH EXHAUST DUCT PENETRATION THROUGH EXTERIOR WALL IS TO REMAIN.
- 2 SUPPLY AND RETURN DUCT RISERS IN DUCT CHASE DOWN FROM MEZZANINE ARE TO REMAIN.
- 3 DEMOLISH EXHAUST DUCT RISER FROM HYPOCHLORITE FEED ROOM TO EXTERIOR OF BUILDING. WALL PENETRATION IS TO REMAIN.
- 4 EXHAUST DUCT RISER FROM FLUORIDE FEED ROOM TO EXTERIOR OF BUILDING IS TO REMAIN.

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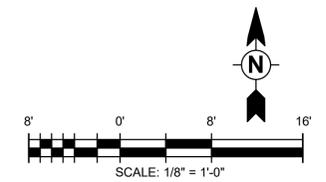


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CITY OF ANN ARBOR, MICHIGAN  
WTP HVAC IMPROVEMENTS - PHASE II  
**MECHANICAL DEMOLITION  
- CHEMICAL FEED  
BUILDING BASEMENT**

PROJ:	200-31537-21005
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DRWN:	JRJ
CHKD:	KK

**M-101**



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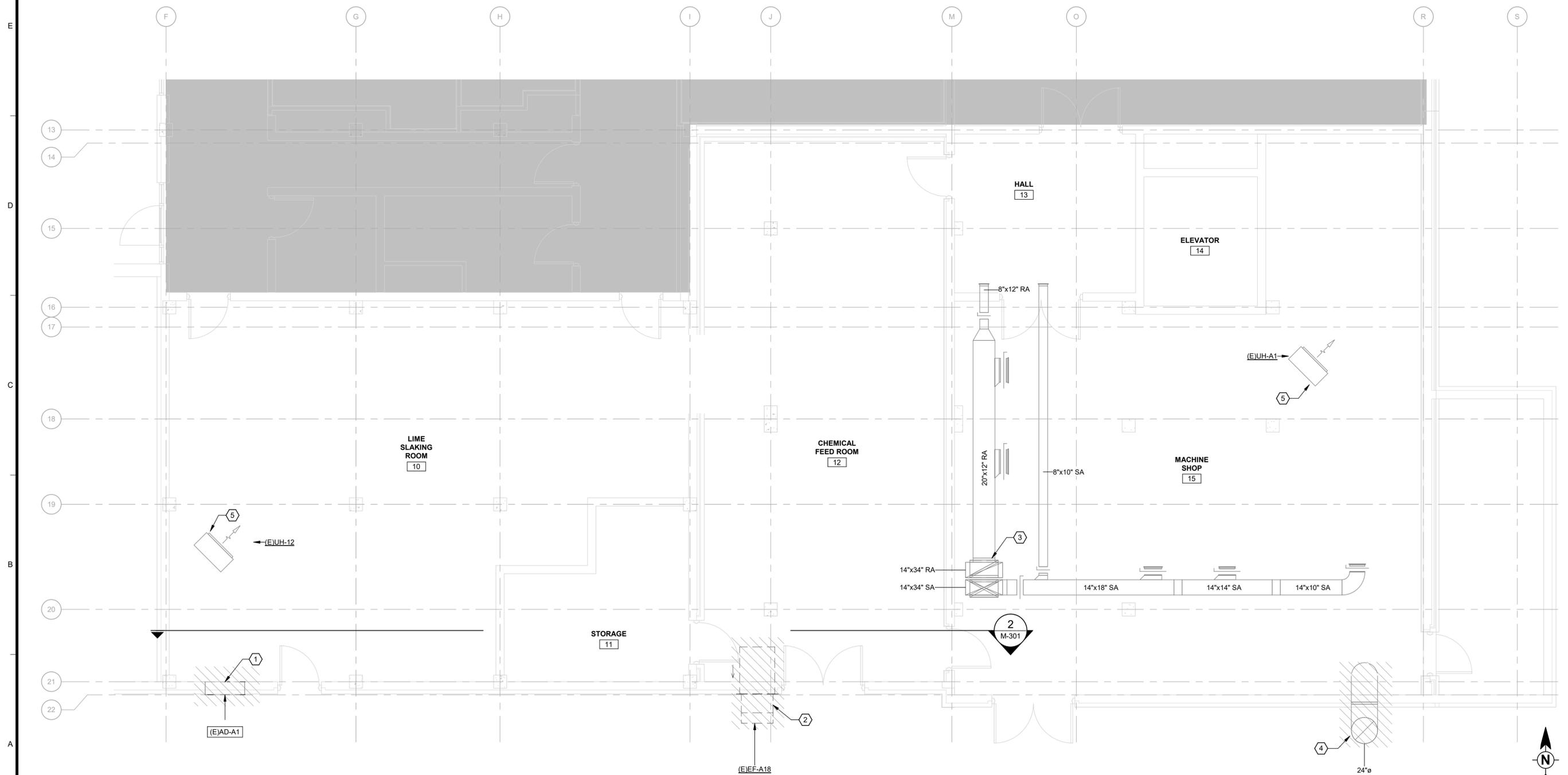
**GENERAL NOTES**

- A. SIZE, QUANTITY, AND LOCATION OF DUCTWORK AND PIPING SHOWN IS APPROXIMATE. ANY SIZES INDICATED ARE TO AID CONTRACTOR IN ESTABLISHING DEMOLITION SCOPE ONLY. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING PIPING LOCATIONS AND SIZES PRIOR TO DEMOLITION. MEANS AND METHODS SHALL BE LEFT UP TO THE CONTRACTOR AT CONTRACTOR'S DISCRETION.
- B. CONTRACTOR SHALL ASSUME THERE ARE NO EXISTING ISOLATION VALVES OR THAT EXISTING ISOLATION VALVES ARE NON-FUNCTIONAL WHEN CONNECTING NEW PIPING INTO EXISTING. CONTRACTOR SHALL INCLUDE COST TO FREEZE OR HOT TAP PIPING, CUT AND PROVIDE ISOLATION VALVES SUCH THAT NEW WORK AND FUTURE MAINTENANCE CAN BE PERFORMED.
- C. CONTRACTOR SHALL COORDINATE ALL DISRUPTIVE OR "NOISY" WORK WITH OWNER AND OBTAIN OWNERS PERMISSION PRIOR TO PERFORMING DISRUPTIVE WORK. PERFORM WORK DURING OFF-HOURS IF NECESSARY. NOISY WORK MAY BE CONSIDERED, SAW CUTTING, CONCRETE DRILLING, GRINDER CUTTING, ETC. IF CONTRACTOR IS UNSURE WHAT WORK CONSTITUTES "NOISY" WORK, SUBMIT RFI TO OWNER FOR CLARIFICATION.
- D. WHEN BRANCH DUCTWORK IS REMOVED, PATCH ALL DUCT OPENINGS. PATCHES SHALL BE CONSTRUCTED OF SAME GAUGE SHEET METAL AS REMAINING DUCTWORK. SCREWED TO DUCTWORK AND SEALED WITH MASTIC.
- E. CONTRACTOR SHALL FIELD VERIFY THAT ALL EXISTING DIFFUSER BRANCH DUCTS TO REMAIN ARE EQUIPPED WITH VOLUME DAMPERS. IF OMITTED, CONTRACTOR SHALL PROVIDE AND INSTALL NEW VOLUME DAMPERS FOR PROPER SYSTEM BALANCING. PROVIDE BASE UNIT PRICING OFF LARGEST RUN OUT FOR VOLUME DAMPER INSTALL.
- F. CONTRACTOR IS TO REMOVE AND RE-INSTALL EXISTING ACOUSTIC CEILING TILES AS NEEDED TO PERFORM MECHANICAL NEW WORK AT THEIR DISCRETION IN COORDINATION WITH CEILING PLAN. EXISTING CEILING TILES ARE TO BE SAFELY AND SECURELY STORED TO PREVENT DAMAGE DURING NEW CONSTRUCTION. ANY DAMAGED OR UNUSABLE CEILING TILES ARE TO BE REPLACED IN KIND.

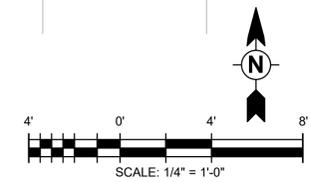
**# KEYNOTES**

- 1 DEMOLISH WALL-MOUNTED 36" X 24" INTAKE LOUVER AND ALL ASSOCIATED ACCESSORIES, AND SUPPORTS. COORDINATE WITH ELECTRICAL FOR EXTENT OF DEMOLITION OF CONTROLS AND WIRING. WALL PENETRATION IS TO REMAIN. SAW CUT WALL PENETRATION TO ACCOMMODATE NEW LOUVER AS NEEDED. REFER TO ARCHITECTURAL DETAILS.
- 2 DEMOLISH WALL-MOUNTED 36" X 36" PROPELLOR EXHAUST FAN AND ALL ASSOCIATED ACCESSORIES, AND SUPPORTS. COORDINATE WITH ELECTRICAL FOR EXTENT OF DEMOLITION OF CONTROLS AND WIRING. WALL PENETRATION IS TO REMAIN. SAW CUT WALL PENETRATION TO ACCOMMODATE NEW FAN AS NEEDED. REFER TO ARCHITECTURAL DETAILS.
- 3 SUPPLY AND RETURN DUCT RISERS IN DUCT CHASE DOWN FROM MEZZANINE ARE TO REMAIN.
- 4 DEMOLISH EXHAUST DUCT RISER FROM HYPOCHLORITE FEED ROOM TO EXTERIOR OF BUILDING. WALL PENETRATION IS TO REMAIN.
- 5 HYDRONIC UNIT HEATERS AND ALL ASSOCIATED HYDRONIC PIPING, ACCESSORIES, SUPPORTS, CONTROLS AND WIRING ARE TO REMAIN.

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**MECHANICAL DEMOLITION - CHEMICAL FEED BUILDING - GROUND FLOOR**  
SCALE: 1/4" = 1'-0"



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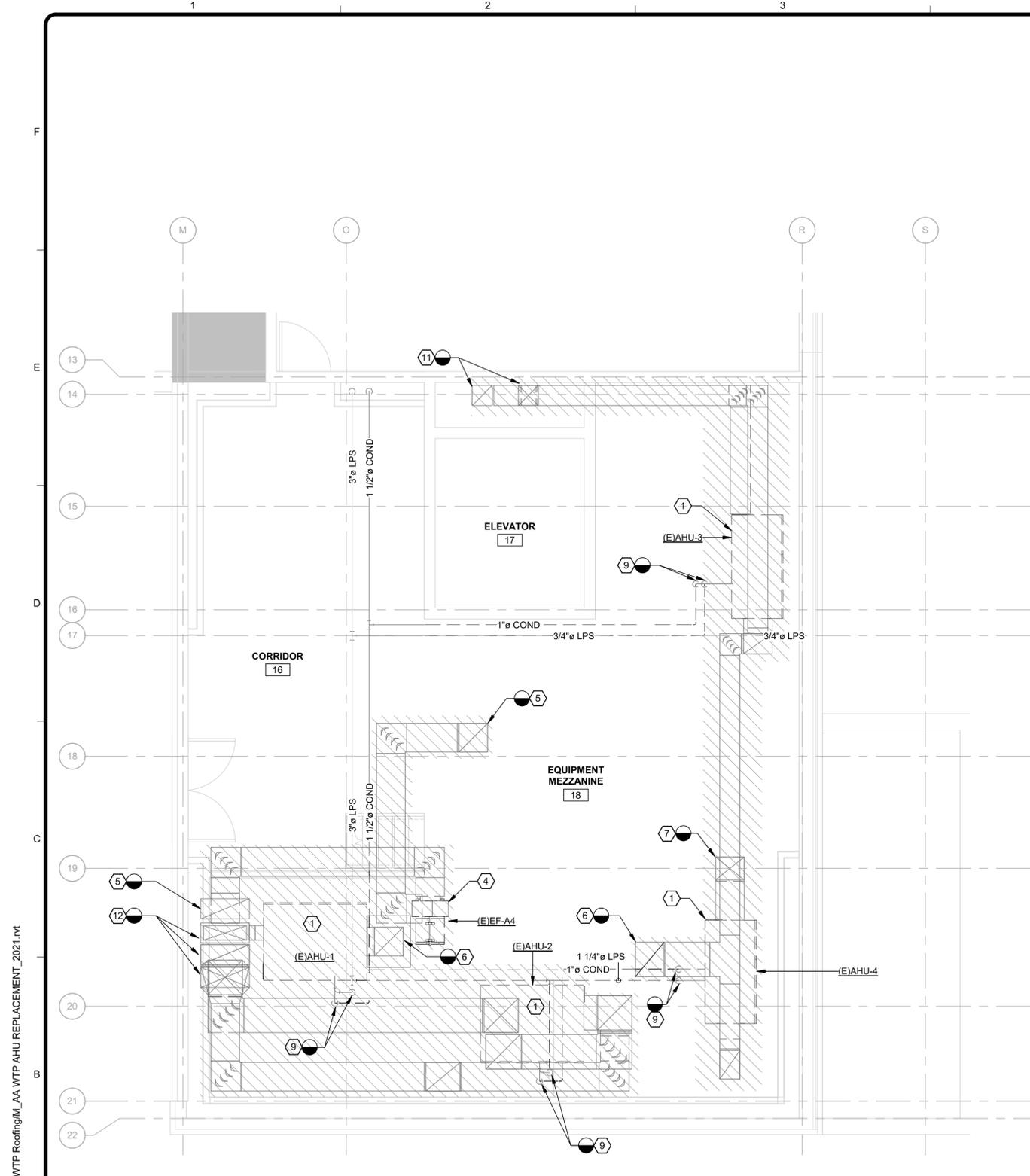
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**MECHANICAL DEMOLITION - CHEMICAL FEED BUILDING GROUND FLOOR**

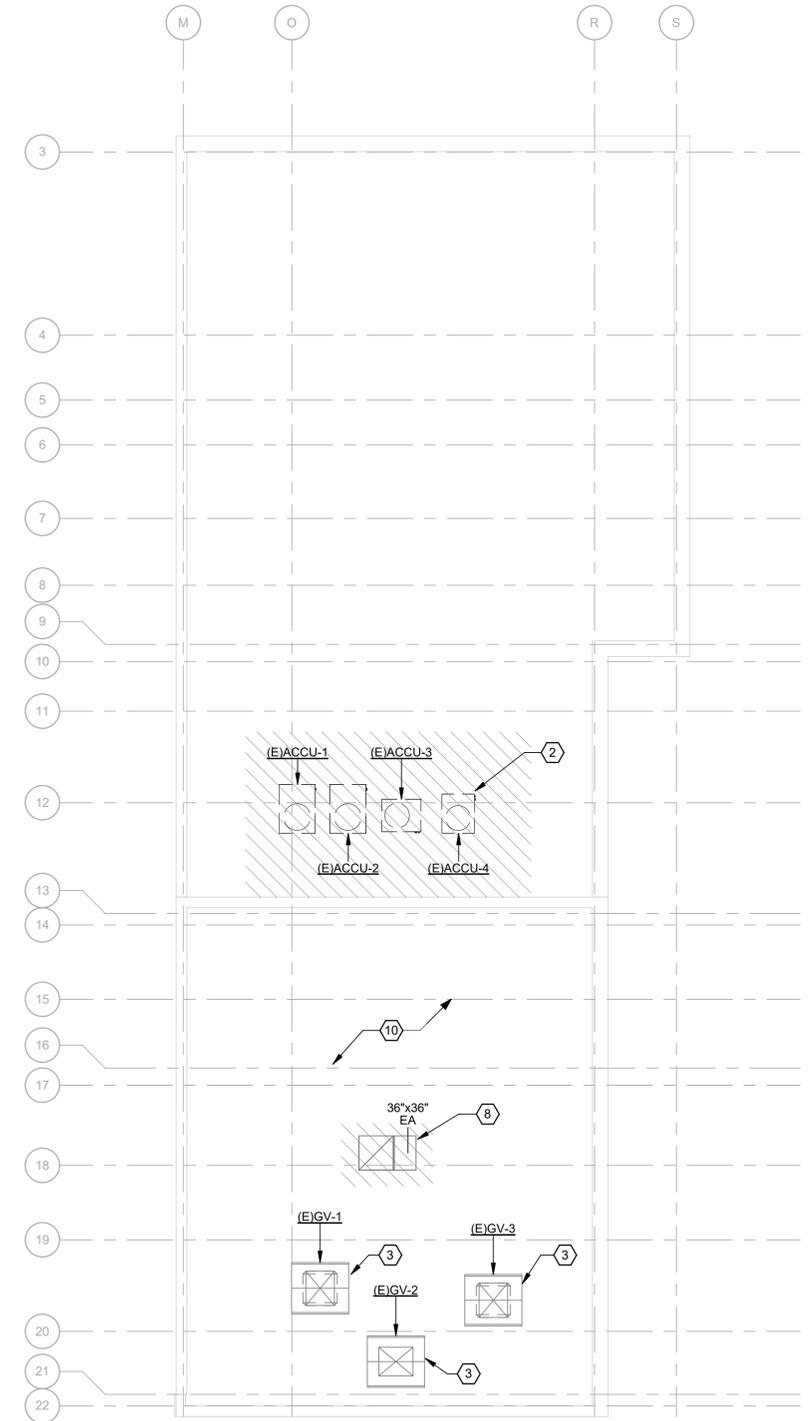
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CHKD:	KK

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**MECHANICAL DEMOLITION - CHEMICAL FEED BUILDING - FOURTH FLOOR / MEZZANINE**  
 SCALE: 1/4" = 1'-0"



**MECHANICAL DEMOLITION - CHEMICAL FEED BUILDING - ROOF**  
 SCALE: 1/8" = 1'-0"

**GENERAL NOTES**

- A. ALL ANCHORING EQUIPMENT ON EXTERIOR OF BUILDING IS TO BE OF STAINLESS STEEL CONSTRUCTION. .
- B. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR ROLL EQUIPMENT OR MATERIALS OVER ROOF.
- C. SIZE, QUANTITY, AND LOCATION OF PIPING SHOWN IS APPROXIMATE. ANY SIZES INDICATED ARE TO AID CONTRACTOR IN ESTABLISHING DEMOLITION SCOPE ONLY. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING PIPING LOCATIONS AND SIZES PRIOR TO DEMOLITION. MEANS AND METHODS SHALL BE LEFT UP TO THE CONTRACTOR AT CONTRACTOR'S DISCRETION.
- D. CONTRACTOR SHALL ASSUME THERE ARE NO EXISTING ISOLATION VALVES OR THAT EXISTING ISOLATION VALVES ARE NON-FUNCTIONAL WHEN CONNECTING NEW PIPING INTO EXISTING. CONTRACTOR SHALL INCLUDE COST TO FREEZE OR HOT TAP PIPING, CUT AND PROVIDE ISOLATION VALVES SUCH THAT NEW WORK AND FUTURE MAINTENANCE CAN BE PERFORMED.
- E. CONTRACTOR SHALL COORDINATE ALL DISRUPTIVE OR "NOISY" WORK WITH OWNER AND OBTAIN OWNERS PERMISSION PRIOR TO PERFORMING DISRUPTIVE WORK. PERFORM WORK DURING OFF-HOURS IF NECESSARY. NOISY WORK MAY BE CONSIDERED, SAW CUTTING, CONCRETE DRILLING, GRINDER CUTTING, ETC. IF CONTRACTOR IS UNSURE WHAT WORK CONSTITUTES "NOISY" WORK, SUBMIT RFI TO OWNER FOR CLARIFICATION.

**KEYNOTES**

- 1 DEMOLISH INTERIOR, FLOOR MOUNTED, AIR HANDLING UNITS AND ALL ASSOCIATED ACCESSORIES, AND SUPPORTS. COORDINATE WITH ELECTRICAL FOR EXTENT OF DEMOLITION OF CONTROLS AND WIRING. DEMOLISH STEAM SUPPLY AND CONDENSATE PIPING, INCLUDING ANY ASSOCIATED PIPING ACCESSORIES, FITTINGS, SUPPORTS, ETC. BACK TO BRANCH ISOLATION VALVE. CONTRACTOR IS TO RE-USE AS MUCH OF EXISTING STEAM AND CONDENSATE PIPING AS REASONABLE.
- 2 DEMOLISH ROOF MOUNTED AIR COOLED CONDENSING UNITS SERVING AIR HANDLING UNITS ON THE MEZZANINE. DEMOLISH ALL ASSOCIATED ACCESSORIES, PIPING, AND SUPPORTS. COORDINATE WITH ELECTRICAL FOR EXTENT OF DEMOLITION OF CONTROLS AND WIRING.
- 3 ROOF MOUNTED INTAKE HOODS SERVING AIR HANDLING UNITS 1, 2, 3, AND 4 ARE TO REMAIN.
- 4 DEMOLISH EXHAUST FAN EF-A4 AND ALL ASSOCIATED ACCESSORIES, AND SUPPORTS. COORDINATE WITH ELECTRICAL FOR EXTENT OF DEMOLITION OF CONTROLS AND WIRING. DEMOLISH EXHAUST DUCTWORK ON INTAKE AND DISCHARGE SIDES OF FAN TO FACILITATE REMOVAL OF EQUIPMENT, EXHAUST DUCTWORK SYSTEM IS TO REMAIN.
- 5 DEMOLISH EXHAUST DUCTWORK SERVING EF-A4 BACK TO VERTICAL DUCT CHASE. DUCTWORK WITHIN CHASE AND BELOW IS TO REMAIN. DEMOLISH EXHAUST DUCTWORK UP THROUGH ROOF, ROOF PENETRATION IS TO REMAIN.
- 6 DEMOLISH OUTSIDE AIR DUCTWORK UP TO GRAVITY INTAKE HOOD ON ROOF. EXISTING 36" X 36" DUCTWORK DOWN FROM INTAKE HOOD TO BELOW ROOF IS TO REMAIN.
- 7 DEMOLISH SUPPLY AIR DUCTWORK FROM AHU-4 DOWN TO DUCT FLOOR PENETRATION BETWEEN MEZZANINE AND FOURTH FLOOR. SUPPLY AIR DUCTWORK BELOW MEZZANINE IS TO REMAIN.
- 8 DEMOLISH ROOF MOUNTED EXHAUST DUCT OUTLET AND ALL ASSOCIATED SUPPORTS. ROOF PENETRATION IS TO REMAIN.
- 9 DEMOLISH STEAM SUPPLY AND CONDENSATE RETURN PIPING ASSEMBLIES DOWN TO PIPE PENETRATION THROUGH MEZZANINE FLOOR. STEAM SUPPLY AND CONDENSATE RETURN PIPE BRANCHES ARE TO REMAIN.
- 10 CONTRACTOR IS TO ADHERE TO PLANT SAFETY PROCEDURES FOR THE MONITORING AND MITIGATION OF RADIO FREQUENCY EXPOSURE FROM EXISTING ANTENNAS ON CHEMICAL FEED BUILDING HIGH ROOF. CONTRACTOR IS TO COORDINATE WITH PLANT PERSONNEL PRIOR TO ANY WORK BEING PERFORMED IN THIS AREA.
- 11 DEMOLISH SUPPLY AND RETURN DUCTWORK SERVING AHU-3 BACK TO DUCT CHASE SERVING LUNCH ROOM, FILTER PRESS CONTROL ROOM, AND RECORDS ROOM. DUCTWORK WITHIN CHASE AND BELOW IS TO REMAIN.
- 12 DEMOLISH SUPPLY AND RETURN DUCTWORK FROM AHU-1 AND AHU-2 BACK TO VERTICAL DUCT CHASE. DUCTWORK WITHIN CHASE AND BELOW IS TO REMAIN.



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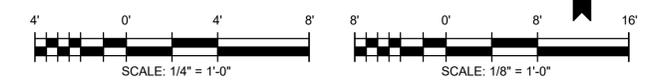
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CITY OF ANN ARBOR, MICHIGAN  
 WTP HVAC IMPROVEMENTS - PHASE II  
**MECHANICAL DEMOLITION - CHEMICAL FEED BUILDING - FOURTH FLOOR & ROOF**

PROJ:	200-31537-21005
DESIGN:	JRJ
DRWN:	JRJ
CHKD:	KK

**M-103**

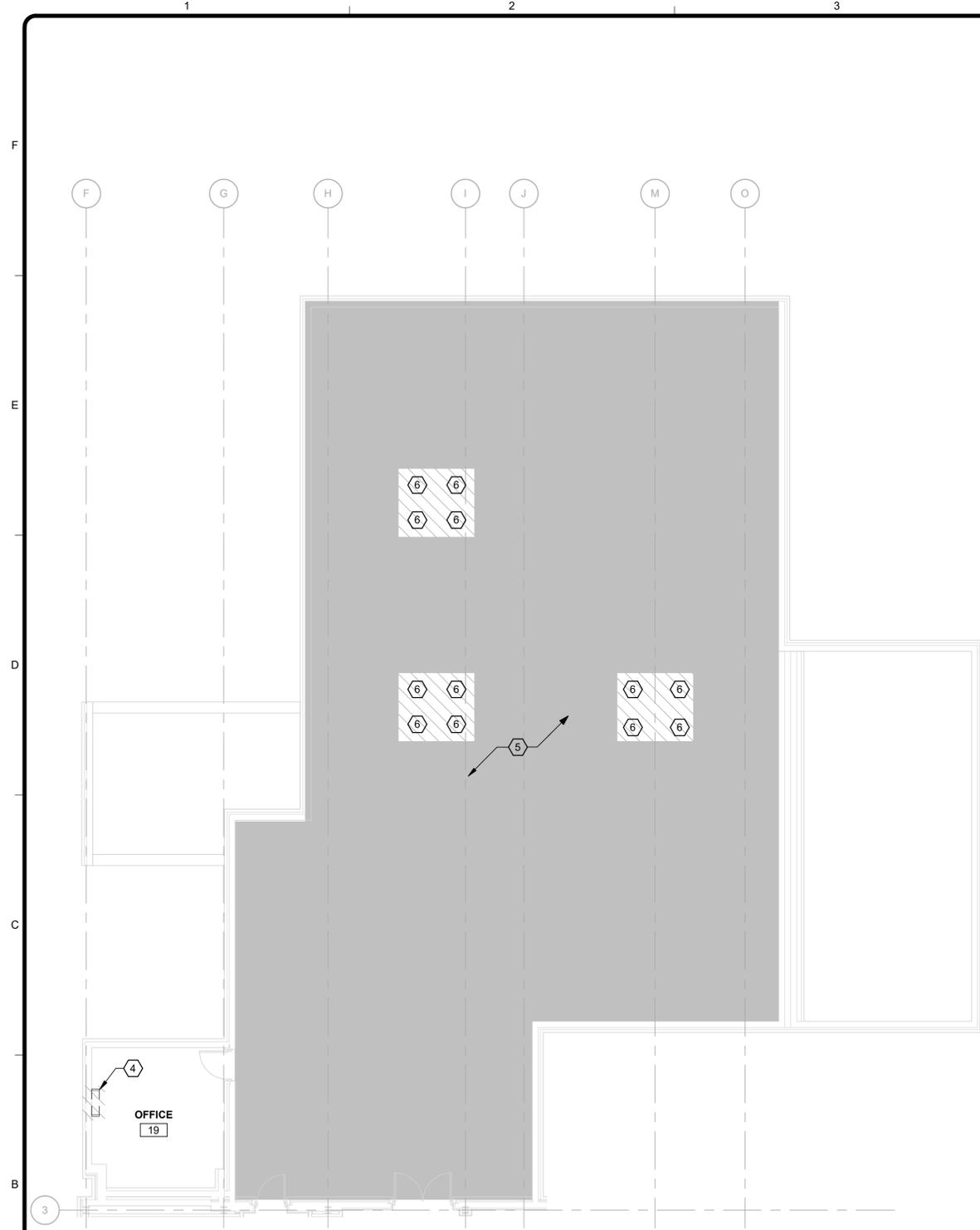
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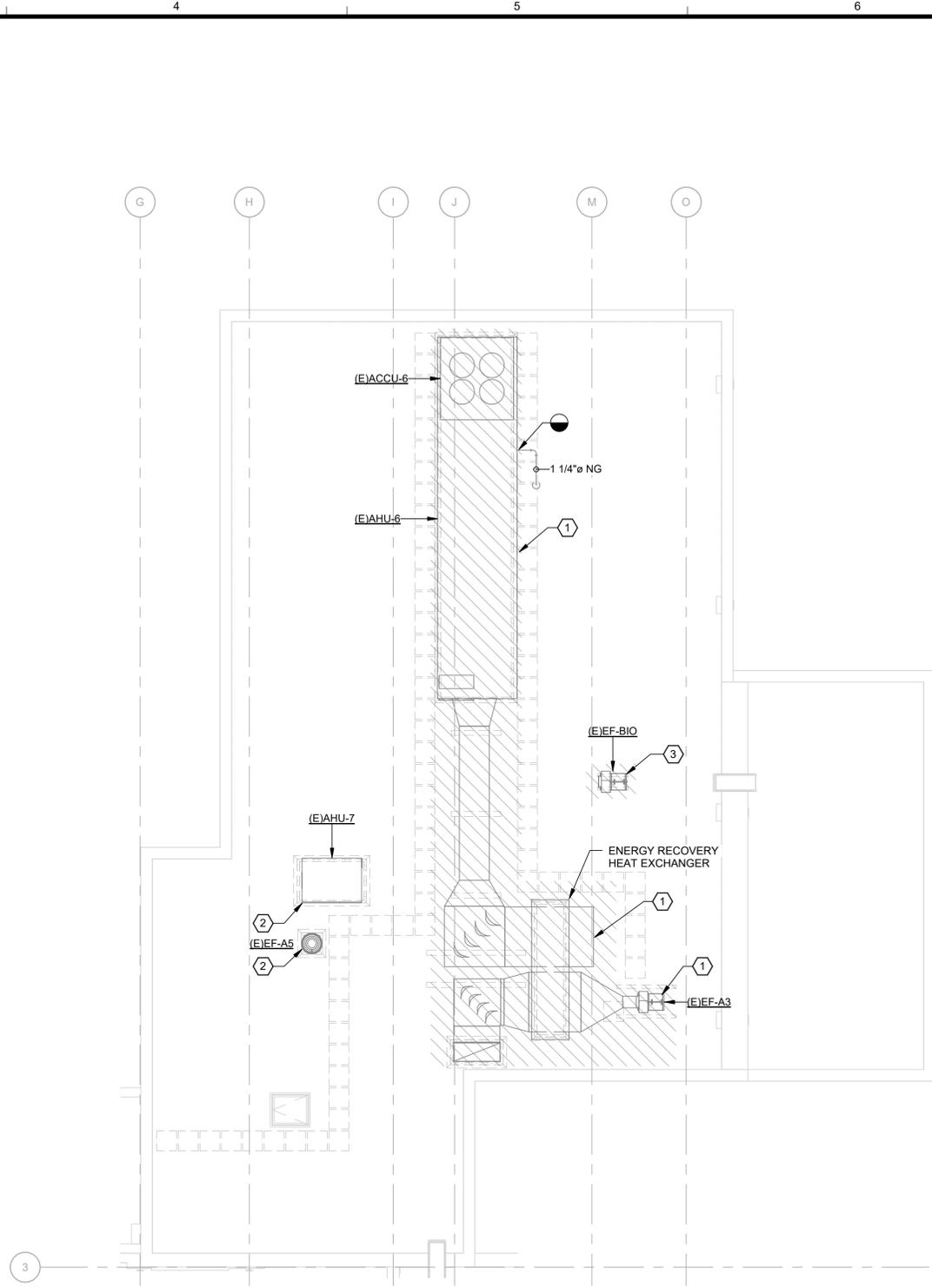
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**MECHANICAL DEMOLITION - ADMINISTRATION BUILDING - GROUND FLOOR**  
SCALE: 1/8" = 1'-0"



**MECHANICAL DEMOLITION - ADMINISTRATION BUILDING - ROOF**  
SCALE: 1/8" = 1'-0"

**GENERAL NOTES**

- A. ALL ANCHORING EQUIPMENT ON EXTERIOR OF BUILDING IS TO BE OF STAINLESS STEEL CONSTRUCTION.
- B. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR ROLL EQUIPMENT OR MATERIALS OVER ROOF.
- C. SIZE, QUANTITY, AND LOCATION OF PIPING SHOWN IS APPROXIMATE. ANY SIZES INDICATED ARE TO AID CONTRACTOR IN ESTABLISHING DEMOLITION SCOPE ONLY. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING PIPING LOCATIONS AND SIZES PRIOR TO DEMOLITION. MEANS AND METHODS SHALL BE LEFT UP TO THE CONTRACTOR AT CONTRACTOR'S DISCRETION.
- D. CONTRACTOR SHALL ASSUME THERE ARE NO EXISTING ISOLATION VALVES OR THAT EXISTING ISOLATION VALVES ARE NON-FUNCTIONAL WHEN CONNECTING NEW PIPING INTO EXISTING. CONTRACTOR SHALL INCLUDE COST TO FREEZE OR HOT TAP PIPING, CUT AND PROVIDE ISOLATION VALVES SUCH THAT NEW WORK AND FUTURE MAINTENANCE CAN BE PERFORMED.
- E. CONTRACTOR SHALL COORDINATE ALL DISRUPTIVE OR "NOISY" WORK WITH OWNER AND OBTAIN OWNERS PERMISSION PRIOR TO PERFORMING DISRUPTIVE WORK. PERFORM WORK DURING OFF-HOURS IF NECESSARY. NOISY WORK MAY BE CONSIDERED, SAW CUTTING, CONCRETE DRILLING, GRINDER CUTTING, ETC. IF CONTRACTOR IS UNSURE WHAT WORK CONSTITUTES "NOISY" WORK, SUBMIT RFI TO OWNER FOR CLARIFICATION.

**KEYNOTES**

- 1. DEMOLISH ROOF MOUNTED AIR HANDLING UNIT AHU-6, ASSOCIATED CONDENSING UNIT ACCU-6, ENERGY RECOVERY HEAT EXCHANGER, EXHAUST FAN EF-A3, AND ALL ASSOCIATED DUCTWORK, ACCESSORIES, AND SUPPORTS. COORDINATE WITH ELECTRICAL FOR EXTENT OF DEMOLITION OF CONTROLS AND WIRING. DEMOLISH SUPPLY AND RETURN DUCTWORK TO BELOW ROOF, ROOF PENETRATIONS ARE TO REMAIN. NATURAL GAS PIPING ABOVE ROOF IS TO REMAIN. DEMOLISH STEAM HUMIDIFICATION PIPING TO BELOW ROOF, CUT AND CAP. PATCH PIPING ROOF PENETRATIONS IN COORDINATION WITH ARCHITECTURAL ROOF WORK. CONTRACTOR IS TO INSPECT ROOF CURB, ROOFING, STRUCTURAL STEEL, ETC. BENEATH AND AROUND DEMOLISHED UNIT FOR EVIDENCE OF WATER LEAKAGE. CONSULT WITH ENGINEER AND OWNER ON RECOMMENDED REPAIRS AND LEAK PREVENTION SOLUTIONS PRIOR TO NEW CONSTRUCTION.
- 2. AIR HANDLING UNIT AHU-7 AND EXHAUST FAN EF-A5 SERVING BASEMENT LEVEL OF ADMINISTRATION BUILDING ARE TO REMAIN.
- 3. DEMOLISH EXHAUST FAN SERVING BIO-HOOD IN LABORATORY AREA AND ALL ASSOCIATED DUCTWORK, ACCESSORIES, SUPPORTS, CONTROLS AND WIRING. DEMOLISH DUCTWORK TO BELOW ROOF, PATCH ROOF PENETRATION IN COORDINATION WITH ARCHITECTURAL ROOF WORK.
- 4. DEMOLISH FAN COIL UNIT IN ENCLOSED OFFICE AND ALL ASSOCIATED ACCESSORIES, OUTDOOR EQUIPMENT, PIPING, AND SUPPORTS. COORDINATE WITH ELECTRICAL FOR EXTENT OF DEMOLITION OF CONTROLS AND WIRING.
- 5. EXISTING LABORATORY AREA, CORRIDORS, STORAGE, ENCLOSED OFFICE, AND OTHER SPACES ARE TO MAINTAIN CURRENT DUCTWORK ROUTING, AIR TERMINAL PLACEMENT, AND SYSTEM BALANCING. INSTALL NEW THERMOSTAT FOR RTU-6 IN SAME OR SIMILAR LOCATION AS EXISTING THERMOSTAT.
- 6. DEMOLISH CEILING MOUNTED EXHAUST SNORKELS AND ALL MOUNTING EQUIPMENT. EXHAUST DUCTWORK, ACCESSORIES, AND ACOUSTIC CEILING TILES ARE TO REMAIN.



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CITY OF ANN ARBOR, MICHIGAN

WTP HVAC IMPROVEMENTS - PHASE II

**MECHANICAL DEMOLITION  
- ADMINISTRATION  
BUILDING LAB & ROOF**

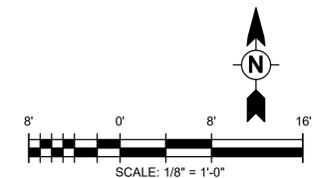
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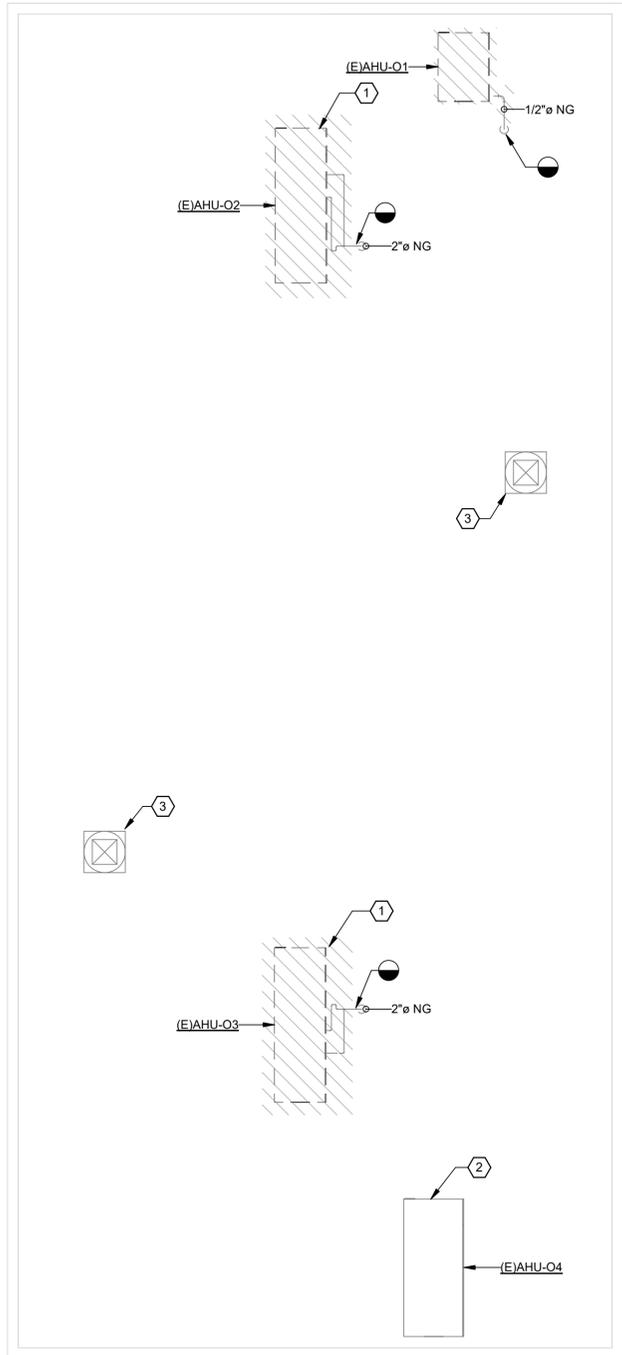
DRWN: JRJ

CHKD: KK

**M-104**



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**MECHANICAL DEMOLITION - OZONE BUILDING - ROOF**  
SCALE: 1/8" = 1'-0"

**GENERAL NOTES**

- A. SIZE, QUANTITY, AND LOCATION OF DUCTWORK AND PIPING SHOWN IS APPROXIMATE. ANY SIZES INDICATED ARE TO AID CONTRACTOR IN ESTABLISHING DEMOLITION SCOPE ONLY. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING PIPING LOCATIONS AND SIZES PRIOR TO DEMOLITION. MEANS AND METHODS SHALL BE LEFT UP TO THE CONTRACTOR AT CONTRACTOR'S DISCRETION.
- B. CONTRACTOR SHALL ASSUME THERE ARE NO EXISTING ISOLATION VALVES OR THAT EXISTING ISOLATION VALVES ARE NON-FUNCTIONAL WHEN CONNECTING NEW PIPING INTO EXISTING. CONTRACTOR SHALL INCLUDE COST TO FREEZE OR HOT TAP PIPING, CUT AND PROVIDE ISOLATION VALVES SUCH THAT NEW WORK AND FUTURE MAINTENANCE CAN BE PERFORMED.
- C. CONTRACTOR SHALL COORDINATE ALL DISRUPTIVE OR "NOISY" WORK WITH OWNER AND OBTAIN OWNERS PERMISSION PRIOR TO PERFORMING DISRUPTIVE WORK. PERFORM WORK DURING OFF-HOURS IF NECESSARY. NOISY WORK MAY BE CONSIDERED, SAW CUTTING, CONCRETE DRILLING, GRINDER CUTTING, ETC. IF CONTRACTOR IS UNSURE WHAT WORK CONSTITUTES "NOISY" WORK, SUBMIT RFI TO OWNER FOR CLARIFICATION.
- D. WHEN BRANCH DUCTWORK IS REMOVED, PATCH ALL DUCT OPENINGS. PATCHES SHALL BE CONSTRUCTED OF SAME GAUGE SHEET METAL AS REMAINING DUCTWORK, SCREWED TO DUCTWORK AND SEALED WITH MASTIC. CONTRACTOR SHALL FIELD VERIFY THAT ALL EXISTING DIFFUSER BRANCH DUCTS TO REMAIN ARE EQUIPPED WITH VOLUME DAMPERS. IF OMITTED, CONTRACTOR SHALL PROVIDE AND INSTALL NEW VOLUME DAMPERS FOR PROPER SYSTEM BALANCING. PROVIDE BASE UNIT PRICING OFF LARGEST RUN OUT FOR VOLUME DAMPER INSTALL.
- F. CONTRACTOR IS TO REMOVE AND RE-INSTALL EXISTING ACOUSTIC CEILING TILES AS NEEDED TO PERFORM MECHANICAL NEW WORK AT THEIR DISCRETION IN COORDINATION WITH CEILING PLAN. EXISTING CEILING TILES ARE TO BE SAFELY AND SECURELY STORED TO PREVENT DAMAGE DURING NEW CONSTRUCTION. ANY DAMAGED OR UNUSABLE CEILING TILES ARE TO BE REPLACED IN KIND.

**KEYNOTES**

- 1 DEMOLISH ROOF MOUNTED MAKE-UP AIR UNITS SERVING THE OZONE BUILDING AND ALL ASSOCIATED ACCESSORIES AND SUPPORTS. COORDINATE WITH ELECTRICAL FOR EXTENT OF DEMOLITION OF CONTROLS AND WIRING. SUPPLY DUCTWORK BELOW ROOF AND DUCT ROOF PENETRATION ARE TO REMAIN. DEMOLISH NATURAL GAS PIPING BACK TO PIPE PENETRATION THROUGH ROOF.
- 2 AIR HANDLING UNIT AND ALL ASSOCIATED ACCESSORIES, SUPPORTS, CONTROLS AND WIRING ARE TO REMAIN.
- 3 ROOF MOUNTED EXHAUST FANS SERVING THE OZONE BUILDING FOR PURGE EXHAUST ARE TO REMAIN.

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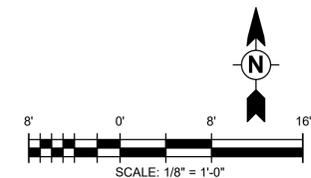


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1	04/07/22	ISSUED FOR BID	JRJ

CITY OF ANN ARBOR, MICHIGAN  
WTP HVAC IMPROVEMENTS - PHASE II  
**MECHANICAL DEMOLITION  
- OZONE BUILDING ROOF**

PROJ: 200-31537-21005  
DESN: JRJ  
DRWN: JRJ  
CHKD: KK

**M-105**



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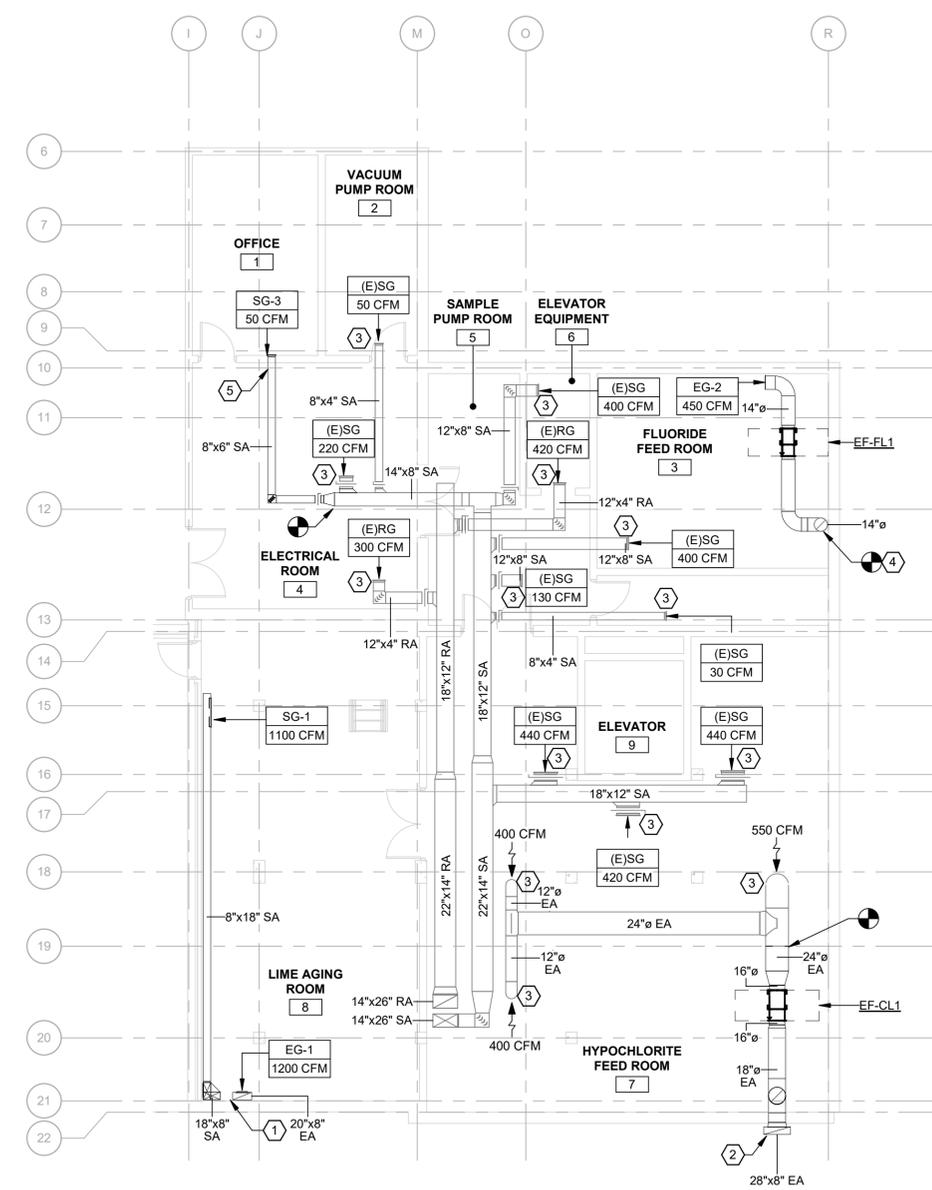




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**MECHANICAL NEW WORK - CHEMICAL FEED BUILDING - BASEMENT LEVEL**  
SCALE: 1/8" = 1'-0"

**GENERAL NOTES**

- A. SIZE, QUANTITY, AND LOCATION OF DUCTWORK AND PIPING SHOWN IS APPROXIMATE. ANY SIZES INDICATED ARE TO AID CONTRACTOR IN ESTABLISHING DEMOLITION SCOPE ONLY. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING PIPING LOCATIONS AND SIZES PRIOR TO DEMOLITION. MEANS AND METHODS SHALL BE LEFT UP TO THE CONTRACTOR AT CONTRACTOR'S DISCRETION.
- B. CONTRACTOR SHALL ASSUME THERE ARE NO EXISTING ISOLATION VALVES OR THAT EXISTING ISOLATION VALVES ARE NON-FUNCTIONAL WHEN CONNECTING NEW PIPING INTO EXISTING. CONTRACTOR SHALL INCLUDE COST TO FREEZE OR HOT TAP PIPING, CUT AND PROVIDE ISOLATION VALVES SUCH THAT NEW WORK AND FUTURE MAINTENANCE CAN BE PERFORMED.
- C. CONTRACTOR SHALL COORDINATE ALL DISRUPTIVE OR "NOISY" WORK WITH OWNER AND OBTAIN OWNERS PERMISSION PRIOR TO PERFORMING DISRUPTIVE WORK. PERFORM WORK DURING OFF-HOURS IF NECESSARY. NOISY WORK MAY BE CONSIDERED, SAW CUTTING, CONCRETE DRILLING, GRINDER CUTTING, ETC. IF CONTRACTOR IS UNSURE WHAT WORK CONSTITUTES "NOISY" WORK, SUBMIT RFI TO OWNER FOR CLARIFICATION.
- D. WHEN BRANCH DUCTWORK IS REMOVED, PATCH ALL DUCT OPENINGS. PATCHES SHALL BE CONSTRUCTED OF SAME GAUGE SHEET METAL AS REMAINING DUCTWORK, SCREWED TO DUCTWORK AND SEALED WITH MASTIC.
- E. CONTRACTOR SHALL FIELD VERIFY THAT ALL EXISTING DIFFUSER BRANCH DUCTS TO REMAIN ARE EQUIPPED WITH VOLUME DAMPERS. IF OMITTED, CONTRACTOR SHALL PROVIDE AND INSTALL NEW VOLUME DAMPERS FOR PROPER SYSTEM BALANCING. PROVIDE BASE UNIT PRICING OFF LARGEST RUN OUT FOR VOLUME DAMPER INSTALL.
- F. CONTRACTOR IS TO REMOVE AND RE-INSTALL EXISTING ACOUSTIC CEILING TILES AS NEEDED TO PERFORM MECHANICAL NEW WORK AT THEIR DISCRETION IN COORDINATION WITH CEILING PLAN. EXISTING CEILING TILES ARE TO BE SAFELY AND SECURELY STORED TO PREVENT DAMAGE DURING NEW CONSTRUCTION. ANY DAMAGED OR UNUSABLE CEILING TILES ARE TO BE REPLACED IN KIND.

**KEYNOTES**

- 1. ROUTE SUPPLY AND EXHAUST DUCTWORK DOWN TO LIME AGING ROOM FROM FLOOR ABOVE. COORDINATE WITH EXISTING EQUIPMENT, BUILDING STRUCTURE, CONDUIT, AND OTHER SYSTEMS TO AVOID COLLISION AT NEW FLOOR PENETRATION(S). ROUTE DUCTWORK TIGHT TO WALL AND CEILING.
- 2. ROUTE EXHAUST DUCTWORK THROUGH EXISTING WALL PENETRATION ABOVE GRADE. PROVIDE CONICAL TAP AT ROUND EXHAUST DUCT CONNECTION INTO EXTERIOR DUCTWORK. ROUTE EXTERIOR DUCTWORK AS TIGHT TO WALL AS POSSIBLE TO AVOID OBSTRUCTIONS WITH WALKWAY AND DUMPSTER AREA. COORDINATE WITH ARCHITECTURAL TO PROVIDE PROTECTIVE BOLLARDS ON EAST SIDE OF DUCTWORK ON EXTERIOR. REFER TO ARCHITECTURAL DRAWINGS FOR BOLLARD DETAILS.
- 3. REBALANCE EXISTING AIR TERMINAL TO THE AIRFLOW INDICATED. CONTRACTOR IS TO FIELD VERIFY DUCTWORK ROUTING, AIR TERMINAL QUANTITIES, AND VOLUME DAMPER LOCATION PRIOR TO SYSTEM BALANCING.
- 4. CONNECT EXHAUST DUCT FROM FLUORIDE FEED ROOM UP TO EXISTING EXHAUST RISER IN LOADING ROOM ABOVE.
- 5. CONNECT NEW SUPPLY AIR BRANCH FOR ELECTRICIAN OFFICE TO EXISTING BRANCH IN BASEMENT. PROVIDE NEW SIDEWALL PENETRATION FOR SUPPLY DUCT AND REGISTER INTO OFFICE.



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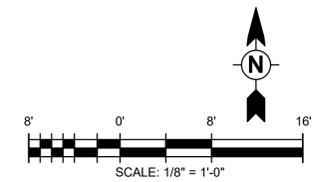


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CITY OF ANN ARBOR, MICHIGAN  
WTP HVAC IMPROVEMENTS - PHASE II  
**MECHANICAL NEW WORK - CHEMICAL FEED BUILDING - BASEMENT FLOOR**

PROJ:	200-31537-21005
DESN:	JRJ
DRWN:	JRJ
CHKD:	KK

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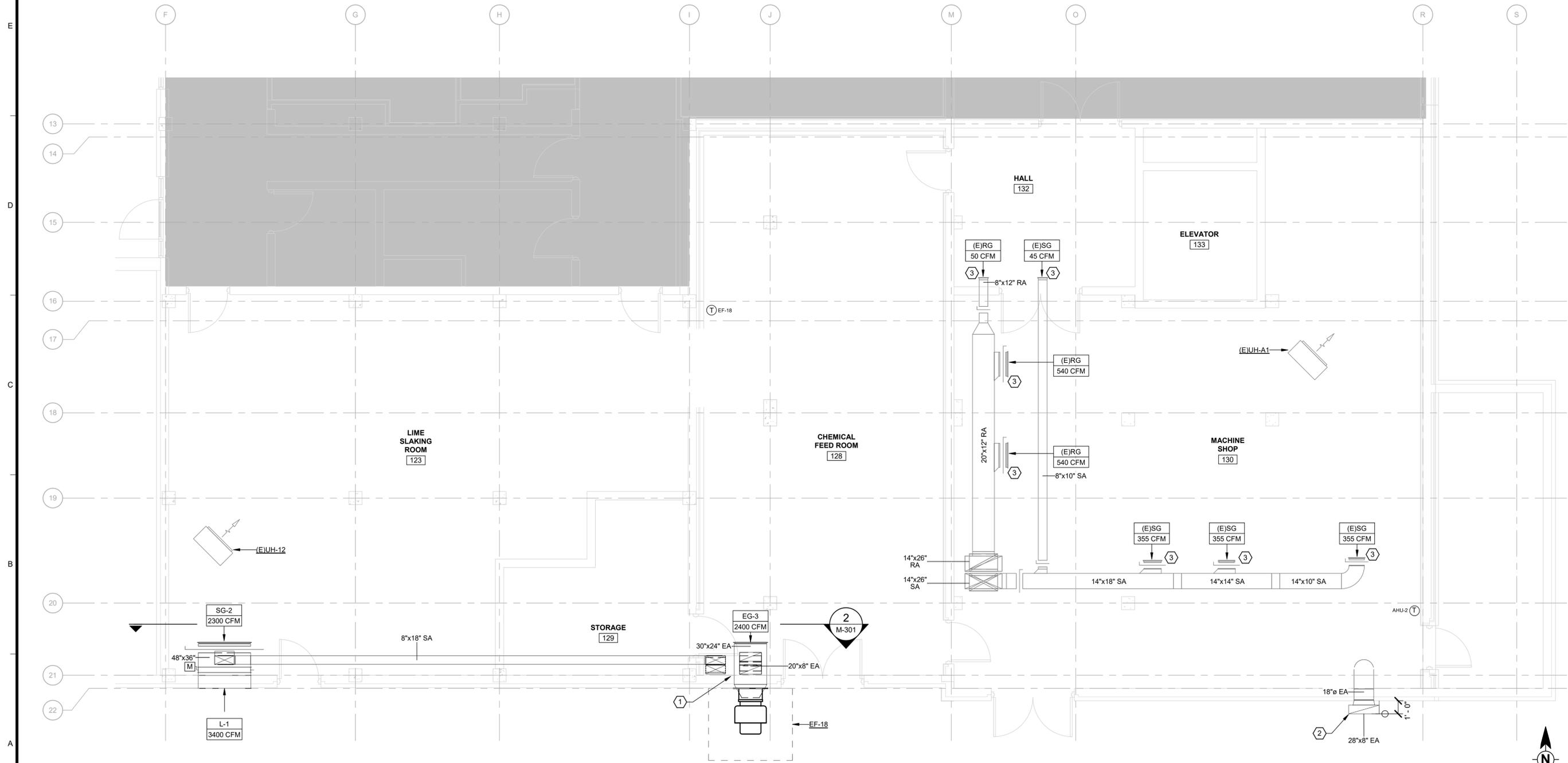
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**GENERAL NOTES**

- A. SIZE, QUANTITY, AND LOCATION OF DUCTWORK AND PIPING SHOWN IS APPROXIMATE. ANY SIZES INDICATED ARE TO AID CONTRACTOR IN ESTABLISHING DEMOLITION SCOPE ONLY. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING PIPING LOCATIONS AND SIZES PRIOR TO DEMOLITION. MEANS AND METHODS SHALL BE LEFT UP TO THE CONTRACTOR AT CONTRACTOR'S DISCRETION.
- B. CONTRACTOR SHALL ASSUME THERE ARE NO EXISTING ISOLATION VALVES OR THAT EXISTING ISOLATION VALVES ARE NON-FUNCTIONAL WHEN CONNECTING NEW PIPING INTO EXISTING. CONTRACTOR SHALL INCLUDE COST TO FREEZE OR HOT TAP PIPING, CUT AND PROVIDE ISOLATION VALVES SUCH THAT NEW WORK AND FUTURE MAINTENANCE CAN BE PERFORMED.
- C. CONTRACTOR SHALL COORDINATE ALL DISRUPTIVE OR "NOISY" WORK WITH OWNER AND OBTAIN OWNERS PERMISSION PRIOR TO PERFORMING DISRUPTIVE WORK. PERFORM WORK DURING OFF-HOURS IF NECESSARY. NOISY WORK MAY BE CONSIDERED, SAW CUTTING, CONCRETE DRILLING, GRINDER CUTTING, ETC. IF CONTRACTOR IS UNSURE WHAT WORK CONSTITUTES "NOISY" WORK, SUBMIT RFI TO OWNER FOR CLARIFICATION.
- D. WHEN BRANCH DUCTWORK IS REMOVED, PATCH ALL DUCT OPENINGS. PATCHES SHALL BE CONSTRUCTED OF SAME GAUGE SHEET METAL AS REMAINING DUCTWORK, SCREWED TO DUCTWORK AND SEALED WITH MASTIC.
- E. CONTRACTOR SHALL FIELD VERIFY THAT ALL EXISTING DIFFUSER BRANCH DUCTS TO REMAIN ARE EQUIPPED WITH VOLUME DAMPERS. IF OMITTED, CONTRACTOR SHALL PROVIDE AND INSTALL NEW VOLUME DAMPERS FOR PROPER SYSTEM BALANCING. PROVIDE BASE UNIT PRICING OFF LARGEST RUN OUT FOR VOLUME DAMPER INSTALL.
- F. CONTRACTOR IS TO REMOVE AND RE-INSTALL EXISTING ACOUSTIC CEILING TILES AS NEEDED TO PERFORM MECHANICAL NEW WORK AT THEIR DISCRETION IN COORDINATION WITH CEILING PLAN. EXISTING CEILING TILES ARE TO BE SAFELY AND SECURELY STORED TO PREVENT DAMAGE DURING NEW CONSTRUCTION. ANY DAMAGED OR UNUSABLE CEILING TILES ARE TO BE REPLACED IN KIND.

**KEYNOTES**

- 1. ROUTE SUPPLY AND EXHAUST DUCTWORK DOWN TO LIME AGING ROOM FROM FLOOR ABOVE. COORDINATE WITH EXISTING EQUIPMENT, BUILDING STRUCTURE, CONDUIT, AND OTHER SYSTEMS TO AVOID COLLISION AT NEW FLOOR PENETRATION(S). ROUTE DUCTWORK TIGHT TO WALL AND CEILING.
- 2. ROUTE EXHAUST DUCTWORK THROUGH EXISTING WALL PENETRATION ABOVE GRADE. PROVIDE CONICAL TAP AT ROUND EXHAUST DUCT CONNECTION INTO EXTERIOR DUCTWORK. ROUTE EXTERIOR DUCTWORK AS TIGHT TO WALL AS POSSIBLE TO AVOID OBSTRUCTIONS WITH WALKWAY AND DUMPSTER AREA. COORDINATE WITH ARCHITECTURAL TO PROVIDE PROTECTIVE BOLLARDS ON EAST SIDE OF DUCTWORK ON EXTERIOR. REFER TO ARCHITECTURAL DRAWINGS FOR BOLLARD DETAILS.
- 3. REBALANCE EXISTING AIR TERMINAL TO THE AIRFLOW INDICATED. CONTRACTOR IS TO FIELD VERIFY DUCTWORK ROUTING, AIR TERMINAL QUANTITIES, AND VOLUME DAMPER LOCATION PRIOR TO SYSTEM BALANCING.



**MECHANICAL NEW WORK - CHEMICAL FEED BUILDING - GROUND FLOOR**  
 SCALE: 1/4" = 1'-0"



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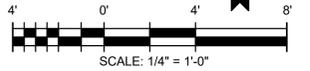


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 WTP HVAC IMPROVEMENTS - PHASE II  
**MECHANICAL NEW WORK - CHEMICAL FEED BUILDING - GROUND FLOOR**

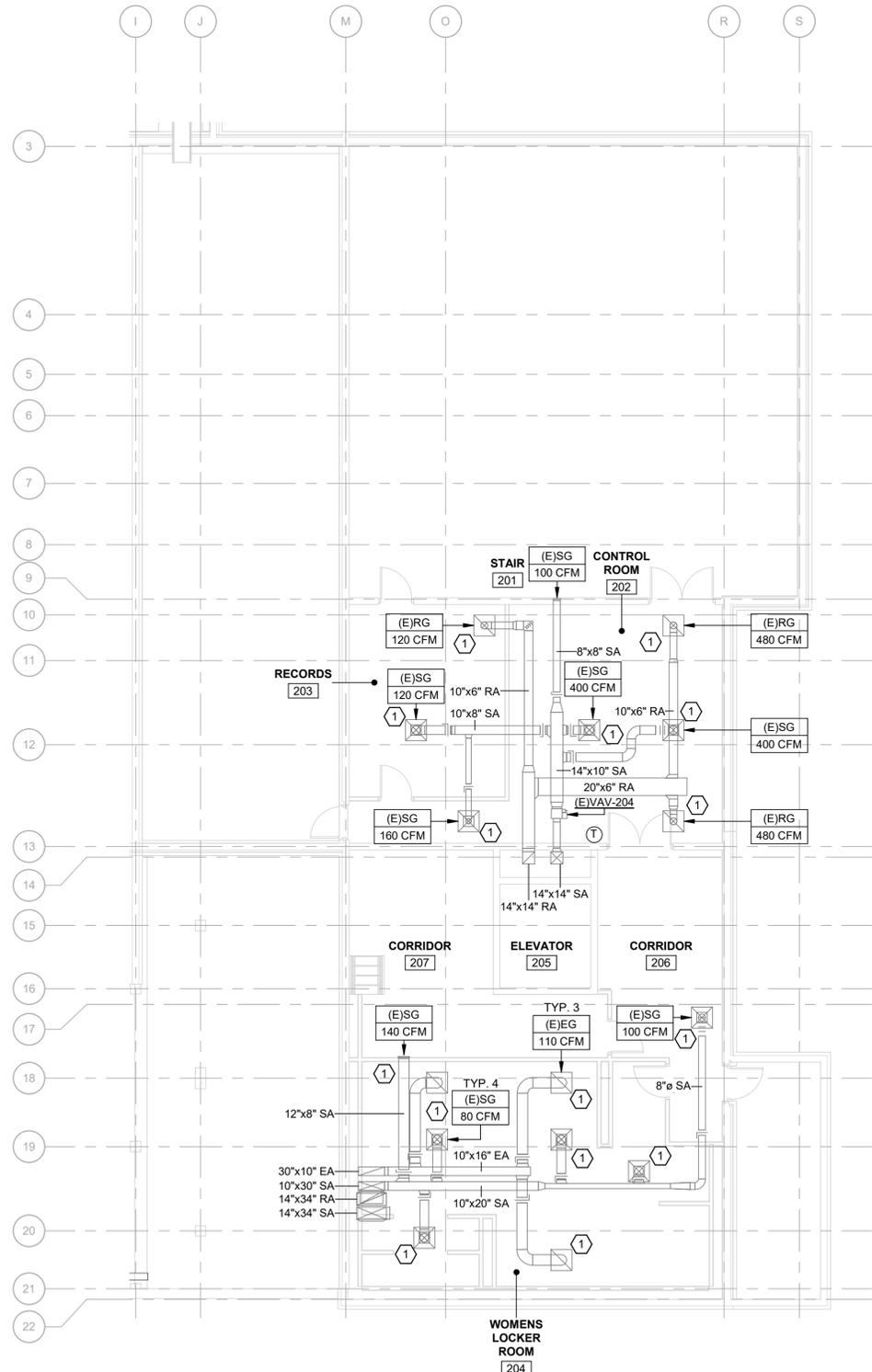
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DRWN:	JRJ
CHKD:	KK

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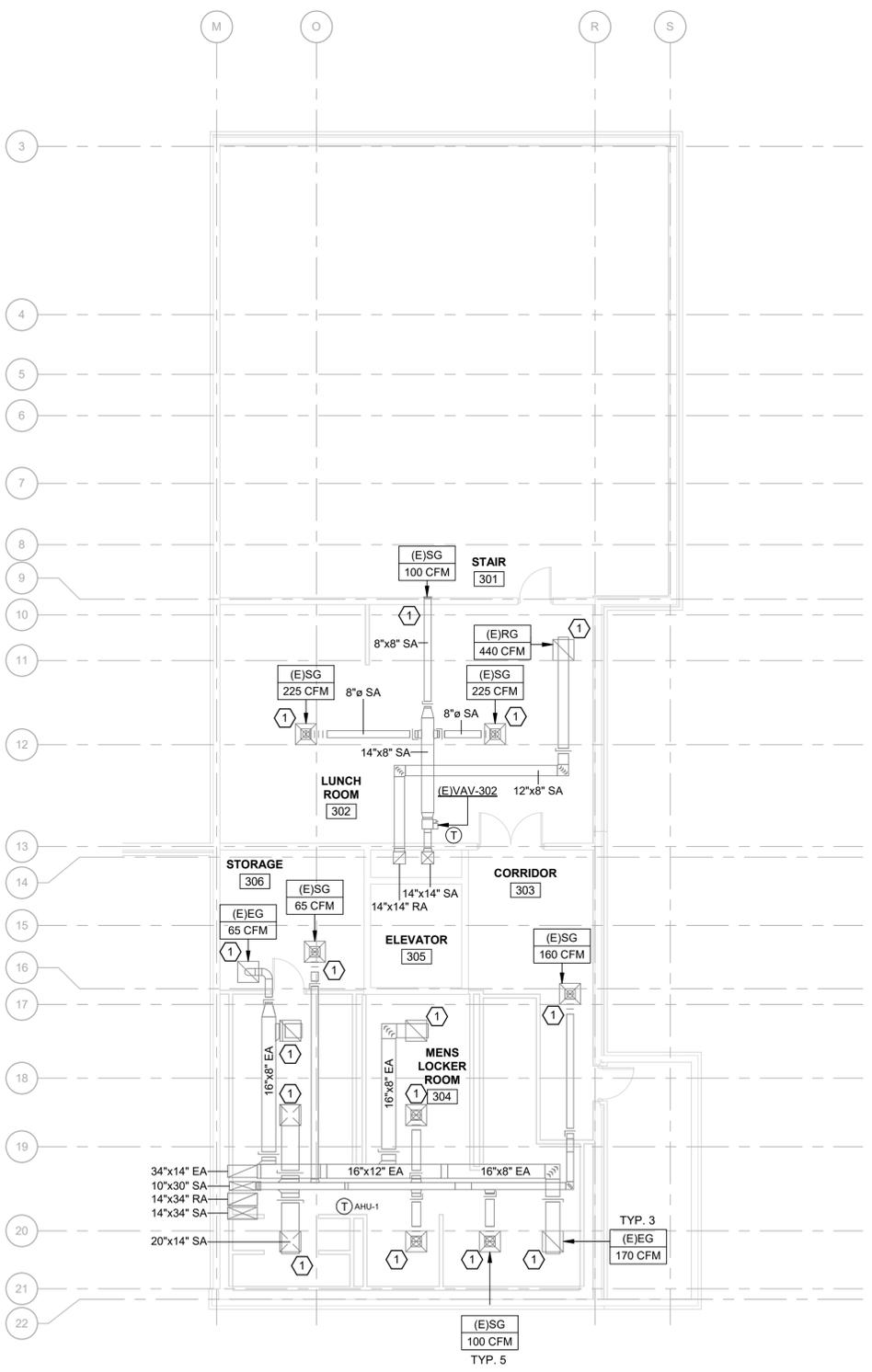


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**MECHANICAL NEW WORK - CHEMICAL FEED BUILDING - SECOND FLOOR**  
SCALE: 1/8" = 1'-0"



**MECHANICAL NEW WORK - CHEMICAL FEED BUILDING - THIRD FLOOR**  
SCALE: 1/8" = 1'-0"

**GENERAL NOTES**

- A. SIZE, QUANTITY, AND LOCATION OF DUCTWORK AND PIPING SHOWN IS APPROXIMATE. ANY SIZES INDICATED ARE TO AID CONTRACTOR IN ESTABLISHING DEMOLITION SCOPE ONLY. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING PIPING LOCATIONS AND SIZES PRIOR TO DEMOLITION. MEANS AND METHODS SHALL BE LEFT UP TO THE CONTRACTOR AT CONTRACTOR'S DISCRETION.
- B. CONTRACTOR SHALL ASSUME THERE ARE NO EXISTING ISOLATION VALVES OR THAT EXISTING ISOLATION VALVES ARE NON-FUNCTIONAL WHEN CONNECTING NEW PIPING INTO EXISTING. CONTRACTOR SHALL INCLUDE COST TO FREEZE OR HOT TAP PIPING, CUT AND PROVIDE ISOLATION VALVES SUCH THAT NEW WORK AND FUTURE MAINTENANCE CAN BE PERFORMED.
- C. CONTRACTOR SHALL COORDINATE ALL DISRUPTIVE OR "NOISY" WORK WITH OWNER AND OBTAIN OWNERS PERMISSION PRIOR TO PERFORMING DISRUPTIVE WORK. PERFORM WORK DURING OFF-HOURS IF NECESSARY. NOISY WORK MAY BE CONSIDERED, SAW CUTTING, CONCRETE DRILLING, GRINDER CUTTING, ETC. IF CONTRACTOR IS UNSURE WHAT WORK CONSTITUTES "NOISY" WORK, SUBMIT RFI TO OWNER FOR CLARIFICATION.
- D. WHEN BRANCH DUCTWORK IS REMOVED, PATCH ALL DUCT OPENINGS. PATCHES SHALL BE CONSTRUCTED OF SAME GAUGE SHEET METAL AS REMAINING DUCTWORK, SCREWED TO DUCTWORK AND SEALED WITH MASTIC.
- E. CONTRACTOR SHALL FIELD VERIFY THAT ALL EXISTING DIFFUSER BRANCH DUCTS TO REMAIN ARE EQUIPPED WITH VOLUME DAMPERS. IF OMITTED, CONTRACTOR SHALL PROVIDE AND INSTALL NEW VOLUME DAMPERS FOR PROPER SYSTEM BALANCING. PROVIDE BASE UNIT PRICING OFF LARGEST RUN OUT FOR VOLUME DAMPER INSTALL.
- F. CONTRACTOR IS TO REMOVE AND RE-INSTALL EXISTING ACOUSTIC CEILING TILES AS NEEDED TO PERFORM MECHANICAL NEW WORK AT THEIR DISCRETION IN COORDINATION WITH CEILING PLAN. EXISTING CEILING TILES ARE TO BE SAFELY AND SECURELY STORED TO PREVENT DAMAGE DURING NEW CONSTRUCTION. ANY DAMAGED OR UNUSABLE CEILING TILES ARE TO BE REPLACED IN KIND.

**KEYNOTES**

- 1 REBALANCE EXISTING AIR TERMINAL TO THE AIRFLOW INDICATED. CONTRACTOR IS TO FIELD VERIFY DUCTWORK ROUTING, AIR TERMINAL QUANTITIES, AND VOLUME DAMPER LOCATION PRIOR TO SYSTEM BALANCING.



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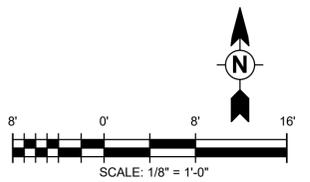


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CITY OF ANN ARBOR, MICHIGAN  
WTP HVAC IMPROVEMENTS - PHASE II  
**MECHANICAL NEW WORK - CHEMICAL FEED BUILDING SECOND & THIRD FLOORS**

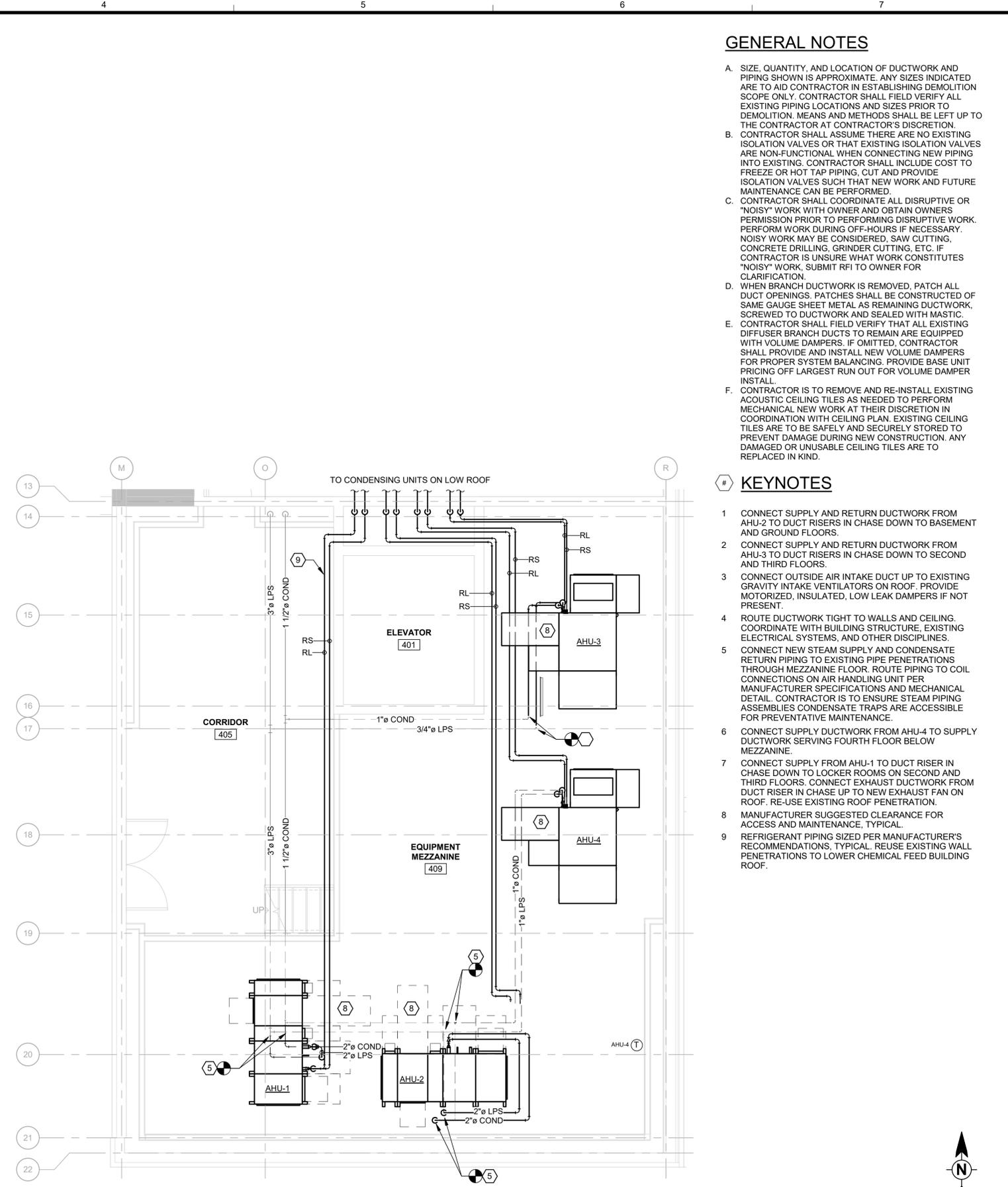
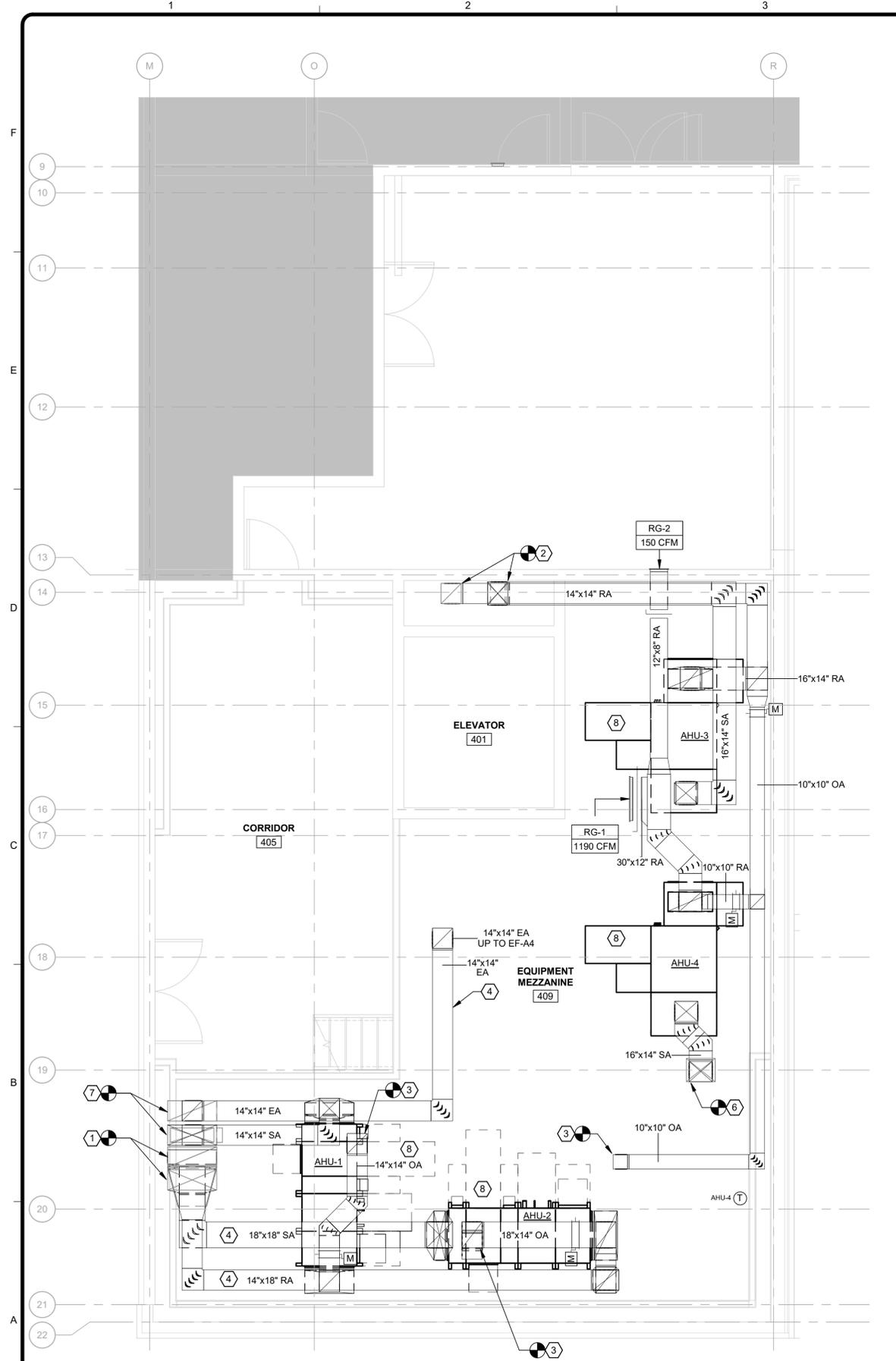
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CHKD:	KK

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**GENERAL NOTES**

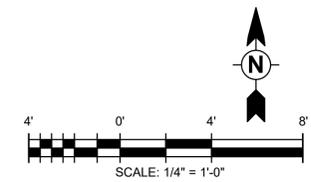
- A. SIZE, QUANTITY, AND LOCATION OF DUCTWORK AND PIPING SHOWN IS APPROXIMATE. ANY SIZES INDICATED ARE TO AID CONTRACTOR IN ESTABLISHING DEMOLITION SCOPE ONLY. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING PIPING LOCATIONS AND SIZES PRIOR TO DEMOLITION. MEANS AND METHODS SHALL BE LEFT UP TO THE CONTRACTOR AT CONTRACTOR'S DISCRETION.
- B. CONTRACTOR SHALL ASSUME THERE ARE NO EXISTING ISOLATION VALVES OR THAT EXISTING ISOLATION VALVES ARE NON-FUNCTIONAL WHEN CONNECTING NEW PIPING INTO EXISTING. CONTRACTOR SHALL INCLUDE COST TO FREEZE OR HOT TAP PIPING, CUT AND PROVIDE ISOLATION VALVES SUCH THAT NEW WORK AND FUTURE MAINTENANCE CAN BE PERFORMED.
- C. CONTRACTOR SHALL COORDINATE ALL DISRUPTIVE OR "NOISY" WORK WITH OWNER AND OBTAIN OWNERS PERMISSION PRIOR TO PERFORMING DISRUPTIVE WORK. PERFORM WORK DURING OFF-HOURS IF NECESSARY. NOISY WORK MAY BE CONSIDERED. SAW CUTTING, CONCRETE DRILLING, GRINDER CUTTING, ETC. IF CONTRACTOR IS UNSURE WHAT WORK CONSTITUTES "NOISY" WORK, SUBMIT RFI TO OWNER FOR CLARIFICATION.
- D. WHEN BRANCH DUCTWORK IS REMOVED, PATCH ALL DUCT OPENINGS. PATCHES SHALL BE CONSTRUCTED OF SAME GAUGE SHEET METAL AS REMAINING DUCTWORK, SCREWED TO DUCTWORK AND SEALED WITH MASTIC.
- E. CONTRACTOR SHALL FIELD VERIFY THAT ALL EXISTING DIFFUSER BRANCH DUCTS TO REMAIN ARE EQUIPPED WITH VOLUME DAMPERS. IF OMITTED, CONTRACTOR SHALL PROVIDE AND INSTALL NEW VOLUME DAMPERS FOR PROPER SYSTEM BALANCING. PROVIDE BASE UNIT PRICING OFF LARGEST RUN OUT FOR VOLUME DAMPER INSTALL.
- F. CONTRACTOR IS TO REMOVE AND RE-INSTALL EXISTING ACOUSTIC CEILING TILES AS NEEDED TO PERFORM MECHANICAL NEW WORK AT THEIR DISCRETION IN COORDINATION WITH CEILING PLAN. EXISTING CEILING TILES ARE TO BE SAFELY AND SECURELY STORED TO PREVENT DAMAGE DURING NEW CONSTRUCTION. ANY DAMAGED OR UNUSABLE CEILING TILES ARE TO BE REPLACED IN KIND.

**KEYNOTES**

- 1. CONNECT SUPPLY AND RETURN DUCTWORK FROM AHU-2 TO DUCT RISERS IN CHASE DOWN TO BASEMENT AND GROUND FLOORS.
- 2. CONNECT SUPPLY AND RETURN DUCTWORK FROM AHU-3 TO DUCT RISERS IN CHASE DOWN TO SECOND AND THIRD FLOORS.
- 3. CONNECT OUTSIDE AIR INTAKE DUCT UP TO EXISTING GRAVITY INTAKE VENTILATORS ON ROOF. PROVIDE MOTORIZED, INSULATED, LOW LEAK DAMPERS IF NOT PRESENT.
- 4. ROUTE DUCTWORK TIGHT TO WALLS AND CEILING. COORDINATE WITH BUILDING STRUCTURE, EXISTING ELECTRICAL SYSTEMS, AND OTHER DISCIPLINES.
- 5. CONNECT NEW STEAM SUPPLY AND CONDENSATE RETURN PIPING TO EXISTING PIPE PENETRATIONS THROUGH MEZZANINE FLOOR. ROUTE PIPING TO COIL CONNECTIONS ON AIR HANDLING UNIT PER MANUFACTURER SPECIFICATIONS AND MECHANICAL DETAIL. CONTRACTOR IS TO ENSURE STEAM PIPING ASSEMBLIES CONDENSATE TRAPS ARE ACCESSIBLE FOR PREVENTATIVE MAINTENANCE.
- 6. CONNECT SUPPLY DUCTWORK FROM AHU-4 TO SUPPLY DUCTWORK SERVING FOURTH FLOOR BELOW MEZZANINE.
- 7. CONNECT SUPPLY FROM AHU-1 TO DUCT RISER IN CHASE DOWN TO LOCKER ROOMS ON SECOND AND THIRD FLOORS. CONNECT EXHAUST DUCTWORK FROM DUCT RISER IN CHASE UP TO NEW EXHAUST FAN ON ROOF. RE-USE EXISTING ROOF PENETRATION.
- 8. MANUFACTURER SUGGESTED CLEARANCE FOR ACCESS AND MAINTENANCE, TYPICAL.
- 9. REFRIGERANT PIPING SIZED PER MANUFACTURER'S RECOMMENDATIONS. TYPICAL. RE-USE EXISTING WALL PENETRATIONS TO LOWER CHEMICAL FEED BUILDING ROOF.

**MECHANICAL DUCTWORK NEW WORK - CHEMICAL FEED BUILDING - FOURTH FL. / MEZZ.**  
SCALE: 1/4" = 1'-0"

**MECHANICAL PIPING NEW WORK - CHEMICAL FEED BUILDING - FOURTH FL. / MEZZ.**  
SCALE: 1/4" = 1'-0"



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WTP HVAC IMPROVEMENTS - PHASE II

MECHANICAL NEW WORK - CHEMICAL FEED BUILDING

FOURTH FLOOR

PROJ:

200-31537-21005

DESN:

JRJ

DRWN:

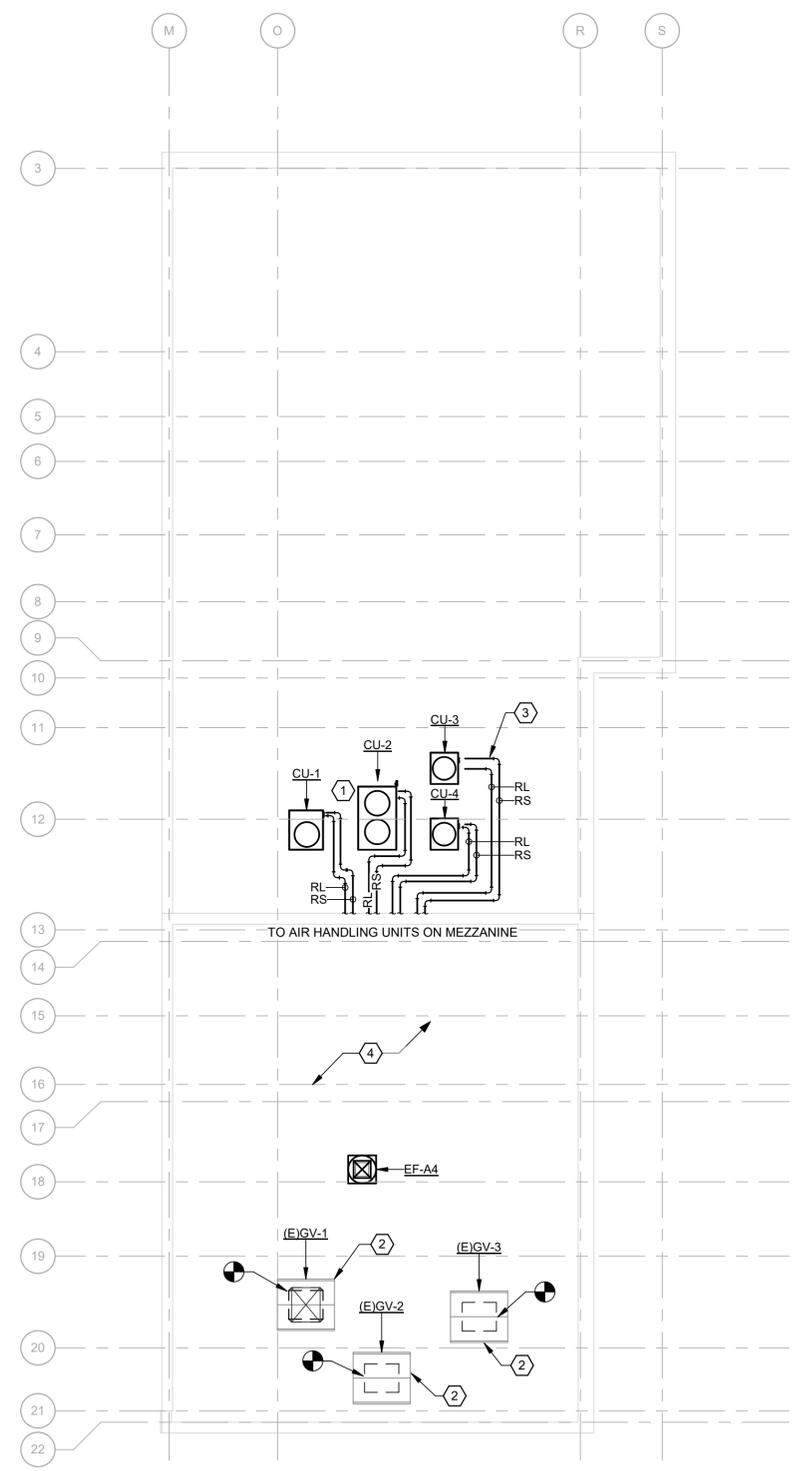
JRJ

CHKD:

KK

M-204

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**MECHANICAL NEW WORK - CHEMICAL FEED BUILDING - ROOF**  
SCALE: 1/8" = 1'-0"

**GENERAL NOTES**

- A. SIZE, QUANTITY, AND LOCATION OF DUCTWORK AND PIPING SHOWN IS APPROXIMATE. ANY SIZES INDICATED ARE TO AID CONTRACTOR IN ESTABLISHING DEMOLITION SCOPE ONLY. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING PIPING LOCATIONS AND SIZES PRIOR TO DEMOLITION. MEANS AND METHODS SHALL BE LEFT UP TO THE CONTRACTOR AT CONTRACTOR'S DISCRETION.
- B. CONTRACTOR SHALL ASSUME THERE ARE NO EXISTING ISOLATION VALVES OR THAT EXISTING ISOLATION VALVES ARE NON-FUNCTIONAL WHEN CONNECTING NEW PIPING INTO EXISTING. CONTRACTOR SHALL INCLUDE COST TO FREEZE OR HOT TAP PIPING, CUT AND PROVIDE ISOLATION VALVES SUCH THAT NEW WORK AND FUTURE MAINTENANCE CAN BE PERFORMED.
- C. CONTRACTOR SHALL COORDINATE ALL DISRUPTIVE OR "NOISY" WORK WITH OWNER AND OBTAIN OWNERS PERMISSION PRIOR TO PERFORMING DISRUPTIVE WORK. PERFORM WORK DURING OFF-HOURS IF NECESSARY. NOISY WORK MAY BE CONSIDERED. SAW CUTTING, CONCRETE DRILLING, GRINDER CUTTING, ETC. IF CONTRACTOR IS UNSURE WHAT WORK CONSTITUTES "NOISY" WORK, SUBMIT RFI TO OWNER FOR CLARIFICATION.
- D. WHEN BRANCH DUCTWORK IS REMOVED, PATCH ALL DUCT OPENINGS. PATCHES SHALL BE CONSTRUCTED OF SAME GAUGE SHEET METAL AS REMAINING DUCTWORK, SCREWED TO DUCTWORK AND SEALED WITH MASTIC.
- E. CONTRACTOR SHALL FIELD VERIFY THAT ALL EXISTING DIFFUSER BRANCH DUCTS TO REMAIN ARE EQUIPPED WITH VOLUME DAMPERS. IF OMITTED, CONTRACTOR SHALL PROVIDE AND INSTALL NEW VOLUME DAMPERS FOR PROPER SYSTEM BALANCING. PROVIDE BASE UNIT PRICING OFF LARGEST RUN OUT FOR VOLUME DAMPER INSTALL.
- F. CONTRACTOR IS TO REMOVE AND RE-INSTALL EXISTING ACOUSTIC CEILING TILES AS NEEDED TO PERFORM MECHANICAL NEW WORK AT THEIR DISCRETION IN COORDINATION WITH CEILING PLAN. EXISTING CEILING TILES ARE TO BE SAFELY AND SECURELY STORED TO PREVENT DAMAGE DURING NEW CONSTRUCTION. ANY DAMAGED OR UNUSABLE CEILING TILES ARE TO BE REPLACED IN KIND.

**KEYNOTES**

- 1 MAINTAIN AT MINIMUM 10'-0" CLEARANCE BETWEEN NEW ROOF MOUNTED EQUIPMENT AND ROOF PARAPET.
- 2 CONNECT OUTSIDE AIR INTAKE DUCT UP TO EXISTING GRAVITY INTAKE VENTILATORS ON ROOF. PROVIDE MOTORIZED, INSULATED, LOW LEAK DAMPERS IF NOT PRESENT.
- 3 REFRIGERANT PIPING SIZED PER MANUFACTURER'S RECOMMENDATIONS. TYPICAL. REUSE EXISTING WALL PENETRATIONS TO LOWER CHEMICAL FEED BUILDING ROOF.
- 4 CONTRACTOR IS TO ADHERE TO PLANT SAFETY PROCEDURES FOR THE MONITORING AND MITIGATION OF RADIO FREQUENCY EXPOSURE FROM EXISTING ANTENNAS ON CHEMICAL FEED BUILDING HIGH ROOF. CONTRACTOR IS TO COORDINATE WITH PLANT PERSONNEL PRIOR TO ANY WORK BEING PERFORMED IN THIS AREA.

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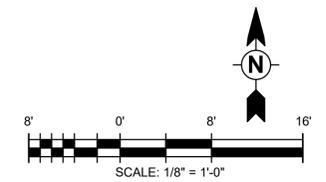


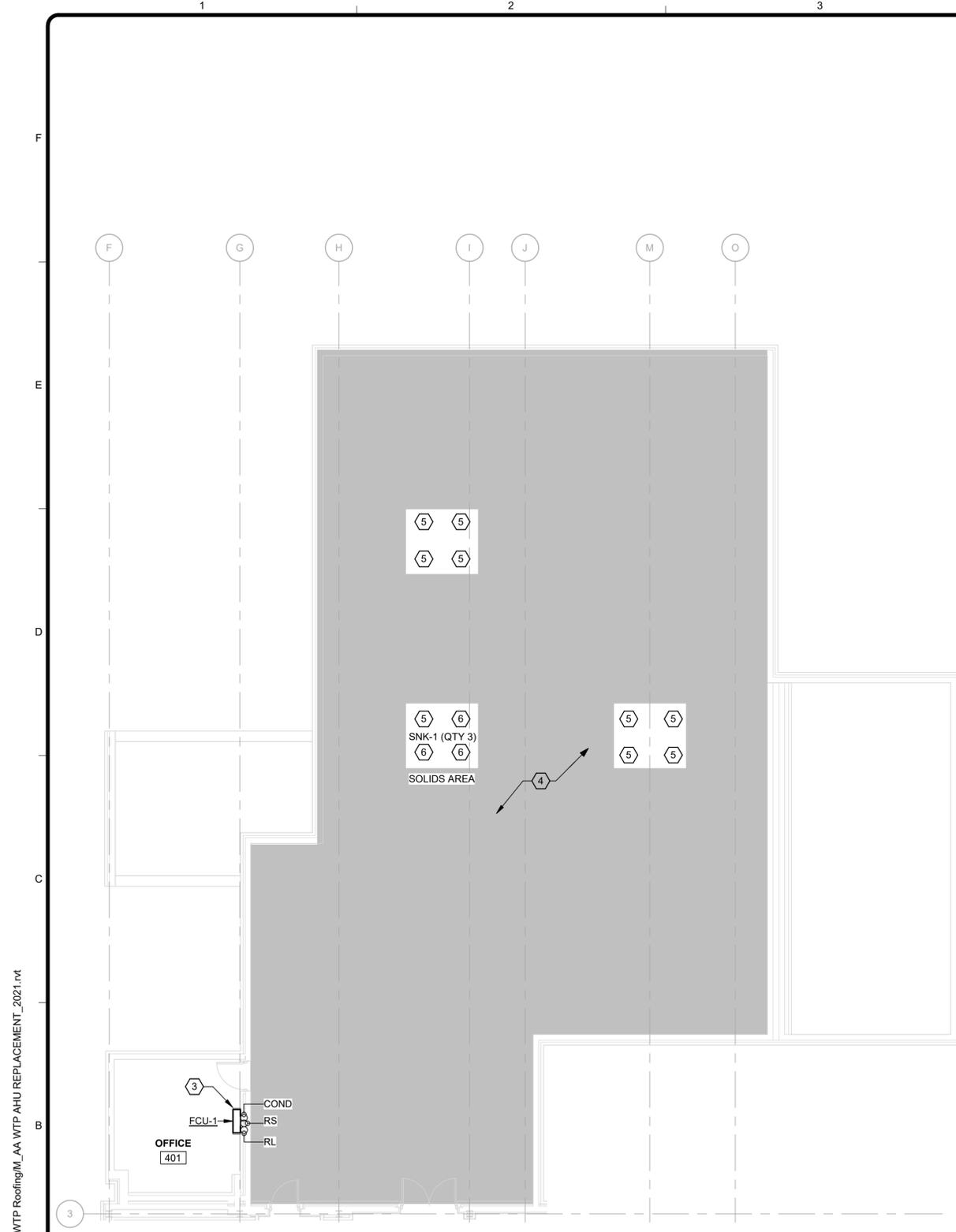
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WTP HVAC IMPROVEMENTS - PHASE II  
**MECHANICAL NEW WORK - CHEMICAL FEED BUILDING ROOF**

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CHKD:	KK

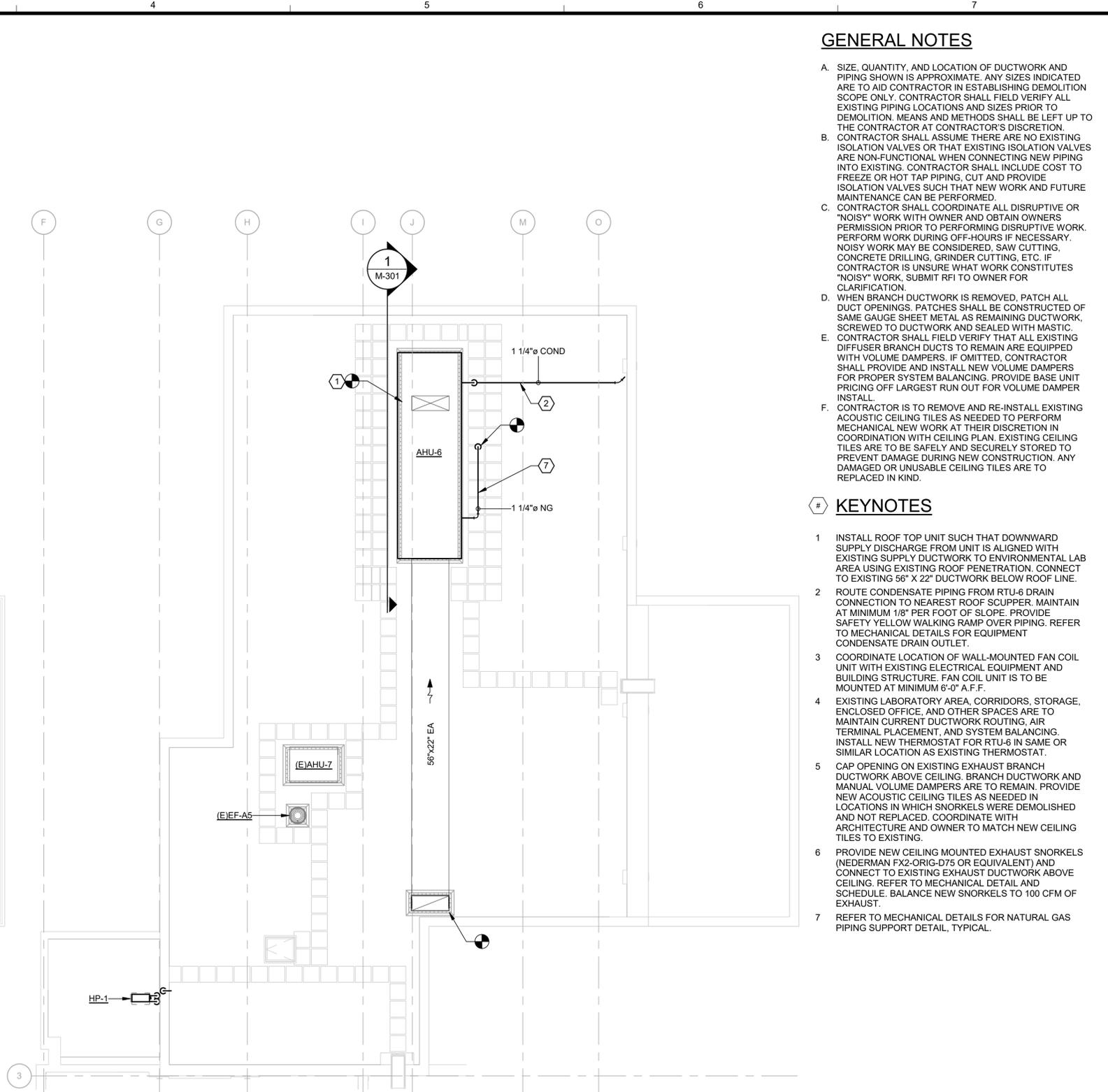
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**MECHANICAL NEW WORK - ADMINISTRATION BUILDING - GROUND FLOOR**

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



**MECHANICAL NEW WORK - ADMINISTRATION BUILDING - ROOF**

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

**GENERAL NOTES**

- A. SIZE, QUANTITY, AND LOCATION OF DUCTWORK AND PIPING SHOWN IS APPROXIMATE. ANY SIZES INDICATED ARE TO AID CONTRACTOR IN ESTABLISHING DEMOLITION SCOPE ONLY. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING PIPING LOCATIONS AND SIZES PRIOR TO DEMOLITION. MEANS AND METHODS SHALL BE LEFT UP TO THE CONTRACTOR AT CONTRACTOR'S DISCRETION.
- B. CONTRACTOR SHALL ASSUME THERE ARE NO EXISTING ISOLATION VALVES OR THAT EXISTING ISOLATION VALVES ARE NON-FUNCTIONAL WHEN CONNECTING NEW PIPING INTO EXISTING. CONTRACTOR SHALL INCLUDE COST TO FREEZE OR HOT TAP PIPING, CUT AND PROVIDE ISOLATION VALVES SUCH THAT NEW WORK AND FUTURE MAINTENANCE CAN BE PERFORMED.
- C. CONTRACTOR SHALL COORDINATE ALL DISRUPTIVE OR "NOISY" WORK WITH OWNER AND OBTAIN OWNERS PERMISSION PRIOR TO PERFORMING DISRUPTIVE WORK. PERFORM WORK DURING OFF-HOURS IF NECESSARY. NOISY WORK MAY BE CONSIDERED. SAW CUTTING, CONCRETE DRILLING, GRINDER CUTTING, ETC. IF CONTRACTOR IS UNSURE WHAT WORK CONSTITUTES "NOISY" WORK, SUBMIT RFI TO OWNER FOR CLARIFICATION.
- D. WHEN BRANCH DUCTWORK IS REMOVED, PATCH ALL DUCT OPENINGS. PATCHES SHALL BE CONSTRUCTED OF SAME GAUGE SHEET METAL AS REMAINING DUCTWORK, SCREWED TO DUCTWORK AND SEALED WITH MASTIC.
- E. CONTRACTOR SHALL FIELD VERIFY THAT ALL EXISTING DIFFUSER BRANCH DUCTS TO REMAIN ARE EQUIPPED WITH VOLUME DAMPERS. IF OMITTED, CONTRACTOR SHALL PROVIDE AND INSTALL NEW VOLUME DAMPERS FOR PROPER SYSTEM BALANCING. PROVIDE BASE UNIT PRICING OFF LARGEST RUN OUT FOR VOLUME DAMPER INSTALL.
- F. CONTRACTOR IS TO REMOVE AND RE-INSTALL EXISTING ACOUSTIC CEILING TILES AS NEEDED TO PERFORM MECHANICAL NEW WORK AT THEIR DISCRETION IN COORDINATION WITH CEILING PLAN. EXISTING CEILING TILES ARE TO BE SAFELY AND SECURELY STORED TO PREVENT DAMAGE DURING NEW CONSTRUCTION. ANY DAMAGED OR UNUSABLE CEILING TILES ARE TO BE REPLACED IN KIND.

**KEYNOTES**

- 1. INSTALL ROOF TOP UNIT SUCH THAT DOWNWARD SUPPLY DISCHARGE FROM UNIT IS ALIGNED WITH EXISTING SUPPLY DUCTWORK TO ENVIRONMENTAL LAB AREA USING EXISTING ROOF PENETRATION. CONNECT TO EXISTING 56" X 22" DUCTWORK BELOW ROOF LINE.
- 2. ROUTE CONDENSATE PIPING FROM RTU-6 DRAIN CONNECTION TO NEAREST ROOF SCUPPER. MAINTAIN AT MINIMUM 1/8" PER FOOT OF SLOPE. PROVIDE SAFETY YELLOW WALKING RAMP OVER PIPING. REFER TO MECHANICAL DETAILS FOR EQUIPMENT CONDENSATE DRAIN OUTLET.
- 3. COORDINATE LOCATION OF WALL-MOUNTED FAN COIL UNIT WITH EXISTING ELECTRICAL EQUIPMENT AND BUILDING STRUCTURE. FAN COIL UNIT IS TO BE MOUNTED AT MINIMUM 6'-0" A.F.F.
- 4. EXISTING LABORATORY AREA, CORRIDORS, STORAGE, ENCLOSED OFFICE, AND OTHER SPACES ARE TO MAINTAIN CURRENT DUCTWORK ROUTING, AIR TERMINAL PLACEMENT, AND SYSTEM BALANCING. INSTALL NEW THERMOSTAT FOR RTU-6 IN SAME OR SIMILAR LOCATION AS EXISTING THERMOSTAT.
- 5. CAP OPENING ON EXISTING EXHAUST BRANCH DUCTWORK ABOVE CEILING. BRANCH DUCTWORK AND MANUAL VOLUME DAMPERS ARE TO REMAIN. PROVIDE NEW ACOUSTIC CEILING TILES AS NEEDED IN LOCATIONS IN WHICH SNORKELS WERE DEMOLISHED AND NOT REPLACED. COORDINATE WITH ARCHITECTURE AND OWNER TO MATCH NEW CEILING TILES TO EXISTING.
- 6. PROVIDE NEW CEILING MOUNTED EXHAUST SNORKELS (NEDERMAN FX2-ORIG-D75 OR EQUIVALENT) AND CONNECT TO EXISTING EXHAUST DUCTWORK ABOVE CEILING. REFER TO MECHANICAL DETAIL AND SCHEDULE. BALANCE NEW SNORKELS TO 100 CFM OF EXHAUST.
- 7. REFER TO MECHANICAL DETAILS FOR NATURAL GAS PIPING SUPPORT DETAIL, TYPICAL.

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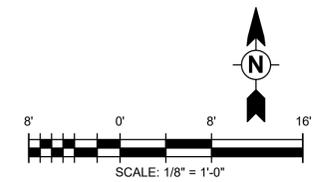


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**MECHANICAL NEW WORK - ADMINISTRATION BUILDING LAB & ROOF**

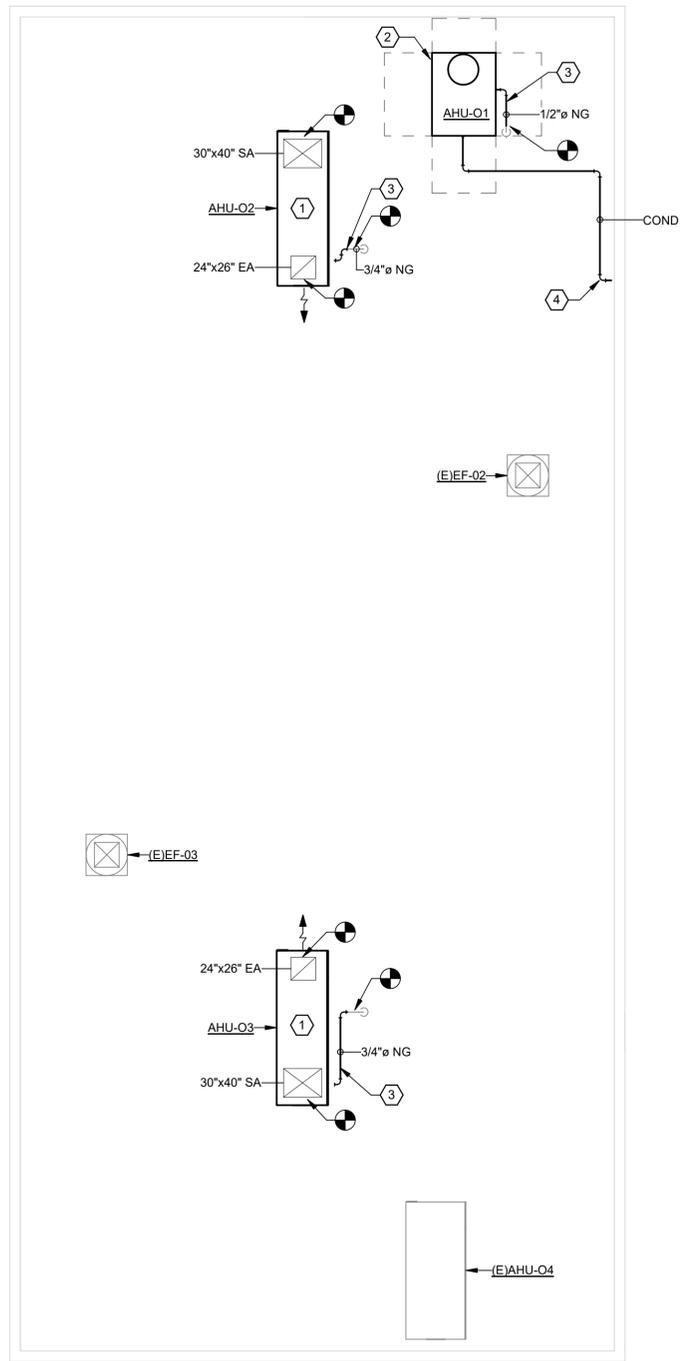
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CHKD:	KK

**M-206**



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**MECHANICAL NEW WORK - OZONE BUILDING - ROOF**  
SCALE: 1/8" = 1'-0"

**GENERAL NOTES**

- A. SIZE, QUANTITY, AND LOCATION OF DUCTWORK AND PIPING SHOWN IS APPROXIMATE. ANY SIZES INDICATED ARE TO AID CONTRACTOR IN ESTABLISHING DEMOLITION SCOPE ONLY. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING PIPING LOCATIONS AND SIZES PRIOR TO DEMOLITION. MEANS AND METHODS SHALL BE LEFT UP TO THE CONTRACTOR AT CONTRACTOR'S DISCRETION.
- B. CONTRACTOR SHALL ASSUME THERE ARE NO EXISTING ISOLATION VALVES OR THAT EXISTING ISOLATION VALVES ARE NON-FUNCTIONAL WHEN CONNECTING NEW PIPING INTO EXISTING. CONTRACTOR SHALL INCLUDE COST TO FREEZE OR HOT TAP PIPING, CUT AND PROVIDE ISOLATION VALVES SUCH THAT NEW WORK AND FUTURE MAINTENANCE CAN BE PERFORMED.
- C. CONTRACTOR SHALL COORDINATE ALL DISRUPTIVE OR "NOISY" WORK WITH OWNER AND OBTAIN OWNERS PERMISSION PRIOR TO PERFORMING DISRUPTIVE WORK. PERFORM WORK DURING OFF-HOURS IF NECESSARY. NOISY WORK MAY BE CONSIDERED, SAW CUTTING, CONCRETE DRILLING, GRINDER CUTTING, ETC. IF CONTRACTOR IS UNSURE WHAT WORK CONSTITUTES "NOISY" WORK, SUBMIT RFI TO OWNER FOR CLARIFICATION.
- D. WHEN BRANCH DUCTWORK IS REMOVED, PATCH ALL DUCT OPENINGS. PATCHES SHALL BE CONSTRUCTED OF SAME GAUGE SHEET METAL AS REMAINING DUCTWORK, SCREWED TO DUCTWORK AND SEALED WITH MASTIC. CONTRACTOR SHALL FIELD VERIFY THAT ALL EXISTING DIFFUSER BRANCH DUCTS TO REMAIN ARE EQUIPPED WITH VOLUME DAMPERS. IF OMITTED, CONTRACTOR SHALL PROVIDE AND INSTALL NEW VOLUME DAMPERS FOR PROPER SYSTEM BALANCING. PROVIDE BASE UNIT PRICING OFF LARGEST RUN OUT FOR VOLUME DAMPER INSTALL.
- F. CONTRACTOR IS TO REMOVE AND RE-INSTALL EXISTING ACOUSTIC CEILING TILES AS NEEDED TO PERFORM MECHANICAL NEW WORK AT THEIR DISCRETION IN COORDINATION WITH CEILING PLAN. EXISTING CEILING TILES ARE TO BE SAFELY AND SECURELY STORED TO PREVENT DAMAGE DURING NEW CONSTRUCTION. ANY DAMAGED OR UNUSABLE CEILING TILES ARE TO BE REPLACED IN KIND.

**KEYNOTES**

- 1. INSTALL AIR HANDLING UNIT ON SAME LOCATION AS PREVIOUS UNIT. CONNECT TO EXISTING SUPPLY AND EXHAUST DUCTWORK FROM ROOM BELOW. CONNECT TO EXISTING NATURAL GAS PIPING ON ROOF. REFER TO MECHANICAL DETAILS FOR CONNECTION DETAIL. FIELD VERIFY EXISTING SYSTEM PRESSURE AND PROVIDE REGULATOR AT EQUIPMENT CONNECTIONS IF REQUIRED. ALLOWABLE PRESSURE RANGES ARE INDICATED ON MECHANICAL SCHEDULES.
- 2. INSTALL PACKAGED ROOF TOP UNIT ON SAME LOCATION AS PREVIOUS UNIT. CONNECT TO EXISTING SUPPLY AND RETURN DUCTWORK FROM ROOM BELOW. CONNECT TO EXISTING NATURAL GAS PIPING ON ROOF. REFER TO MECHANICAL DETAILS FOR CONNECTION DETAIL. FIELD VERIFY EXISTING SYSTEM PRESSURE AND PROVIDE REGULATOR AT EQUIPMENT CONNECTIONS IF REQUIRED. ALLOWABLE PRESSURE RANGES ARE INDICATED ON MECHANICAL SCHEDULES.
- 3. REFER TO MECHANICAL DETAILS FOR NATURAL GAS PIPING SUPPORT DETAIL, TYPICAL.
- 4. ROUTE CONDENSATE PIPING FROM AHU TO NEAREST ROOF SCUPPER. MAINTAIN AT MINIMUM 1/8" OF SLOPE PER FOOT OF PIPE.



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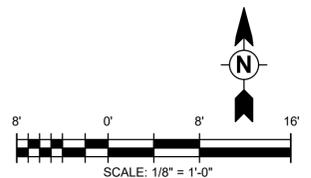


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WTP HVAC IMPROVEMENTS - PHASE II  
**MECHANICAL NEW WORK - OZONE BUILDING ROOF**

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CHKD:	KK

**M-207**



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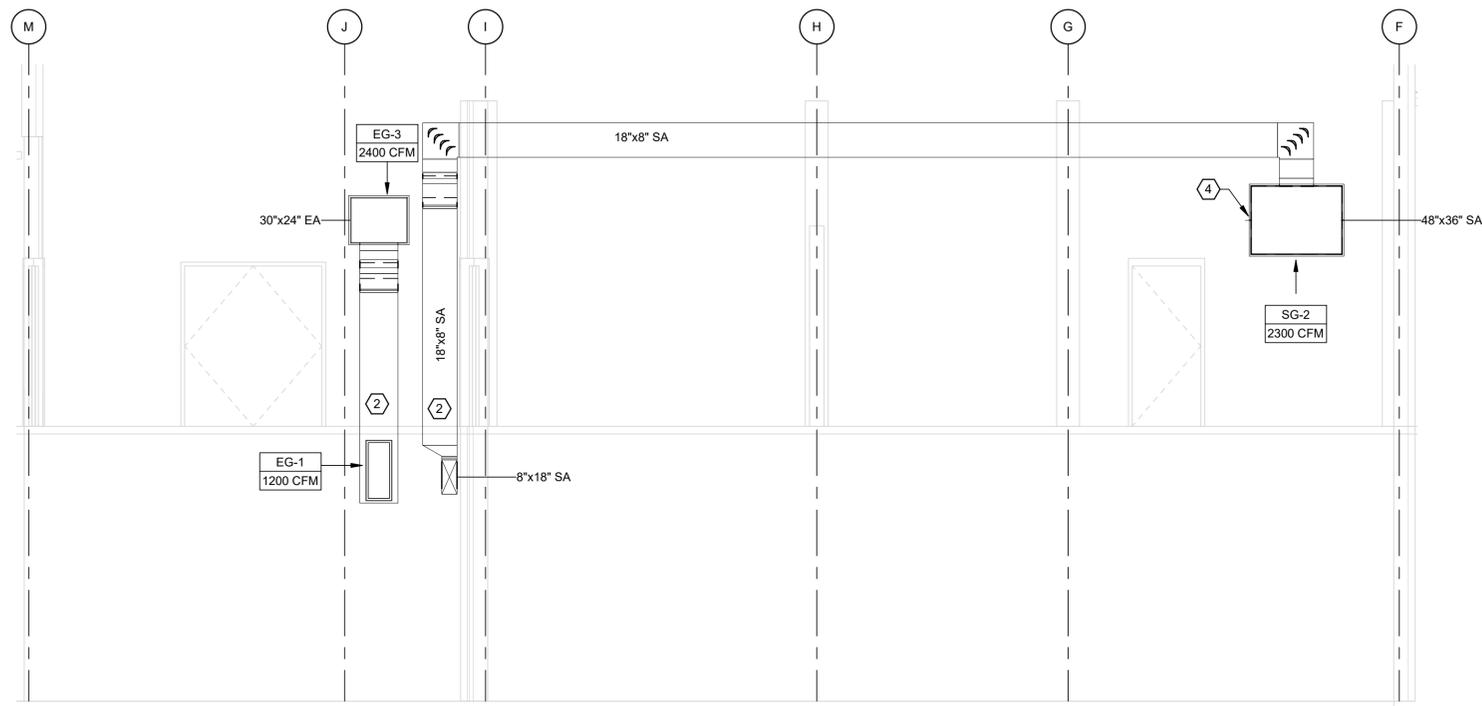


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**1 MECHANICAL SECTION - ADMINISTRATION BUILDING AHU-6**  
M-301 SCALE: 1/4" = 1'-0"



**2 MECHANICAL SECTION - LIME AGING AND SLAKING ROOMS VENTILATION**  
M-301 SCALE: 1/4" = 1'-0"

**KEYNOTES**

- 1 INSTALL ROOF TOP UNIT SUCH THAT DOWNWARD SUPPLY DISCHARGE FROM UNIT IS ALIGNED WITH EXISTING SUPPLY DUCTWORK TO ENVIRONMENTAL LAB AREA USING EXISTING ROOF PENETRATION. CONNECT TO EXISTING 56" X 22" DUCTWORK BELOW ROOF LINE.
- 2 ROUTE SUPPLY AND EXHAUST DUCTWORK DOWN TO LIME AGING ROOM FROM FLOOR ABOVE. COORDINATE WITH EXISTING EQUIPMENT, BUILDING STRUCTURE, CONDUIT, AND OTHER SYSTEMS TO AVOID COLLISION AT NEW FLOOR PENETRATION(S). ROUTE DUCTWORK TIGHT TO WALL AND CEILING.
- 3 REFER TO MECHANICAL DETAILS FOR ROOF MOUNTED DUCT SUPPORT DETAIL, TYPICAL.
- 4 CONTRACTOR TO FIELD VERIFY EXISTING WALL PENETRATION HEIGHT AND OPENING PRIOR TO LOUVER INSTALLATION.



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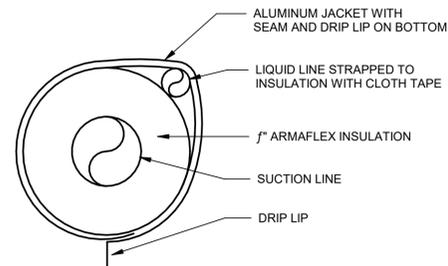
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WTP HVAC IMPROVEMENTS - PHASE II  
**MECHANICAL SECTIONS**

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DRWN: JRJ  
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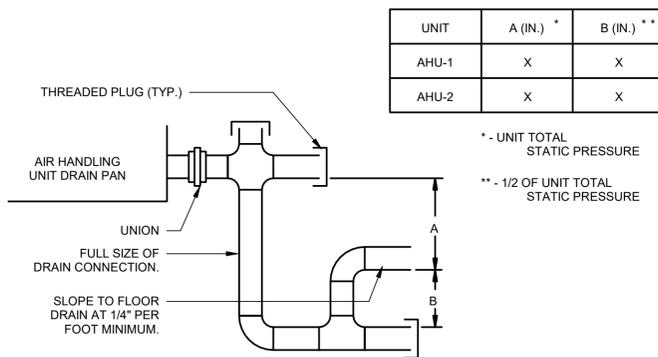
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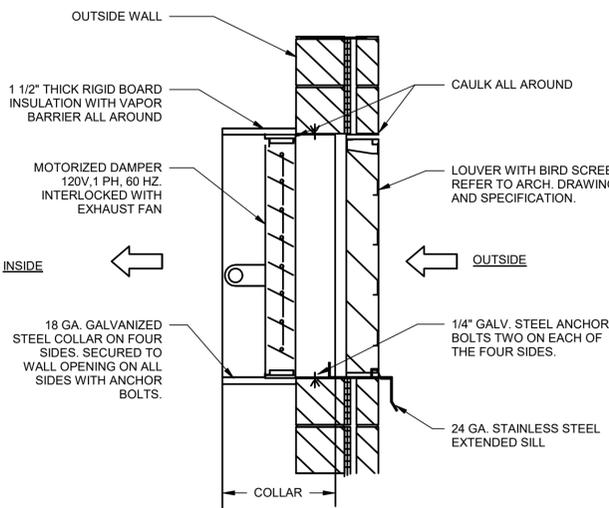
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**7 EXTERIOR REFRIGERANT LINE INSULATION DETAIL**  
M-501 SCALE: N.T.S.

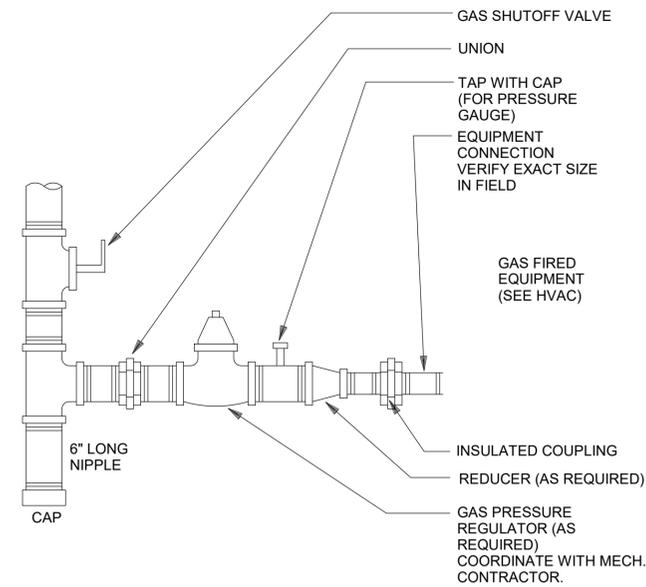


**8 AHU CONDENSATE DRAIN DETAIL**  
M-501 SCALE: N.T.S.

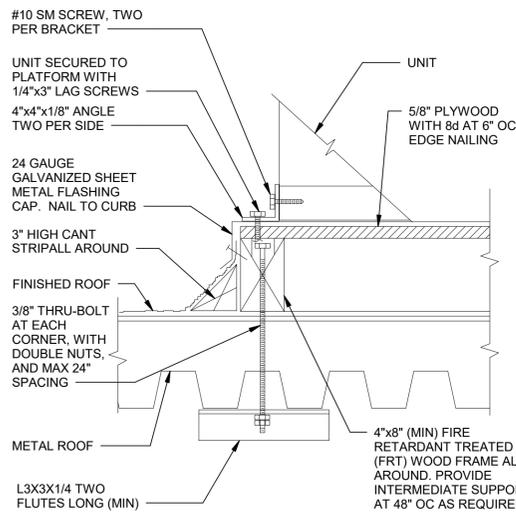


**9 LOUVER/DAMPER DETAIL**  
M-501 SCALE: N.T.S.

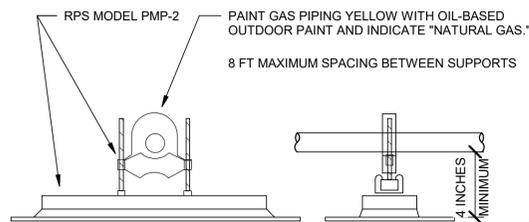
- NOTES:
- FOR LOCATION AND SIZE OF THE WALL OPENINGS, SEE PLANS.
  - LOUVER/DAMPER ASSEMBLIES TO BE ASSEMBLED AT LOUVER MANUFACTURER FACTORY.
  - EXTENDED SILL TO BE PROVIDED BY LOUVER MANUFACTURER.
  - MOTOR ACTUATORS TO BE SIZED AND INSTALLED BY LOUVER MANUFACTURER.
  - INSTALLATION OF LOUVER TO BE IN ACCORDANCE WITH LOUVER MANUFACTURER'S RECOMMENDATIONS.



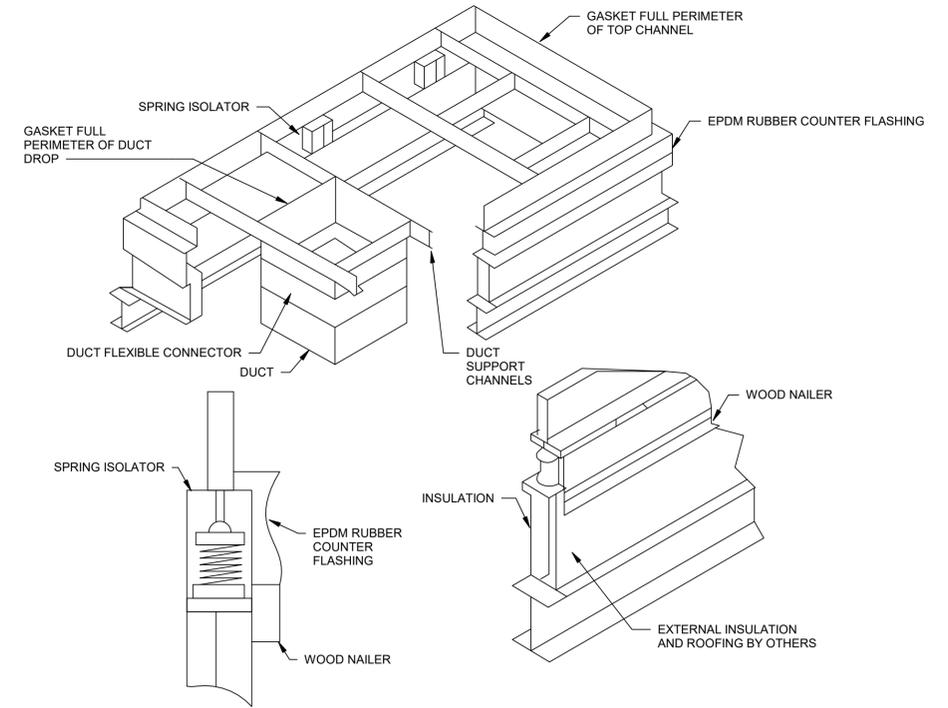
**4 GAS FIRED EQUIPMENT CONNECTION DETAIL**  
M-501 SCALE: N.T.S.



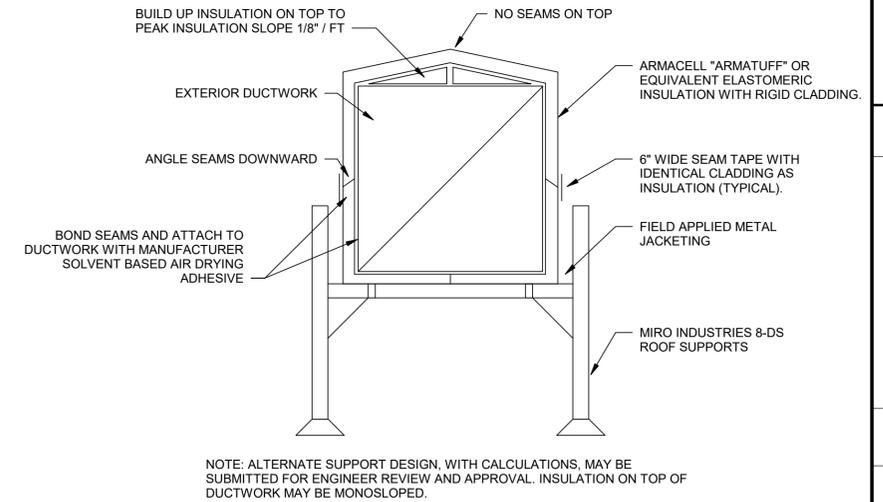
**5 TYPICAL ROOF MOUNTED CONDENSING UNIT DETAIL**  
M-501 SCALE: N.T.S.



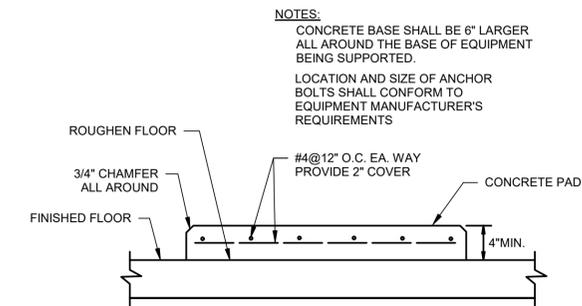
**6 ABOVE ROOF GAS PIPING**  
M-501 SCALE: N.T.S.



**1 ROOF VIBRATION ISOLATION CURB DETAIL**  
M-501 SCALE: N.T.S.

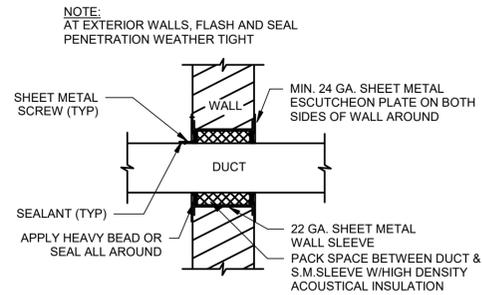


**2 EXTERIOR DUCT SUPPORT AND INSULATION**  
M-501 SCALE: N.T.S.

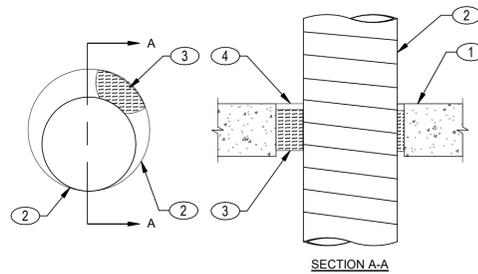


**3 CONCRETE EQUIPMENT PAD DETAIL**  
M-501 SCALE: N.T.S.

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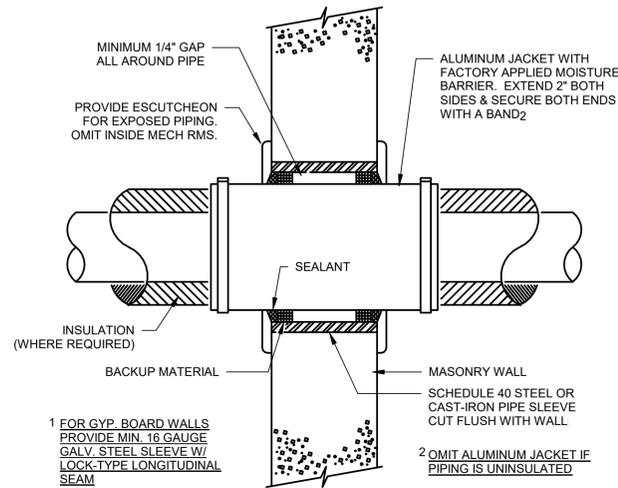


**6 DUCT PENETRATION THROUGH NON-FIRE RATED WALL**  
M-502 SCALE: N.T.S.

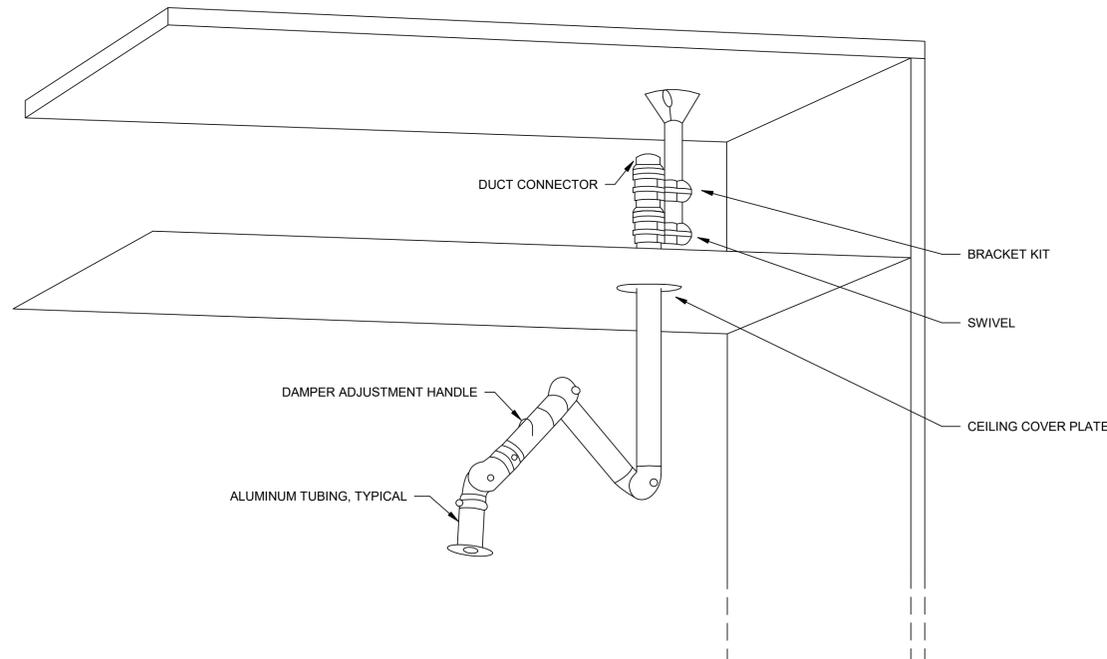


- NOTES: #
- FLOOR ASSEMBLY: LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF) CONCRETE. MINIMUM THICKNESS IS 4-1/2". MAXIMUM 18" DIAMETER OPENING IN SOLID LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE.
  - THROUGH PENETRANT: ONE STEEL DUCT TO BE INSTALLED EITHER CONCENTRICALLY OR ECCENTRICALLY WITHIN THE FIRESTOP SYSTEM. AN ANNULAR SPACE OF MINIMUM 1/2" TO MAXIMUM 1-1/2" IS REQUIRED WITHIN THE FIRESTOP SYSTEM. STEEL DUCT TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR ASSEMBLY. THE FOLLOWING SIZES OF STEEL DUCTS MAY BE USED:
    - STEEL PIPE: NOMINAL 16" (OR SMALLER) NO. 24 GAUGE (OR HEAVIER) SPIRAL WOUND GALVANIZED STEEL DUCT.
    - STEEL VENT DUCT: NOMINAL 10" (OR SMALLER) NO. 28 GAUGE (OR HEAVIER) GALVANIZED STEEL VENT DUCT.
  - PACKING MATERIAL: MINIMUM OF 3-1/2" THICKNESS OF MINIMUM 4 PCF MINERAL WOOL BATT INSULATION FIRMLY PACKED INTO OPENING AS A PERMANENT FORM. PACKING MATERIAL TO BE RECESSED FROM TOP SURFACE OF FLOOR OR FROM BOTH SURFACES OF WALL TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.
  - FILL, VOID OR CAVITY MATERIAL-CAULK OR SEALANT: MINIMUM 1/2" THICKNESS OF CAULK APPLIED WITHIN THE ANNULUS, FLUSH WITH TOP SURFACE OF FLOOR. THE HOURLY F RATINGS AND THE MIN REQUIRED CAULK THICKNESSES ARE DEPENDENT UPON A NUMBER OF PARAMETERS, AS DEFINED BY THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

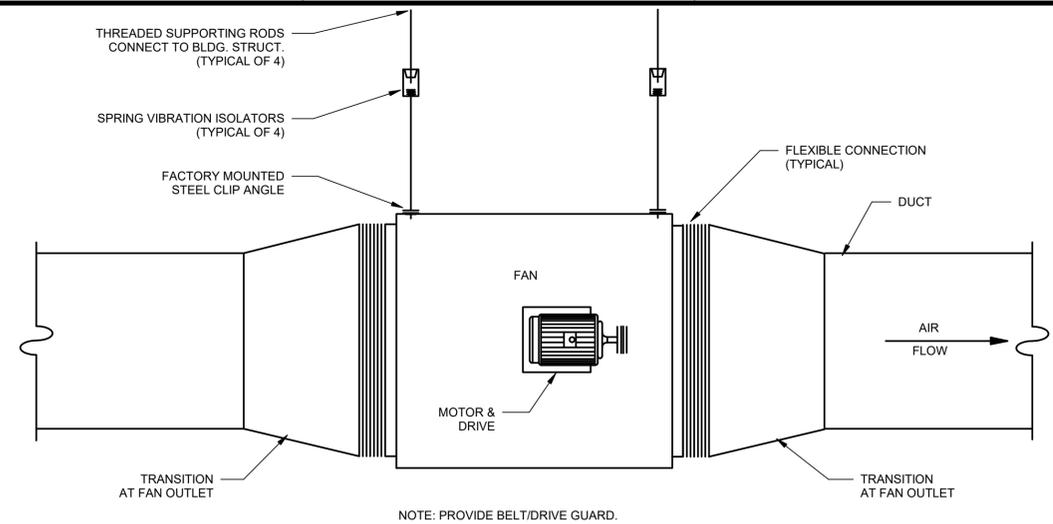
**4 DUCT PENETRATION THROUGH CONCRETE FLOOR - 2 HR RATED**  
M-502 SCALE: N.T.S.



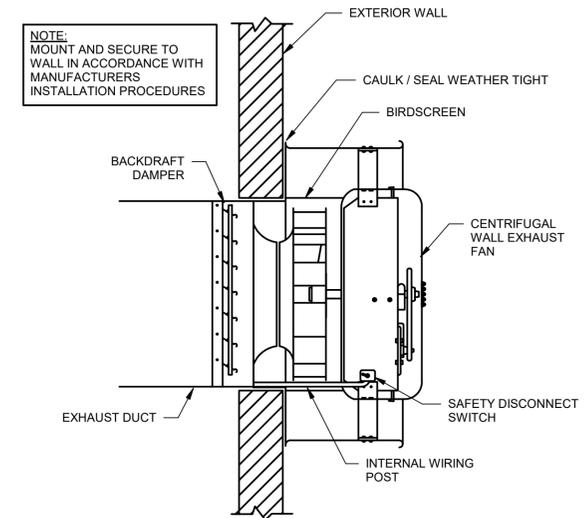
**7 WALL PIPE PENETRATION DETAIL**  
M-502 SCALE: N.T.S.



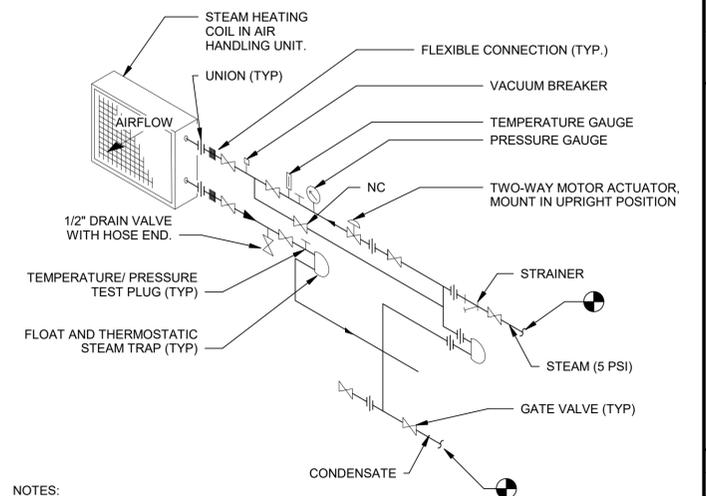
**5 TYPICAL EXHAUST EXTRACTION ARM DETAIL**  
M-502 SCALE: 12" = 1'-0"



**1 IN-LINE FAN DETAIL**  
M-502 SCALE: N.T.S.



**2 CENTRIFUGAL WALL EXHAUST FAN DETAIL**  
M-502 SCALE: N.T.S.



**3 TYPICAL LOW PRESSURE STEAM COIL DETAIL**  
M-502 SCALE: N.T.S.



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CITY OF ANN ARBOR, MICHIGAN  
WTP HVAC IMPROVEMENTS - PHASE II  
MECHANICAL DETAILS

PROJ: 200-31537-21005  
DESN: JRJ  
DRWN: JRJ  
CHKD: KK

**M-502**

PACKAGED ROOF TOP UNIT SCHEDULE																								
MARK	SUPPLY FANS						RETURN (EXHAUST) FANS						OUTSIDE AIRFLOW (CFM)	COOLING										
	AIRFLOW (CFM)	E.S.P. (IN-WG)	T.S.P. (IN-WG)	FAN QTY.	RPM	HP	AIRFLOW (CFM)	E.S.P. (IN-WG)	T.S.P. (IN-WG)	FAN QTY.	HP	RPM		AMBIENT TEMP. (°F)	NOMINAL TONS (INCLUDING RECOVERY)	TOTAL CAPACITY (MBH)	SENSIBLE COOLING (MBH)	E.A.T (DB/WB DEG F)	L.A.T (DB/WB DEG F)	NO. OF ROWS	NO. OF CIRCUITS	NO. OF STAGES	EER	IEER
AHU-6	12480	2.00	5.29	2	1792	10	12480	2.00	4.38	2	7.5	1762	12480	98	104	866.9	447.5	85.0 / 73.1	52.5 / 52.3	6	2	2	8.4	11.6
AHU-01	1500	1.00	1.5	1	1600	2.3	1500	1.00	1.50	1	2.3	1600	100	95	4	48.0	-	80 / 67	57 / 56	2	1	1	12.4	17.0

PACKAGED ROOF TOP UNIT SCHEDULE (CONTD.)																								
MARK	HEATING						ELECTRIC PREHEAT			ENERGY RECOVERY						ELECTRICAL			WEIGHT (LBS)	MANUFACTURER	MODEL	NOTES		
	INPUT (MBH)	OUTPUT (MBH)	TURNDOWN RATIO	E.A.T. (DB °F)	L.A.T. (DB °F)	HEAT SOURCE	INLET PRESSURE MIN/MAX (IN. WC)	CAPACITY (KW)	TEMPERATURE RISE (°F)	MIXED AIR		EFFECTIVENESS		RECOVERED CAPACITY (MBH)		VOLTS / PH / HZ	MCA	MOP						
										COOLING ENTHALPY (BTU/LB)	HEATING ENTHALPY (BTU/LB)	COOLING L.A.T. (°F)	HEATING L.A.T. (°F)	COOLING (%)	HEATING (%)								COOLING	HEATING
AHU-6	1000	800	10:1	40.6	99.6	NATURAL GAS	6 - 14	55	13.9	36.6	11.8	85	40.6	50.1	61.8	434.3	494.4	460 / 3 / 60	181.9	200	12310	VALENT	VPRC-352-70C	1, 2, 3
AHU-01	120	97	5:1	-10	90	NATURAL GAS	7 - 14	-	-	-	-	-	-	-	-	-	-	460 / 3 / 60	11.3	15	1353	DAIKIN	DPS-004-AHHG4	3

- NOTES:**
- PROVIDE GPS IMOD MODULAR NEEDLEPOINT BIPOLAR IONIZATION SYSTEM IN THE COOLING COIL CABINET PER GLOBAL PLASMA SOLUTIONS MANUFACTURER SPECIFICATIONS.
  - PROVIDE GPS I-DETECT-P PLENUM-MOUNTED ION DETECTOR IN SUPPLY AIR DISCHARGE PLENUM PER GLOBAL PLASMA SOLUTIONS MANUFACTURER SPECIFICATIONS.
  - PROVIDE 18" FACTORY ROOF CURB COORDINATED WITH EXISTING ROOF PENETRATIONS.

CHEMICAL FEED BUILDING INTERIOR AIR HANDLING UNIT (AHU) SCHEDULE																	
MARK	SUPPLY FAN					RETURN / EXHAUST			OUTSIDE AIRFLOW (CFM)	COOLING							
	AIRFLOW (CFM)	E.S.P. (IN-WG)	T.S.P. (IN-WG)	RPM	MOTOR HP	AIRFLOW (CFM)	E.S.P. (IN-WG)	T.S.P. (IN-WG)		AMBIENT TEMP. (°F)	NOMINAL TONS	TOTAL CAPACITY (MBH)	SENSIBLE COOLING (MBH)	E.A.T (DB/WB DEG F)	L.A.T (DB/WB DEG F)	COIL FACE AREA (SQ FT)	FIN SPACING (FINS/IN)
AHU-1	1285	1.50	3.00	2182	2.5	-	-	-	1285	95	7.3	88.1	53.2	95 / 75	54.8 / 53.3	3.12	9
AHU-2	3690	2.00	3.19	3124	2.25	1850	2.00	3.19	1840	95	12.5	151.1	99.7	80 / 67	55.3 / 53.7	7.5	9
AHU-3	1730	1.85	3.05	1592	1.57	1520	1.85	3.05	210	95	4.2	49.8	41.3	78.1 / 63.8	53.5 / 52.7	3.2	16
AHU-4	1450	1.00	2.11	1566	1.57	1340	0.50	1.05	110	95	4.0	47.2	37.9	77.0 / 63.6	53.1 / 52.4	3.2	16

CHEMICAL FEED BUILDING INTERIOR AIR HANDLING UNIT (AHU) SCHEDULE (CONTD.)														
MARK	HEATING						ELECTRICAL			WEIGHT (LBS)	MANUFACTURER	MODEL	NOTES	
	HEAT SOURCE	STEAM INLET (LB)	CONDENSATE (LB/HR)	OUTPUT (MBH)	E.A.T. (DB °F)	L.A.T. (DB °F)	VOLTS / PH / HZ	MCA	MOP					
AHU-1	STEAM	5	154.0	147.8	-10	101.7	460 / 3 / 60	3.5	15	990	DAIKIN	CAH003GDCC	1	
AHU-2	STEAM	5	187.0	179.2	52.0	96.4	460 / 3 / 60	7	15	1505	DAIKIN	CAH008GDCC	1	
AHU-3	STEAM	5	106.6	77.9	58.6	105.0	460 / 3 / 60	11.7	15	562	DAIKIN	BCHD0161	1	
AHU-4	STEAM	5	104.2	74.5	54.5	110.0	460 / 3 / 60	7.8	15	562	DAIKIN	BCHD0161	-	

- NOTES:**
- PROVIDE GPS-FC48 AUTOCLEANING NEEDLEPOINT BIPOLAR IONIZATION SYSTEM IN THE SUPPLY FAN INLET CABINET PER GLOBAL PLASMA SOLUTIONS MANUFACTURER SPECIFICATIONS.

OZONE BUILDING ROOF MOUNTED AIR HANDLING UNIT (AHU) SCHEDULE																						
MARK	AIRFLOW (CFM)	E.S.P. (IN-WG)	T.S.P. (IN-WG)	FILTER TYPE	HP	MOTOR TYPE	RPM	AIRFLOW (CFM)	RETURN T.S.P. (IN-WG)	INPUT CAP. (MBH)	OUTPUT CAP. (MBH)	AMBIENT TEMP. HEATING (F)	VOLTS / PH / HZ	MCA	MOP	LENGTH (IN)	WIDTH (IN)	HEIGHT (IN)	WEIGHT (LBS)	MANUFACTURER	MODEL	NOTES
AHU-02	5165 CFM	0.50 in-wg	1.20 in-wg	MERV 13	3.0	DIRECT	880	4650	1.2	600	480	-10	460 / 3 / 60	4.1	15	110 1/2"	52 1/4"	41"	2080	HASTINGS	HRHVB-600-V	-
AHU-03	5165 CFM	0.50 in-wg	1.20 in-wg	MERV 13	3.0	DIRECT	880	4650	1.2	600	480	-10	460 / 3 / 60	4.1	15	110 1/2"	52 1/4"	41"	2080	HASTINGS	HRHVB-600-V	-

- NOTES:**
- PROVIDE FACTORY ROOF CURB COORDINATED WITH EXISTING ROOF PENETRATIONS.

SPLIT SYSTEM HEAT PUMP SCHEDULE																
MARK	ASSOCIATED EQUIPMENT	AIR FLOW (CFM)	TONS	COOLING CAPACITY (MBH)	HEATING CAPACITY (MBH)	NO. OF FANS	AMBIENT TEMP. (°F)	REFRIGERANT	MCA	MOCP	EER	VOLTS / PH / HZ	WEIGHT (LBS)	MANUFACTURER	MODEL	NOTES
FCU-1	HP-1	436	1	10.9	8.6	1	95	R-410A	8.7	15 A	12.5	208 / 1 / 60	22	DAIKIN	FTX12AXVJU	1
HP-1	FCU-1	1051	1	10.9	8.6	1	95	R-410A	8.7	15 A	-	208 / 1 / 60	64	DAIKIN	RX12AXVJU	1

- NOTES:**
- INDOOR UNIT SHALL BE POWERED THROUGH OUTDOOR HEAT PUMP. PROVIDE INDOOR UNIT WITH FACTORY REMOTE PROGRAMMABLE THERMOSTAT, BLUE DIAMOND CONDENSATE PUMP, MERV 13 FILTER BOX, AND 100' REFRIGERANT LINESET. PROVIDE OUTDOOR UNIT WITH FACTORY 24" STAND. SECURE TO CONCRETE PAD. INSTALL SYSTEM PER MANUFACTURER REQUIREMENTS.



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CITY OF ANN ARBOR, MICHIGAN  
WTP HVAC IMPROVEMENTS - PHASE II  
MECHANICAL SCHEDULES

PROJ: 200-31537-21005  
DESN: JRJ  
DRWN: JRJ  
CHKD: KK

M-601

CONDENSING UNIT SCHEDULE																
MARK	NOMINAL TONS	TOTAL CAPACITY (MBH)	NO. OF FANS	NO. OF STAGES	NO. OF CIRCUITS	DESIGN AMBIENT TEMP. (°F)	VOLTS / PH / HZ	FAN HP	MCA	MOP	FLA	ASSOCIATED EQUIPMENT	WEIGHT (LBS)	MANUFACTURER	MODEL	NOTES
CU-1	10	120.0	1	2	1	95	460 / 3 / 60	0.33	22	35	12.0	AHU-1	340	DAIKIN	DX11TA1204	-
CU-2	12	143.0	2	2	1	95	460 / 3 / 60	0.33	27	35	24	AHU-2	746	DAIKIN	RCS12F150D	-
CU-3	4	46.0	1	1	1	95	460 / 3 / 60	0.33	8.4	15	6.1	AHU-3	188	DAIKIN	DX13SA0484	-
CU-4	4	46.0	1	1	1	95	460 / 3 / 60	0.33	8.4	15	6.1	AHU-4	188	DAIKIN	DX13SA0484	-

FAN SCHEDULE												
MARK	AIR FLOW (CFM)	S.P. (IN WG)	FAN RPM	HP	VOLTS / PH / HZ	TYPE	DRIVE	LOCATION	SERVICE	MANUFACTURER	MODEL	NOTES
EF-18	3600	1.00	1537	2	208 / 1 / 60	WALL MOUNTED CENTRIFUGAL	DIRECT	LIME SLAKING RM	EXHAUST	GREENHECK	CUE-160-VG	1, 2
EF-A4	905	1.50	1755	3/4	115 / 1 / 60	ROOF MOUNTED CENTRIFUGAL	DIRECT	CHEMICAL FEED BUILDING ROOF	EXHAUST	GREENHECK	CUE-140HP-VG	2
EF-AM1	210	0.51	1550	1/20	115 / 1 / 60	WALL MOUNTED CENTRIFUGAL	DIRECT	AMMONIA BUILDING	EXHAUST	GREENHECK	CUE-100-A	1, 2
EF-CL1	1350	1.55	3500	3/4	460 / 3 / 60	INLINE TUBE AXIAL	DIRECT	HYPOCHLORITE FEED RM	EXHAUST	GREENHECK	AX-36-160-0409	1
EF-F1	1200	0.53	1725	1/3	115 / 1 / 60	ROOF MOUNTED CENTRIFUGAL	DIRECT	FILTER GALLERY EAST	EXHAUST	GREENHECK	CUE-100-A	2, 3
EF-FL1	450	0.51	1770	1/3	460 / 3 / 60	INLINE TUBE AXIAL	DIRECT	FLOURIDE FEED RM	EXHAUST	GREENHECK	AX-31-160-0613	1
EF-NA1	510	0.25	1300	1/25	115 / 1 / 60	ROOF MOUNTED CENTRIFUGAL	DIRECT	SODIUM HYDROXIDE VAULT	EXHAUST	GREENHECK	CUE-100-A	2

- NOTES:**  
1. PROVIDE WITH FACTORY CHEMICAL RESISTANT COATING. REFER TO MANUFACTURER COATING APPLICATION GUIDE FOR COATING RESISTANCE TO SPECIFIC CHEMICALS.  
2. PROVIDE WITH FACTORY CURB SEAL, BIRD SCREEN, NON-STICK ALUMINUM WHEEL, AND DISCONNECT SWITCH.  
3. PROVIDE WITH MOTORIZED CONTROL DAMPER INTERLOCKED WITH FAN.

LOUVER SCHEDULE												
MARK	LOCATION	TYPE	AIR FLOW (CFM)	SIZE W X H (IN)	FREE AREA (SQ FT)	VELOCITY (FPM)	AIR PRESSURE DROP (IN WG)	MOUNTING	MATERIAL	MANUFACTURER	MODEL	NOTES
L-1	LIME SLAKING ROOM	INTAKE	3400	48" X 36"	6.91	492	0.04	SIDEWALL	ALUMINUM	GREENHECK	ESD-635	-
L-2	FILTER GALLERY	INTAKE	1200	36" X 24"	2.77	433	0.03	SIDEWALL	ALUMINUM	GREENHECK	ESD-635	-

- NOTES:**  
1. PROVIDE WITH INSECT SCREEN AND MOTORIZED DAMPER. FINISH COLOR SHALL MATCH EXISTING LOUVERS AT FACILITY.

GRILLE, REGISTER, AND DIFFUSER SCHEDULE										
MARK	DESCRIPTION	PANEL SIZE (IN)	AIR FLOW RANGE (CFM)	FINISH	MATERIAL	DAMPER	MAX NC	MANUFACTURER	MODEL	NOTES
EG-1	DUCT MOUNTED EXHAUST GRILLE	30 X 12	1200	MILL WHITE	ALUMINUM	MANUAL	17	TITUS	272FL	-
EG-2	DUCT MOUNTED EXHAUST GRILLE	14" ø	450	MILL WHITE	ALUMINUM	-	< 15	TITUS	R-300F	-
EG-3	DUCT MOUNTED EXHAUST GRILLE	30 X 24	2400	MILL WHITE	ALUMINUM	MANUAL	< 15	TITUS	272FL	-
EG-4	DUCT MOUNTED EXHAUST GRILLE	8 X 8	110	MILL WHITE	ALUMINUM	MANUAL	< 15	TITUS	272FL	-
EG-5	DUCT MOUNTED EXHAUST GRILLE	20 X 20	1200	MILL WHITE	ALUMINUM	MOTORIZED	< 15	TITUS	272FL	-
RG-1	DUCT MOUNTED RETURN GRILLE	30 X 12	1190	MILL WHITE	ALUMINUM	MANUAL	< 15	TITUS	272FL	-
RG-2	WALL MOUNTED RETURN GRILLE	12 X 8	150	MILL WHITE	ALUMINUM	MANUAL	< 15	TITUS	272FL	-
SG-1	DUCT MOUNTED SUPPLY GRILLE	30 X 12	1100	MILL WHITE	ALUMINUM	MANUAL	< 15	TITUS	272FL	-
SG-2	DUCT MOUNTED SUPPLY GRILLE	48 X 36	2400	MILL WHITE	ALUMINUM	MANUAL	< 15	TITUS	272FL	-
SG-3	WALL MOUNTED SUPPLY GRILLE	8 X 6	100	MILL WHITE	ALUMINUM	MANUAL	< 15	TITUS	272FL	-

LABORATORY EXHAUST SNORKEL (SNK) SCHEDULE							
MARK	DESCRIPTION	AIRFLOW (CFM)	PRESSURE DROP (IN-WG)	ARM DIAMETER (IN)	MANUFACTURER	MODEL	NOTES
SNK-1	CEILING MOUNTED EXHAUST EXTRACTION ARM	110 - 265	1.0	4	NEDERMAN	FX2-ORIG-D100-L1800	1

- NOTES:**  
1. PROVIDE WITH ABOVE CEILING EXTENSION KIT, DOME HOOD, CEILING COVER PLATE, AND DUCT CONNECTOR ACCESSORIES.



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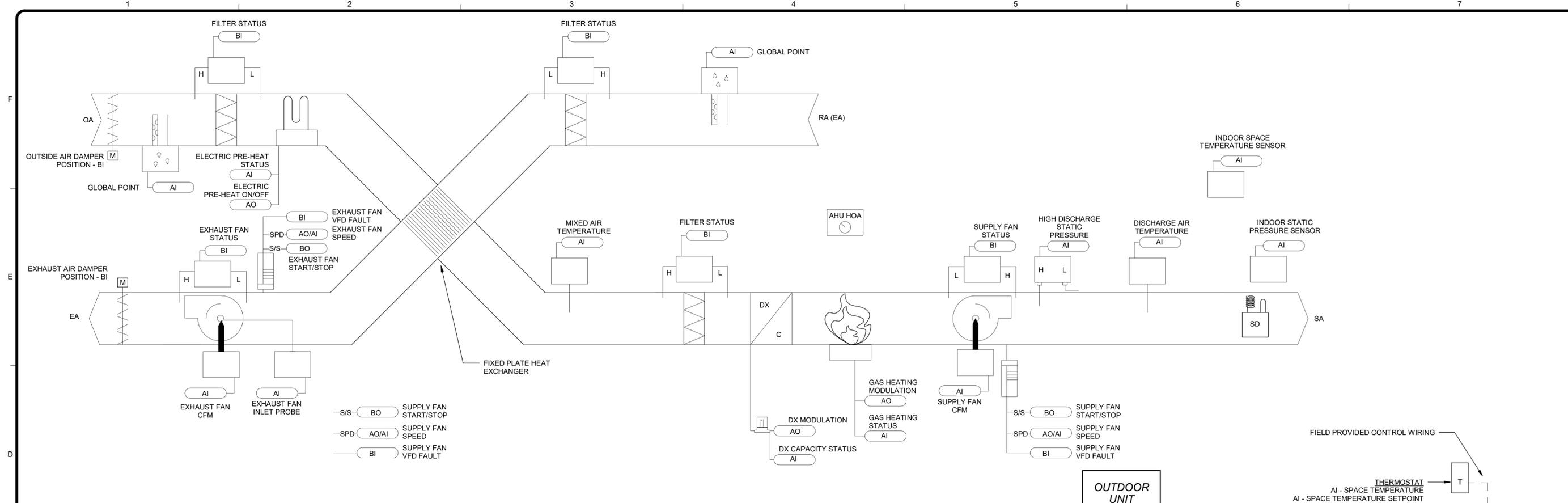
MARK	DATE	DESCRIPTION
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CITY OF ANN ARBOR, MICHIGAN  
WTP HVAC IMPROVEMENTS - PHASE II  
MECHANICAL SCHEDULES

PROJ: 200-31537-21005  
DESN: JRJ  
DRWN: JRJ  
CHKD: KK

M-602

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**PACKAGED ROOF TOP UNIT WITH ENERGY RECOVERY SEQUENCE OF OPERATIONS (AHU-6)**

MANUFACTURER SHALL PROVIDE THE UNIT WITH A STAND-ALONE UNIT CONTROLLER CAPABLE OF THE FOLLOWING SEQUENCES OF OPERATIONS AND MINIMUM FEATURES. ALL CONTROL SENSORS AND DEVICES INDICATED SHALL EITHER BE PROVIDED BY MANUFACTURER OR CONTROLS CONTRACTOR IN ORDER TO MEET THE INTENT OF THESE SEQUENCES.

**THE CONTROL OF AHU-6. INSTRUMENTS, GAGES, CONTROL VALVES, AND ACCESSORIES SHALL UTILIZE THE CONTROL SYSTEM PROVIDED BY THE CONTRACTOR. CONTRACTOR SHALL PROVIDE ALL NECESSARY WIRING AND CONDUIT, DEVICES, CONTROLLERS, INTERLOCKS, AND SWITCHES AS NECESSARY TO MEET THE INTENT OF THESE SEQUENCES AND THE CONTROL DIAGRAMS SHOWN. CONTRACTOR SHALL COORDINATE FOR A FULLY FUNCTIONAL SYSTEM.**

THE OUTSIDE AIR DAMPER AND EXHAUST AIR DAMPER SHALL OPEN AND PROVIDE PROOF OF OPEN STATUS. THE RETURN AIR DAMPER SHALL CLOSE AND PROVIDE PROOF OF STATUS. THE SUPPLY AIR FAN AND EXHAUST FAN SHALL START UPON PROOF OF DAMPERS AND RUN CONTINUOUSLY UNLESS SHUT DOWN BY OPERATOR OR SAFETIES. THE UNIT CONTROLLER SHALL MAINTAIN THE OCCUPIED SPACE TEMPERATURE SETPOINT. THE LABORATORY EXHAUST HOODS RUN CONTINUOUSLY. AHU-6 IS TO ALSO RUN CONTINUOUSLY TO CONDITION THE SPACE.

**HEATING MODE:**  
IF SPACE TEMPERATURE FALLS BELOW THE SETPOINT MINUS THE DEADBAND THE HEATING SHALL BE ENABLED BY THE UNIT CONTROLLER. UPON PROOF OF INTERNAL SAFETIES THE GAS BURNER SHALL START AND MODULATE TO MAINTAIN THE SPACE TEMPERATURE SETPOINT. THE ELECTRIC PRE-HEAT WILL PRE-CONDITION OUTSIDE AIR BEFORE ENTERING THE FIXED PLATE HEAT EXCHANGER.

**COOLING MODE:**  
IF SPACE TEMPERATURE RISES ABOVE THE SETPOINT PLUS THE DEADBAND THE DX COOLING SYSTEM SHALL BE ENABLED BY THE UNIT CONTROLLER. THE UNIT CONTROLLER SHALL MODULATE THE COOLING SYSTEM TO MAINTAIN THE SPACE TEMPERATURE SETPOINT. AHU-6 INCLUDES A DUAL COMPRESSOR CIRCUIT FOR COOLING REDUNDANCY. IN THE EVENT ONE OF THE CIRCUITS FAILS, AN ALARM SHALL BE ANNUNCIATED AT THE UNIT CONTROLLER AND UNIT SHALL CONTINUE TO OPERATE WITH SINGLE CIRCUIT.

**ALARMS**  
THE FOLLOWING ALARMS SHALL BE SENT FROM THE UNIT CONTROLLER TO THE PLANT'S SCADA SYSTEM:

**COOLING:**  
- FAILURE OF EITHER COMPRESSOR CIRCUIT  
- SPACE TEMPERATURE EXCEEDS 80°F

**HEATING:**  
- SPACE TEMPERATURE FALLS BELOW 65°F

**BYPASS MODE:**  
- UNIT IS IN OCCUPIED BYPASS MODE

**SUPPLY:**  
- SUPPLY FAN FAILURE: COMMANDED ON BUT THE STATUS IS OFF  
- SUPPLY FAN IN HAND: COMMANDED OFF BUT THE STATUS IS ON  
- SUPPLY FAN VFD FAULT: FAN CANNOT MEET VFD SETPOINT

**EXHAUST:**  
- EXHAUST FAN FAILURE: COMMANDED ON BUT THE STATUS IS OFF  
- EXHAUST FAN IN HAND: COMMANDED OFF BUT THE STATUS IS ON  
- EXHAUST FAN VFD FAULT: FAN CANNOT MEET VFD SETPOINT

**PACKAGED ROOF TOP UNIT WITH ENERGY RECOVERY SEQUENCE OF OPERATIONS (AHU-6) CONT.**

**OCCUPIED BYPASS:**  
THE UNIT CONTROLLER SHALL MONITOR STATUS OF "ON" AND "CANCEL" BUTTONS OF THE SPACE TEMPERATURE SENSORS. WHEN OCCUPIED BYPASS REQUEST IS RECEIVED FROM A SPACE SENSOR, THE UNIT SHALL TRANSITION FROM CURRENT OCCUPANCY MODE TO OCCUPIED BYPASS MODE AND UNIT SHALL MAINTAIN SPACE TEMPERATURE TO OCCUPIED SETPOINTS (ADJ.)

**ENERGY RECOVERY:**  
THE UNIT CONTROLLER SHALL VARY THE POSITION OF THE OUTSIDE AIR DAMPER TO OBTAIN THE MAXIMUM TEMPERATURE DIFFERENCE BETWEEN INLET AND OUTLET OUTSIDE AIR TEMPERATURES ACROSS THE FIXED PLATE HEAT EXCHANGER. THE UNIT CONTROLLER SHALL READ THE OUTSIDE AIR DAMPER POSITION AND DISPLAY AT THE GUI.

**SUPPLY FAN:**  
THE SUPPLY FAN SHALL OPERATE CONTINUOUSLY WHILE THE EXHAUST FUME HOODS ARE OPERATIONAL. A DIFFERENTIAL PRESSURE SWITCH SHALL MONITOR DIFFERENTIAL PRESSURE ACROSS THE FAN. IF THE SWITCH DOES NOT OPEN WITHIN 40 SECONDS AFTER REQUEST FOR FAN OPERATION, A FAN FAILURE ALARM SHALL BE ANNUNCIATED AT THE UNIT CONTROLLER. THE UNIT SHALL STOP, REQUIRING A MANUAL RESET. THE EXHAUST FAN IS TO BE INTERLOCKED WITH THE SUPPLY FAN SUCH THAT WHEN THE SUPPLY FAN IS RUNNING, THE EXHAUST FAN IS ALSO TO RUN.

**SUPPLY & EXHAUST FAN HIGH PRESSURE LIMIT OPERATION:**  
IF SUPPLY DUCT STATIC PRESSURE REACHES 4.00 INCHES OF W.C. (ADJ.), THE HIGH LIMIT PRESSURE SWITCH SHALL SHUT DOWN THE UNIT, REQUIRING A MANUAL RESET TO RE-START THE UNIT. SUPPLY AND EXHAUST FANS ARE INTERLOCKED VIA SOFTWARE; A FAILURE OF EITHER SHALL DISABLE BOTH.

**FILTER STATUS:**  
A DIFFERENTIAL PRESSURE SWITCH SHALL MONITOR DIFFERENTIAL PRESSURE ACROSS THE FILTER WHEN THE FAN IS RUNNING. THE CONTRACTOR SHALL SET THE PRESSURE SWITCHES TO CLOSE WHEN THE PRESSURE ACROSS THE FILTER RACK IS 150% OF THE LISTED CLEAN PRESSURE DROP. IF THE SWITCH CLOSURES FOR 2 MINUTES AFTER A REQUEST FOR FAN OPERATION, A DIRTY FILTER ALARM SHALL BE ANNUNCIATED AT THE BAS.

**SETPOINTS:**

- COOLING SETPOINT: 75
- HEATING SETPOINT: 70
- DEADBAND: 2 DEGREES
- ALL SETPOINTS ADJUSTABLE AT UNIT CONTROLLER.
- OCCUPIED HOURS: 6:00 AM TO 5:00 PM.
- UNOCCUPIED HOURS: 5:00 PM TO 6:00 AM.

**SPLIT SYSTEM HEAT PUMP SEQUENCE OF OPERATIONS (FCU-1/HP-1)**

THE SPLIT SYSTEM HEAT PUMP SHALL MONITOR SPACE TEMPERATURE THROUGH THE SPACE THERMOSTAT. THE UNIT SHALL AUTOMATICALLY SWITCH OVER FROM COOLING TO HEATING BASED ON THE COOLING AND HEATING SET POINTS AND THE SPACE TEMPERATURE. THE OUTDOOR UNIT SHALL MODULATE THE COMPRESSOR IN ACCORDANCE WITH MANUFACTURER SEQUENCES TO MAINTAIN SPACE TEMPERATURE. IF SPACE TEMPERATURE IS SATISFIED AND THE COMPRESSOR IS RUNNING AT MINIMUM SPEED BOTH THE INDOOR AND OUTDOOR UNIT SHALL BE OFF. THE OUTSIDE AIR MOTORIZED DAMPER SHALL OPEN WHEN SYSTEM IS IN OCCUPIED MODE AND SHALL CLOSE WHEN SYSTEM IS IN UNOCCUPIED MODE.

**OCCUPIED HOURS (ADJ.)**  
MONDAY - FRIDAY 7AM - 6PM

**UNOCCUPIED HOURS (ADJ.)**  
FRIDAY 6PM - MONDAY 7AM  
MONDAY - FRIDAY: 6PM - 7AM

INDOOR UNIT SHALL BE SUPPLIED WITH A THIRD PARTY "ASPEN PUMP" MODEL "SILENT + MINI AQUA" CONDENSATE PUMP (OR EQUIVALENT) THAT HAS PURPOSEFULLY DESIGNED TO INTERFACE WITH THE INDOOR FAN COIL UNIT AND FIT INSIDE THE CHASSIS OF THE INDOOR UNIT. THE CONDENSATE PUMP SHALL BE POWERED THROUGH THE INDOOR UNIT. THE PUMP SHALL BE SUPPLIED WITH A SMALL RESERVOIR WITH INTERCONNECTING TUBING FROM RESERVOIR TO THE PUMP. THE RESERVOIR SHALL INCLUDE A MAGNETIC FLOAT WITH HIGH LIMIT SWITCH THAT WILL PREVENT THE FAN COIL UNIT FROM CONTINUED OPERATION IN THE EVENT OF A PUMP FAILURE. THE PUMP SHALL BE PROVIDED WITH A QUICK CONNECTING POWER/COMMUNICATION CABLE TO CONNECT THE PUMP TO THE INDOOR UNIT'S ACCESSORY PORT.

THE THERMOSTATS SHALL HAVE THE FOLLOWING MINIMUM FEATURES/FUNCTIONS:

**OPERATION:**

- START/STOP
- OPERATION MODE
- SPACE TEMPERATURE SET POINT (64 °F - 90 °F)
- FAN SPEED (HI-MED-LO)
- AIRFLOW DIRECTION

**MONITORING:**

- STATUS
- OPERATION MODE
- TEMPERATURE SETTING
- FAN SPEED
- AIRFLOW DIRECTION

**SCHEDULING:**

- ONE TIME TIMER
- DAILY TIMER

**FEATURES:**

- 26 FEET OF 4-WIRE VINYL SHEATHED CABLE
- LCD DISPLAY
- 2-HR BATTERY BACKUP

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STATE OF MICHIGAN  
LUKE ESTEBAN RAMIREZ  
ENGINEER  
No. 6201310438  
LICENSED PROFESSIONAL ENGINEER

MARK	DATE	DESCRIPTION
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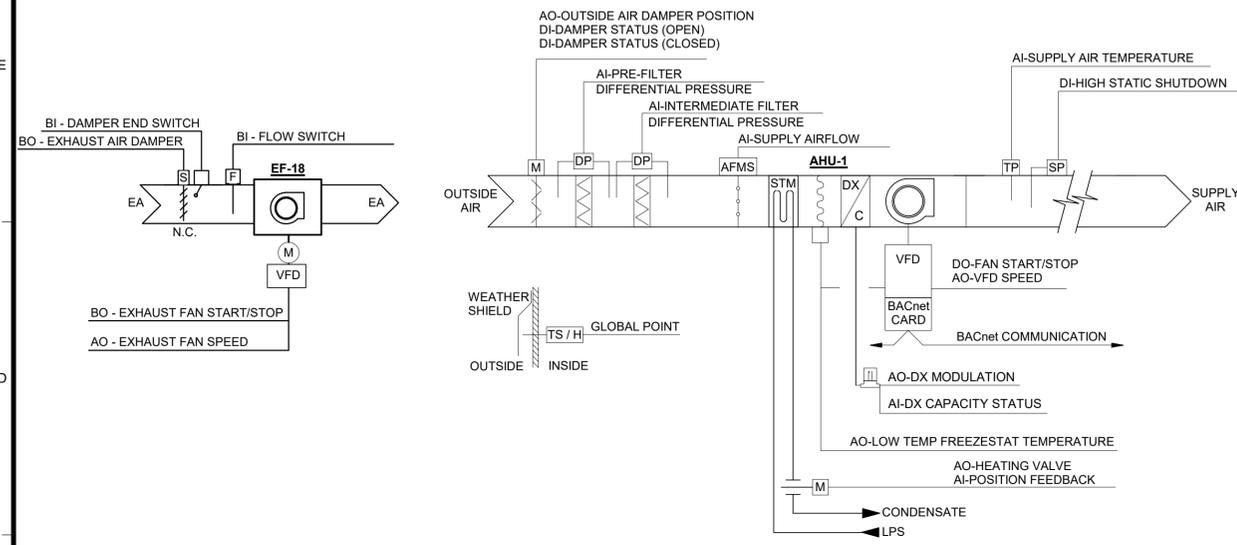
CITY OF ANN ARBOR, MICHIGAN  
WTP HVAC IMPROVEMENTS - PHASE II  
MECHANICAL CONTROLS

PROJ:	200-31537-21005
DESN:	JRJ
DRWN:	JRJ
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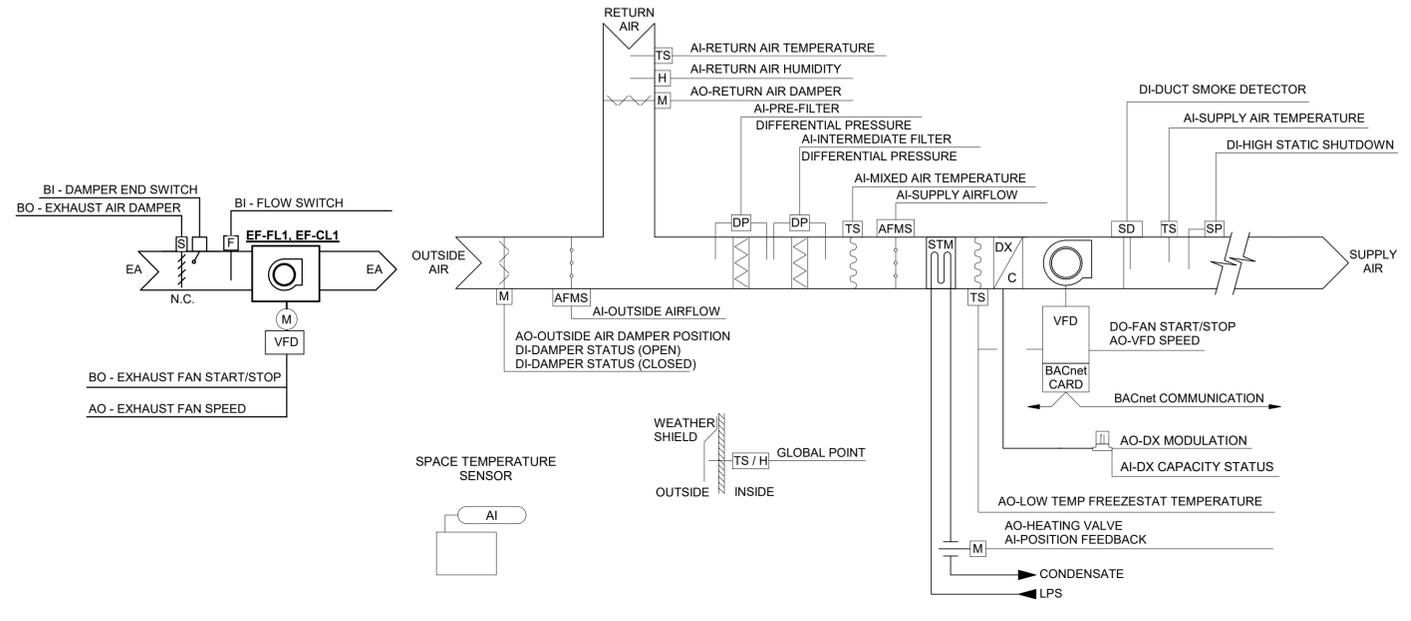
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**AIR HANDLING UNIT (AHU-1, EF-18) WITH 100% OUTSIDE AIR SEQUENCE OF OPERATIONS**



**AIR HANDLING UNIT (AHU-2, EF-FL1, EF-CL1) SEQUENCE OF OPERATIONS**

**AIR HANDLING UNIT WITH 100% OUTSIDE AIR SEQUENCE OF OPERATIONS (AHU-1, EF-18)**

MANUFACTURER SHALL PROVIDE THE UNIT WITH A STAND-ALONE UNIT CONTROLLER CAPABLE OF THE FOLLOWING SEQUENCES OF OPERATIONS AND MINIMUM FEATURES. ALL CONTROL SENSORS AND DEVICES INDICATED SHALL EITHER BE PROVIDED BY MANUFACTURER OR CONTROLS CONTRACTOR IN ORDER TO MEET THE INTENT OF THESE SEQUENCES.

**THE CONTROL OF AHU-1 AND EF-18, INSTRUMENTS, GAGES, CONTROL VALVES, AND ACCESSORIES SHALL UTILIZE THE CONTROL SYSTEM PROVIDED BY THE CONTRACTOR. CONTRACTOR SHALL PROVIDE ALL NECESSARY WIRING AND CONDUIT, DEVICES, CONTROLLERS, INTERLOCKS, AND SWITCHES AS NECESSARY TO MEET THE INTENT OF THESE SEQUENCES AND THE CONTROL DIAGRAMS SHOWN. CONTRACTOR SHALL COORDINATE FOR A FULLY FUNCTIONAL SYSTEM.**

**OCCUPIED MODE:**  
THE OUTSIDE AIR DAMPER AND EXHAUST AIR DAMPER SHALL OPEN AND PROVIDE PROOF OF OPEN STATUS. THE SUPPLY AIR FAN AND EXHAUST FAN SHALL START UPON PROOF OF DAMPERS AND RUN CONTINUOUSLY UNLESS SHUT DOWN BY OPERATOR OR SAFETIES. THE UNIT CONTROLLER SHALL MAINTAIN THE OCCUPIED SPACE TEMPERATURE SETPOINT.

**UNOCCUPIED MODE:**  
WHEN THE UNIT SWITCHES FROM OCCUPIED TO UNOCCUPIED MODE, THE SUPPLY AND EXHAUST FAN SHALL STOP, THE OUTSIDE AND EXHAUST AIR DAMPERS SHALL CLOSE. IF SPACE TEMPERATURE FALLS BELOW OR RISES ABOVE THE UNOCCUPIED HEATING OR COOLING SETPOINTS, THE SUPPLY FAN SHALL START. THE UNIT CONTROLLER SHALL MAINTAIN THE UNOCCUPIED SPACE TEMPERATURE SETPOINTS. IF SPACE TEMPERATURE IS SATISFIED THE SUPPLY FAN SHALL STOP AND HEATING AND COOLING SHALL BE DISABLED.

**OPTIMAL START:**  
THE UNIT CONTROLLER SHALL MONITOR THE SCHEDULED OCCUPIED TIME, OCCUPIED SPACE SETPOINTS AND SPACE TEMPERATURE TO CALCULATE WHEN THE OPTIMAL START OCCURS.

**OPTIMAL STOP:**  
THE UNIT CONTROLLER SHALL MONITOR SCHEDULED UNOCCUPIED TIME, OCCUPIED SETPOINTS AND SPACE TEMPERATURE TO CALCULATE WHEN OPTIMAL STOP OCCURS. WHEN OPTIMAL STOP MODE IS ACTIVE, UNIT CONTROLLER SHALL MAINTAIN SPACE TEMPERATURE TO THE SPACE TEMPERATURE OFFSET SETPOINT.

**HEATING MODE:**  
IF SPACE TEMPERATURE FALLS BELOW THE SETPOINT MINUS THE DEADBAND THE HEATING SHALL BE ENABLED BY THE UNIT CONTROLLER. UPON PROOF OF INTERNAL SAFETIES THE STEAM HEATING VALVE SHALL MODULATE TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.

**COOLING MODE:**  
IF SPACE TEMPERATURE RISES ABOVE THE SETPOINT PLUS THE DEADBAND THE DX COOLING SYSTEM SHALL BE ENABLED BY THE UNIT CONTROLLER. THE UNIT CONTROLLER SHALL MODULATE THE COOLING SYSTEM TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.

**AIR HANDLING UNIT WITH 100% OUTSIDE AIR SEQUENCE OF OPERATIONS (AHU-1, EF-18) CONT.**

**OCCUPIED BYPASS:**  
THE UNIT CONTROLLER SHALL MONITOR STATUS OF "ON" AND "CANCEL" BUTTONS OF THE SPACE TEMPERATURE SENSORS. WHEN OCCUPIED BYPASS REQUEST IS RECEIVED FROM A SPACE SENSOR, THE UNIT SHALL TRANSITION FROM CURRENT OCCUPANCY MODE TO OCCUPIED BYPASS MODE AND UNIT SHALL MAINTAIN SPACE TEMPERATURE TO OCCUPIED SETPOINTS (ADJ.)

**SUPPLY FAN:**  
THE SUPPLY FAN SHALL ENABLE WHILE IN OCCUPIED MODE AND CYCLED ON DURING UNOCCUPIED MODE. A DIFFERENTIAL PRESSURE SWITCH SHALL MONITOR DIFFERENTIAL PRESSURE ACROSS THE FAN. IF THE SWITCH DOES NOT OPEN WITHIN 40 SECONDS AFTER REQUEST FOR FAN OPERATION, A FAN FAILURE ALARM SHALL BE ANNUNCIATED AT THE UNIT CONTROLLER, THE UNIT SHALL STOP, REQUIRING A MANUAL RESET.

**EXHAUST FAN (EF-18):**  
THE EXHAUST FAN EF-18 SHALL ENABLE WHILE IN OCCUPIED MODE AND CYCLED ON DURING UNOCCUPIED MODE. IF THE FAN DOES NOT RUN WITHIN 40 SECONDS AFTER REQUEST FOR FAN OPERATION, A FAN FAILURE ALARM SHALL BE ANNUNCIATED AT THE UNIT CONTROLLER, THE UNIT SHALL STOP, REQUIRING A MANUAL RESET.

**SUPPLY & EXHAUST FAN HIGH PRESSURE LIMIT OPERATION:**  
IF SUPPLY DUCT STATIC PRESSURE REACHES 4.00 INCHES OF W.C. (ADJ.), THE HIGH LIMIT PRESSURE SWITCH SHALL SHUT DOWN THE UNIT, REQUIRING A MANUAL RESET TO RE-START THE UNIT. SUPPLY AND EXHAUST FANS ARE INTERLOCKED VIA SOFTWARE; A FAILURE OF EITHER SHALL DISABLE BOTH.

**FILTER STATUS:**  
A DIFFERENTIAL PRESSURE SWITCH SHALL MONITOR DIFFERENTIAL PRESSURE ACROSS THE FILTER WHEN THE FAN IS RUNNING. IF THE SWITCH CLOSES FOR 2 MINUTES AFTER A REQUEST FOR FAN OPERATION, A DIRTY FILTER ALARM SHALL BE ANNUNCIATED AT THE BAS.

**SETPOINTS:**

- OCCUPIED COOLING SETPOINT: 75
- OCCUPIED HEATING SETPOINT: 70
- UNOCCUPIED COOLING SETPOINT: 80
- UNOCCUPIED HEATING SETPOINT: 65
- DEADBAND: 2 DEGREES
- ALL SETPOINTS ADJUSTABLE AT UNIT CONTROLLER.

**OCCUPIED HOURS (ADJ.)**  
MONDAY - FRIDAY 7AM - 6PM

**UNOCCUPIED HOURS (ADJ.)**  
FRIDAY 6PM - MONDAY 7AM  
MONDAY - FRIDAY: 6PM - 7AM

**AIR HANDLING UNIT WITH ENERGY RECOVERY SEQUENCE OF OPERATIONS (AHU-2, EF-FL1, EF-CL1)**

MANUFACTURER SHALL PROVIDE THE UNIT WITH A STAND-ALONE UNIT CONTROLLER CAPABLE OF THE FOLLOWING SEQUENCES OF OPERATIONS AND MINIMUM FEATURES. ALL CONTROL SENSORS AND DEVICES INDICATED SHALL EITHER BE PROVIDED BY MANUFACTURER OR CONTROLS CONTRACTOR IN ORDER TO MEET THE INTENT OF THESE SEQUENCES.

**THE CONTROL OF AHU-2, EF-FL1, AND EF-CL1, INSTRUMENTS, GAGES, CONTROL VALVES, AND ACCESSORIES SHALL UTILIZE THE CONTROL SYSTEM PROVIDED BY THE CONTRACTOR. CONTRACTOR SHALL PROVIDE ALL NECESSARY WIRING AND CONDUIT, DEVICES, CONTROLLERS, INTERLOCKS, AND SWITCHES AS NECESSARY TO MEET THE INTENT OF THESE SEQUENCES AND THE CONTROL DIAGRAMS SHOWN. CONTRACTOR SHALL COORDINATE FOR A FULLY FUNCTIONAL SYSTEM.**

**OCCUPIED MODE:**  
THE OUTSIDE AIR DAMPER, RETURN AIR DAMPER, AND EXHAUST AIR DAMPERS SHALL OPEN AND PROVIDE PROOF OF OPEN STATUS. THE SUPPLY AIR FAN AND EXHAUST FANS SHALL START UPON PROOF OF DAMPERS AND RUN CONTINUOUSLY UNLESS SHUT DOWN BY OPERATOR OR SAFETIES. THE UNIT CONTROLLER SHALL MAINTAIN THE OCCUPIED SPACE TEMPERATURE SETPOINT. AIR HANDLING UNIT IS TO PROVIDE FULL DESIGN SUPPLY AIRFLOW.

**UNOCCUPIED MODE:**  
WHEN THE UNIT SWITCHES FROM OCCUPIED TO UNOCCUPIED MODE, THE RETURN AIR DAMPER SHALL CLOSE AND THE SUPPLY FAN SHALL RAMP DOWN TO THE LOW FLOW UNOCCUPIED MODE, PROVIDING 1750 CFM OF 100% OA AS MAKEUP AIR FOR THE CHEMICAL EXHAUST FANS. IF SPACE TEMPERATURE FALLS BELOW OR RISES ABOVE THE UNOCCUPIED HEATING OR COOLING SETPOINTS, THE RETURN AIR DAMPER SHALL OPEN AND THE SUPPLY FAN SHALL RAMP BACK UP TO THE DESIGN SUPPLY AIRFLOW. THE UNIT CONTROLLER SHALL MAINTAIN THE UNOCCUPIED SPACE TEMPERATURE SETPOINTS. IF SPACE TEMPERATURE IS SATISFIED THE SUPPLY FAN SHALL STOP AND HEATING AND COOLING SHALL BE DISABLED.

**HEATING MODE:**  
IF SPACE TEMPERATURE FALLS BELOW THE SETPOINT MINUS THE DEADBAND THE HEATING SHALL BE ENABLED BY THE UNIT CONTROLLER. UPON PROOF OF INTERNAL SAFETIES THE STEAM HEATING VALVE SHALL MODULATE TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.

**COOLING MODE:**  
IF SPACE TEMPERATURE RISES ABOVE THE SETPOINT PLUS THE DEADBAND THE DX COOLING SYSTEM SHALL BE ENABLED BY THE UNIT CONTROLLER. THE UNIT CONTROLLER SHALL MODULATE THE COOLING SYSTEM TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.

**AIR HANDLING UNIT SEQUENCE OF OPERATIONS (AHU-2, EF-FL1, EF-CL1) CONT.**

**SUPPLY FAN:**  
THE SUPPLY FAN SHALL OPERATE CONTINUOUSLY. A DIFFERENTIAL PRESSURE SWITCH SHALL MONITOR DIFFERENTIAL PRESSURE ACROSS THE FAN. IF THE SWITCH DOES NOT OPEN WITHIN 40 SECONDS AFTER REQUEST FOR FAN OPERATION, A FAN FAILURE ALARM SHALL BE ANNUNCIATED AT THE UNIT CONTROLLER, THE UNIT SHALL STOP, REQUIRING A MANUAL RESET.

**CHEMICAL EXHAUST FANS (EF-CL1 AND EF-FL1):**  
THE EXHAUST FANS FOR THE HYPOCHLORITE AND FLUORIDE ROOMS SHALL RUN CONTINUOUSLY AND BE ENABLED WHILE THE SUPPLY FAN IS OPERATING. WHEN THE SUPPLY FAN IS RUNNING, THE EXHAUST DAMPER IN EACH ROOM SHALL OPEN. UPON HARDWARE PROOF OF DAMPER OPEN (ENDSWITCH), THE FAN SHALL START. WHEN THE SUPPLY FAN STOPS, THE HYPOCHLORITE AND FLUORIDE ROOMS' EXHAUST FANS SHALL BE COMMANDED TO STOP. THE FAN SHALL STOP AND THE DAMPER SHALL CLOSE (POWER INTERLOCK).

**SUPPLY & EXHAUST FAN HIGH PRESSURE LIMIT OPERATION:**  
IF SUPPLY DUCT STATIC PRESSURE REACHES 4.00 INCHES OF W.C. (ADJ.), THE HIGH LIMIT PRESSURE SWITCH SHALL SHUT DOWN THE UNIT, REQUIRING A MANUAL RESET TO RE-START THE UNIT. SUPPLY AND EXHAUST FANS ARE INTERLOCKED VIA SOFTWARE; A FAILURE OF EITHER SHALL DISABLE BOTH.

**FILTER STATUS:**  
A DIFFERENTIAL PRESSURE SWITCH SHALL MONITOR DIFFERENTIAL PRESSURE ACROSS THE FILTER WHEN THE FAN IS RUNNING. IF THE SWITCH CLOSES FOR 2 MINUTES AFTER A REQUEST FOR FAN OPERATION, A DIRTY FILTER ALARM SHALL BE ANNUNCIATED AT THE BAS.

**SETPOINTS:**

- COOLING SETPOINT: 75
- HEATING SETPOINT: 70
- UNOCCUPIED COOLING SETPOINT: 80
- UNOCCUPIED HEATING SETPOINT: 65
- DEADBAND: 2 DEGREES
- ALL SETPOINTS ADJUSTABLE AT UNIT CONTROLLER.

**OCCUPIED HOURS (ADJ.)**  
MONDAY - FRIDAY 7AM - 6PM

**UNOCCUPIED HOURS (ADJ.)**  
FRIDAY 6PM - MONDAY 7AM  
MONDAY - FRIDAY: 6PM - 7AM



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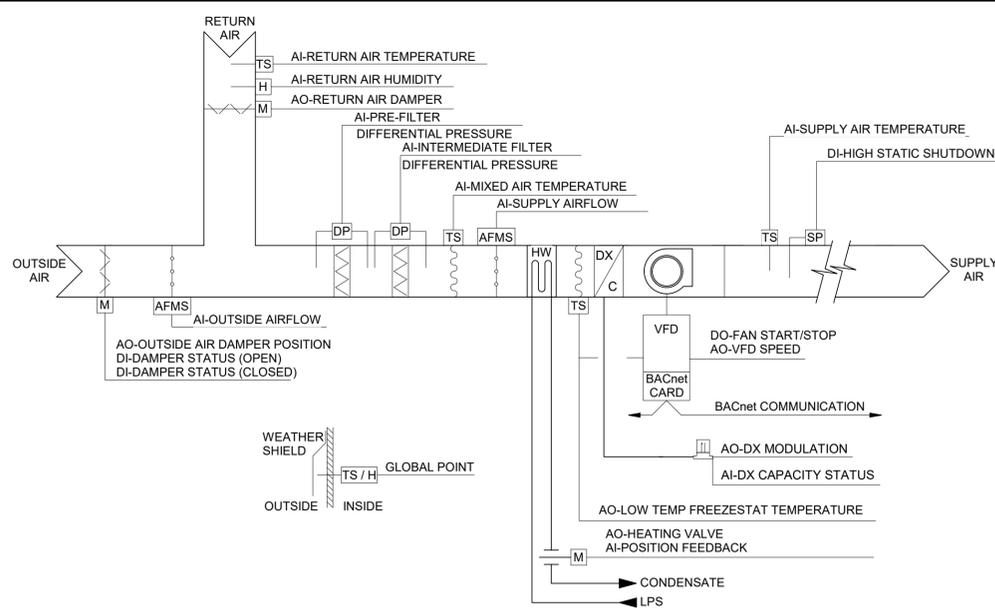


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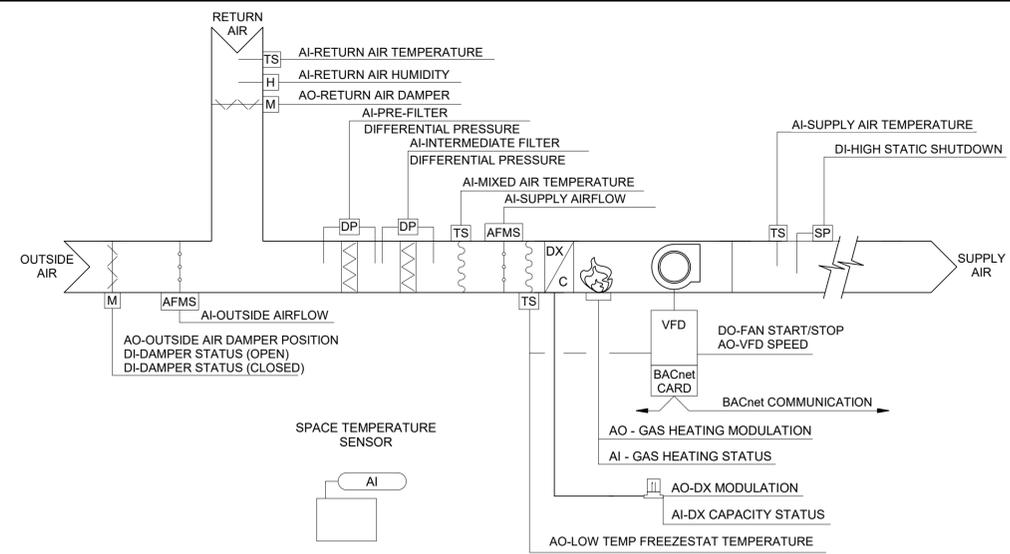
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MECHANICAL CONTROLS

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CHKD:	KK

M-702



**AIR HANDLING UNIT (AHU-3, AHU-4) SEQUENCE OF OPERATIONS**



**PACKAGED ROOF TOP UNIT (AHU-01) SEQUENCE OF OPERATIONS**

**AIR HANDLING UNIT SEQUENCE OF OPERATIONS (AHU-3, AHU-4)**

MANUFACTURER SHALL PROVIDE THE UNIT WITH A STAND-ALONE UNIT CONTROLLER CAPABLE OF THE FOLLOWING SEQUENCES OF OPERATIONS AND MINIMUM FEATURES. ALL CONTROL SENSORS AND DEVICES INDICATED SHALL EITHER BE PROVIDED BY MANUFACTURER OR CONTROLS CONTRACTOR IN ORDER TO MEET THE INTENT OF THESE SEQUENCES.

**THE CONTROL OF AHU-3 AND AHU-4, INSTRUMENTS, GAGES, CONTROL VALVES, AND ACCESSORIES SHALL UTILIZE THE CONTROL SYSTEM PROVIDED BY THE CONTRACTOR. CONTRACTOR SHALL PROVIDE ALL NECESSARY WIRING AND CONDUIT, DEVICES, CONTROLLERS, INTERLOCKS, AND SWITCHES AS NECESSARY TO MEET THE INTENT OF THESE SEQUENCES AND THE CONTROL DIAGRAMS SHOWN. CONTRACTOR SHALL COORDINATE FOR A FULLY FUNCTIONAL SYSTEM.**

**OCCUPIED MODE:**  
THE OUTSIDE AIR DAMPER AND EXHAUST AIR DAMPER SHALL OPEN AND PROVIDE PROOF OF OPEN STATUS. THE RETURN AIR DAMPER SHALL CLOSE AND PROVIDE PROOF OF STATUS. THE SUPPLY AIR FAN AND EXHAUST FAN SHALL START UPON PROOF OF DAMPERS AND RUN CONTINUOUSLY UNLESS SHUT DOWN BY OPERATOR OR SAFETIES. THE UNIT CONTROLLER SHALL MAINTAIN THE OCCUPIED SPACE TEMPERATURE SETPOINT.

**UNOCCUPIED MODE:**  
WHEN THE UNIT SWITCHES FROM OCCUPIED TO UNOCCUPIED MODE, THE SUPPLY AND EXHAUST FAN SHALL STOP. THE OUTSIDE AND EXHAUST AIR DAMPERS SHALL CLOSE AND THE RETURN AIR DAMPER SHALL OPEN. IF SPACE TEMPERATURE FALLS BELOW OR RISES ABOVE THE UNOCCUPIED HEATING OR COOLING SETPOINTS, THE SUPPLY FAN SHALL START. THE UNIT CONTROLLER SHALL MAINTAIN THE UNOCCUPIED SPACE TEMPERATURE SETPOINTS. IF SPACE TEMPERATURE IS SATISFIED THE SUPPLY FAN SHALL STOP AND HEATING AND COOLING SHALL BE DISABLED.

**OPTIMAL START:**  
THE UNIT CONTROLLER SHALL MONITOR THE SCHEDULED OCCUPIED TIME, OCCUPIED SPACE SETPOINTS AND SPACE TEMPERATURE TO CALCULATE WHEN THE OPTIMAL START OCCURS.

**OPTIMAL STOP:**  
THE UNIT CONTROLLER SHALL MONITOR SCHEDULED UNOCCUPIED TIME, OCCUPIED SETPOINTS AND SPACE TEMPERATURE TO CALCULATE WHEN OPTIMAL STOP OCCURS. WHEN OPTIMAL STOP MODE IS ACTIVE, UNIT CONTROLLER SHALL MAINTAIN SPACE TEMPERATURE TO THE SPACE TEMPERATURE OFFSET SETPOINT.

**HEATING MODE:**  
IF SPACE TEMPERATURE FALLS BELOW THE SETPOINT MINUS THE DEADBAND THE HEATING SHALL BE ENABLED BY THE UNIT CONTROLLER. UPON PROOF OF INTERNAL SAFETIES THE STEAM HEATING VALVE SHALL MODULATE TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.

**COOLING MODE:**  
IF SPACE TEMPERATURE RISES ABOVE THE SETPOINT PLUS THE DEADBAND THE DX COOLING SYSTEM SHALL BE ENABLED BY THE UNIT CONTROLLER. THE UNIT CONTROLLER SHALL MODULATE THE COOLING SYSTEM TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.

**AIR HANDLING UNIT SEQUENCE OF OPERATIONS (AHU-3, AHU-4) CONT.**

**OCCUPIED BYPASS:**  
THE UNIT CONTROLLER SHALL MONITOR STATUS OF "ON" AND "CANCEL" BUTTONS OF THE SPACE TEMPERATURE SENSORS. WHEN OCCUPIED BYPASS REQUEST IS RECEIVED FROM A SPACE SENSOR, THE UNIT SHALL TRANSITION FROM CURRENT OCCUPANCY MODE TO OCCUPIED BYPASS MODE AND UNIT SHALL MAINTAIN SPACE TEMPERATURE TO OCCUPIED SETPOINTS (ADJ.)

**SUPPLY FAN:**  
THE SUPPLY FAN SHALL ENABLE WHILE IN OCCUPIED MODE AND CYCLED ON DURING UNOCCUPIED MODE. A DIFFERENTIAL PRESSURE SWITCH SHALL MONITOR DIFFERENTIAL PRESSURE ACROSS THE FAN. IF THE SWITCH DOES NOT OPEN WITHIN 40 SECONDS AFTER REQUEST FOR FAN OPERATION, A FAN FAILURE ALARM SHALL BE ANNUNCIATED AT THE UNIT CONTROLLER, THE UNIT SHALL STOP, REQUIRING A MANUAL RESET.

**SUPPLY & EXHAUST FAN HIGH PRESSURE LIMIT OPERATION:**  
IF SUPPLY DUCT STATIC PRESSURE REACHES 4.00 INCHES OF W.C. (ADJ.), THE HIGH LIMIT PRESSURE SWITCH SHALL SHUT DOWN THE UNIT, REQUIRING A MANUAL RESET TO RE-START THE UNIT. SUPPLY AND EXHAUST FANS ARE INTERLOCKED VIA SOFTWARE; A FAILURE OF EITHER SHALL DISABLE BOTH.

**FILTER STATUS:**  
A DIFFERENTIAL PRESSURE SWITCH SHALL MONITOR DIFFERENTIAL PRESSURE ACROSS THE FILTER WHEN THE FAN IS RUNNING. IF THE SWITCH CLOSURES FOR 2 MINUTES AFTER A REQUEST FOR FAN OPERATION, A DIRTY FILTER ALARM SHALL BE ANNUNCIATED AT THE BAS.

**SETPOINTS:**

- OCCUPIED COOLING SETPOINT: 75
- OCCUPIED HEATING SETPOINT: 70
- UNOCCUPIED COOLING SETPOINT: 80
- UNOCCUPIED HEATING SETPOINT: 65
- DEADBAND: 2 DEGREES
- ALL SETPOINTS ADJUSTABLE AT UNIT CONTROLLER.

**OCCUPIED HOURS (ADJ.)**  
MONDAY - FRIDAY 7AM - 6PM

**UNOCCUPIED HOURS (ADJ.)**  
FRIDAY 6PM - MONDAY 7AM  
MONDAY - FRIDAY: 6PM - 7AM

**PACKAGED ROOF TOP UNIT SEQUENCE OF OPERATIONS (AHU-01)**

MANUFACTURER SHALL PROVIDE THE UNIT WITH A STAND-ALONE UNIT CONTROLLER CAPABLE OF THE FOLLOWING SEQUENCES OF OPERATIONS AND MINIMUM FEATURES. ALL CONTROL SENSORS AND DEVICES INDICATED SHALL EITHER BE PROVIDED BY MANUFACTURER OR CONTROLS CONTRACTOR IN ORDER TO MEET THE INTENT OF THESE SEQUENCES.

**THE CONTROL OF AHU-01, INSTRUMENTS, GAGES, CONTROL VALVES, AND ACCESSORIES SHALL UTILIZE THE CONTROL SYSTEM PROVIDED BY THE CONTRACTOR. CONTRACTOR SHALL PROVIDE ALL NECESSARY WIRING AND CONDUIT, DEVICES, CONTROLLERS, INTERLOCKS, AND SWITCHES AS NECESSARY TO MEET THE INTENT OF THESE SEQUENCES AND THE CONTROL DIAGRAMS SHOWN. CONTRACTOR SHALL COORDINATE FOR A FULLY FUNCTIONAL SYSTEM.**

**HEATING MODE:**  
IF SPACE TEMPERATURE FALLS BELOW THE SETPOINT MINUS THE DEADBAND THE HEATING SHALL BE ENABLED BY THE UNIT CONTROLLER. UPON PROOF OF INTERNAL SAFETIES THE GAS BURNER SHALL START AND MODULATE TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.

**COOLING MODE:**  
IF SPACE TEMPERATURE RISES ABOVE THE SETPOINT PLUS THE DEADBAND THE DX COOLING SYSTEM SHALL BE ENABLED BY THE UNIT CONTROLLER. THE UNIT CONTROLLER SHALL MODULATE THE COOLING SYSTEM TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.

**PACKAGED ROOF TOP UNIT SEQUENCE OF OPERATIONS (AHU-01)**

**SUPPLY FAN:**  
THE SUPPLY FAN SHALL CYCLED ON DURING UNIT OPERATION. A DIFFERENTIAL PRESSURE SWITCH SHALL MONITOR DIFFERENTIAL PRESSURE ACROSS THE FAN. IF THE SWITCH DOES NOT OPEN WITHIN 40 SECONDS AFTER REQUEST FOR FAN OPERATION, A FAN FAILURE ALARM SHALL BE ANNUNCIATED AT THE UNIT CONTROLLER, THE UNIT SHALL STOP, REQUIRING A MANUAL RESET.

**SUPPLY & EXHAUST FAN HIGH PRESSURE LIMIT OPERATION:**  
IF SUPPLY DUCT STATIC PRESSURE REACHES 4.00 INCHES OF W.C. (ADJ.), THE HIGH LIMIT PRESSURE SWITCH SHALL SHUT DOWN THE UNIT, REQUIRING A MANUAL RESET TO RE-START THE UNIT. SUPPLY AND EXHAUST FANS ARE INTERLOCKED VIA SOFTWARE; A FAILURE OF EITHER SHALL DISABLE BOTH.

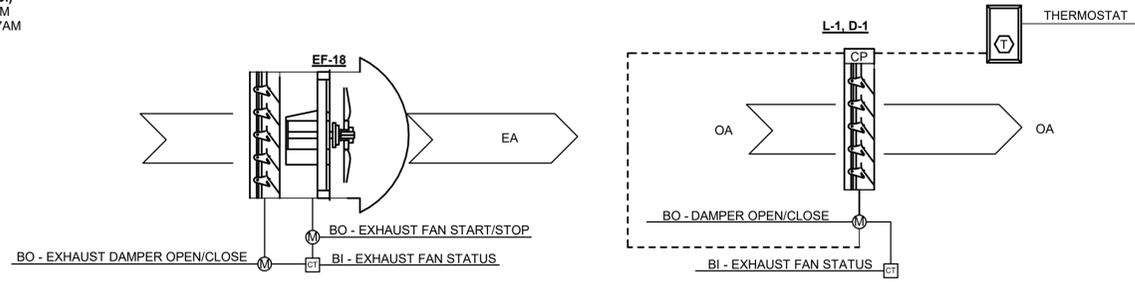
**FILTER STATUS:**  
A DIFFERENTIAL PRESSURE SWITCH SHALL MONITOR DIFFERENTIAL PRESSURE ACROSS THE FILTER WHEN THE FAN IS RUNNING. IF THE SWITCH CLOSURES FOR 2 MINUTES AFTER A REQUEST FOR FAN OPERATION, A DIRTY FILTER ALARM SHALL BE ANNUNCIATED AT THE BAS.

**SETPOINTS:**

- OCCUPIED COOLING SETPOINT: 75
- OCCUPIED HEATING SETPOINT: 70
- UNOCCUPIED COOLING SETPOINT: 80
- UNOCCUPIED HEATING SETPOINT: 65
- DEADBAND: 2 DEGREES
- ALL SETPOINTS ADJUSTABLE AT UNIT CONTROLLER.

**OCCUPIED HOURS (ADJ.)**  
MONDAY - FRIDAY 7AM - 6PM

**UNOCCUPIED HOURS (ADJ.)**  
FRIDAY 6PM - MONDAY 7AM  
MONDAY - FRIDAY: 6PM - 7AM



**LIME AGING AND SLAKING COOLING AND VENTILATION (L-1, EF-18)**

**SEQUENCE SUMMARY:**  
L-1 IN CONJUNCTION WITH EF-18 SHALL PROVIDE COOLING AND VENTILATION TO THE FILTER GALLERY. WHEN THE TEMPERATURE IN THE SPACE REACHES 85°F (ADJ.) EF-18 SHALL TURN ON AND D-1 SHALL OPEN IN CONJUNCTION TO PROVIDE NATURAL VENTILATION TO THE ROOM. ALL BINARY INPUTS AND OUTPUTS TO BE WIRED BACK TO MAIN HV CONTROL PANEL.

**THE CONTROL OF L-1 AND EF-18, INSTRUMENTS, GAGES, CONTROL VALVES, AND ACCESSORIES SHALL UTILIZE THE CONTROL SYSTEM PROVIDED BY THE CONTRACTOR. CONTRACTOR SHALL PROVIDE ALL NECESSARY WIRING AND CONDUIT, DEVICES, CONTROLLERS, INTERLOCKS, AND SWITCHES AS NECESSARY TO MEET THE INTENT OF THESE SEQUENCES AND THE CONTROL DIAGRAMS SHOWN. CONTRACTOR SHALL COORDINATE FOR A FULLY FUNCTIONAL SYSTEM.**

**COOLING:**  
MOTORIZED CONTROL DAMPER D-1 ON L-1 WILL OPEN. ONCE D-2 IS PROVED TO BE OPEN, EF-18 SHALL BE ACTIVATED TO INDUCE FAN COOLING IF THE TEMPERATURE (MEASURED VIA SPACE THERMOSTAT) IN THE SPACE REACHES ABOVE 85 °F.

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.

**EXHAUST FAN (EF-18):**  
THE CONTROLLER SHALL MONITOR THE ZONE TEMPERATURE.

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH ZONE AIR TEMP: IF THE ZONE AIR TEMPERATURE IS GREATER THAN 110 °F (ADJ.)
- LOW ZONE AIR TEMP: IF THE ZONE AIR TEMPERATURE IS LESS THAT 45 °F (ADJ.)

ALARMS SHALL BE PROVIDED AS FOLLOWS:

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

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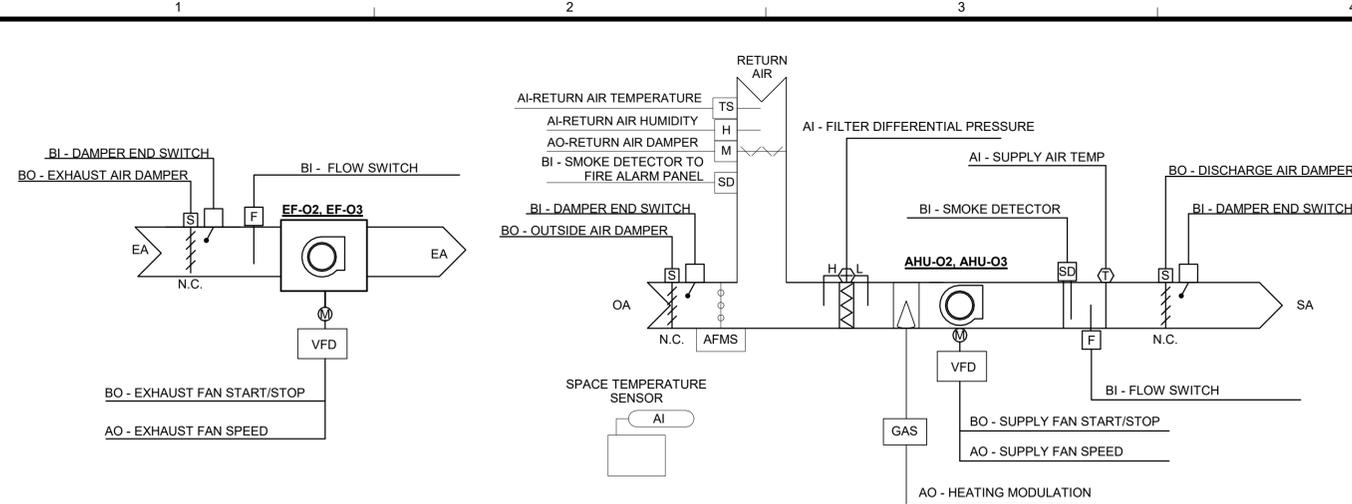
CITY OF ANN ARBOR, MICHIGAN  
WTP HVAC IMPROVEMENTS - PHASE II  
MECHANICAL CONTROLS

PROJ:	200-31537-21005
DESN:	JRJ
DRWN:	JRJ
CHKD:	KK

**M-703**

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**OZONE BUILDING HEATING AND VENTILATION (AHU-02, AHU-03, EF-02, EF-03)**

**SEQUENCE SUMMARY:**  
 MANUFACTURER SHALL PROVIDE THE UNIT WITH A STAND-ALONE UNIT CONTROLLER CAPABLE OF THE FOLLOWING SEQUENCES OF OPERATIONS AND MINIMUM FEATURES. ALL CONTROL SENSORS AND DEVICES INDICATED SHALL EITHER BE PROVIDED BY MANUFACTURER OR CONTROLS CONTRACTOR IN ORDER TO MEET THE INTENT OF THESE SEQUENCES.

**THE CONTROL OF AHU-02, AHU-03, EF-02, AND EF-03. INSTRUMENTS, GAUGES, CONTROL VALVES, AND ACCESSORIES SHALL UTILIZE THE CONTROL SYSTEM PROVIDED BY THE CONTRACTOR. CONTRACTOR SHALL PROVIDE ALL NECESSARY WIRING AND CONDUIT, DEVICES, CONTROLLERS, INTERLOCKS, AND SWITCHES AS NECESSARY TO MEET THE INTENT OF THESE SEQUENCES AND THE CONTROL DIAGRAMS SHOWN. CONTRACTOR SHALL COORDINATE FOR A FULLY FUNCTIONAL SYSTEM.**

**RUN CONDITIONS**  
 AHU-02 AND AHU-03 SHALL CYCLE ON AND OFF TO MAINTAIN SPACE TEMPERATURE, UNLESS SHUT DOWN ON SAFETIES OR TURNED OFF MANUALLY AT THE UNIT CONTROLLERS, MOTOR STARTERS, OR DISCONNECTS. IN THE EVENT OF HIGH OZONE LEVELS DETECTED BY OZONE MONITOR WITHIN THE SPACE, AHU-02 AND AHU-03 OUTSIDE AIR DAMPER WILL OPEN 100% AND EF-02 AND EF-03 WILL TURN ON TO PURGE THE SPACE OF EXCESS OZONE. ONCE THE OZONE LEVEL WITHIN THE SPACE IS BELOW PERMISSIBLE LIMITS AND THE ALARM HAS BEEN CLEARED, EF-02 AND EF-03 WILL TURN OFF AND AHU-02 AND AHU-03 OUTSIDE AIR DAMPERS WILL MODULATE TO 10% OPEN.

**STATUS = ON (DEFAULT):** OUTSIDE AIR DAMPERS OPEN FOR 10% OUTSIDE AIR, AHU-02 AND AHU-03 SUPPLY FAN ON, AHU-02 AND EF-03 OFF, GAS BURNER MODULATES AS INITIALIZED BY DISCHARGE TEMPERATURE SENSOR.

**STATUS = ON (HIGH OZONE):** OUTSIDE AIR DAMPERS OPEN FOR 100% OUTSIDE AIR, AHU-02 AND AHU-03 SUPPLY FAN ON, AHU-02 AND AHU-03 RETURN FAN OFF, EF-02 AND EF-03 ON, GAS BURNER MODULATES AS INITIALIZED BY DISCHARGE TEMPERATURE SENSOR.

**STATUS = OFF:** ALL DAMPERS CLOSED, ALL FANS OFF.

**FILTER DIFFERENTIAL PRESSURE MONITOR:**  
 THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FILTER.

**ALARMS SHALL BE PROVIDED AS FOLLOWS:**  
 FILTER CHANGE REQUIRED: WHEN THE DIFFERENTIAL PRESSURE ACROSS THE FILTER EXCEEDS THE MEAN PRESSURE DROP (150% OF THE CLEAN FILTER PRESSURE DROP).

**FAN STATUS FLOW SWITCH:**  
 PROVIDE A FLOW SWITCH IN THE DISCHARGE OF THE AHU-02 AND AHU-03 AND ON THE INTAKE OF THE EXHAUST FANS EF-02 AND EF-03. FLOW SWITCH SHALL BE WIRED TO CONTROLLER AND IF NO FLOW IS DETECTED VISUAL AND AUDIBLE ALARMS SHALL BE COMMUNICATED TO THE SCADA OPERATOR DISPLAY.

**FREEZE PROTECTION:**  
 IF THE SUPPLY AIR TEMPERATURE IS BELOW 30 °F AND THE FANS HAVE BEEN RUNNING FOR 5 MINUTES THE OUTSIDE AIR DAMPER SHALL CLOSE, THE UNIT SHALL SHUT DOWN AND AN ALARM SHALL BE PROVIDED. UNITS SHALL REQUIRE MANUAL RESTART ON FREEZE PROTECTION.

**SMOKE DETECTION:**  
 THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A SMOKE DETECTOR STATUS. UNIT SHALL REQUIRE A MANUAL RESTART.

**OUTSIDE AND DISCHARGE AIR DAMPER:**  
 THE OUTSIDE AND DISCHARGE AIR DAMPERS SHALL OPEN ANYTIME AHU-02 AND AHU-03 RUN AND SHALL CLOSE ANYTIME THE UNIT STOPS. THE SUPPLY FAN SHALL START ONLY AFTER THE STATUS OF BOTH DAMPERS IS "OPEN". THE OUTSIDE AIR DAMPER SHALL CLOSE 15 SEC (ADJ.) AFTER THE SUPPLY FAN STOPS.

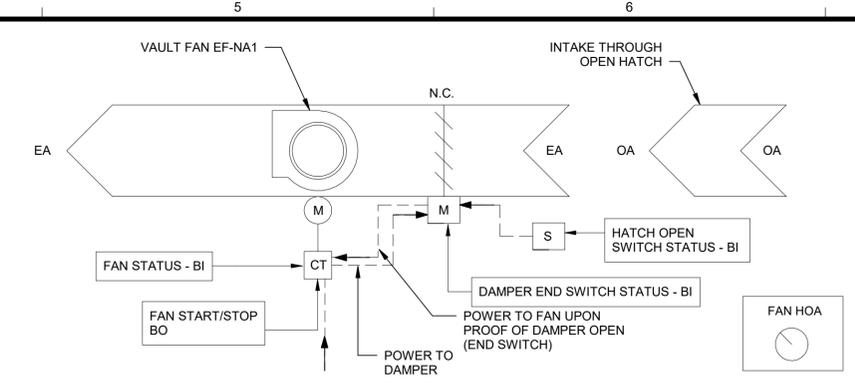
**SUPPLY FAN:**  
 THE SUPPLY FAN SHALL RUN TO MAINTAIN SPACE TEMPERATURE AND VENTILATION UNLESS SHUT DOWN ON SAFETIES AND SHALL DEFAULT TO RUN AT 100% DESIGN SPEED.

- ALARMS SHALL BE PROVIDED AS FOLLOWS:**
- OUTSIDE OR DISCHARGE AIR DAMPER FAILURE: COMMANDED OPEN BUT THE STATUS IS CLOSED.
  - OUTSIDE OR DISCHARGE AIR DAMPER IN HAND: COMMANDED CLOSED, BUT THE STATUS IS OPEN.
  - HIGH SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS GREATER THAN 110 °F (ADJ.).
  - LOW SUPPLY AIR TEMP: IF THE SUPPLY AIR TEMPERATURE IS LESS THAN 40 °F (ADJ.) AFTER 5 MINUTES.
  - SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
  - SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

**EXHAUST FAN (EF-02 AND EF-03):**  
 THE EXHAUST FANS SHALL RUN WHENEVER OZONE LEVELS ABOVE PERMISSIBLE LIMIT ARE DETECTED AND SHALL DEFAULT TO RUN AT 100% OF DESIGN SPEED.

- ALARMS SHALL BE PROVIDED AS FOLLOWS:**
- EXHAUST FAN FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
  - EXHAUST FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.

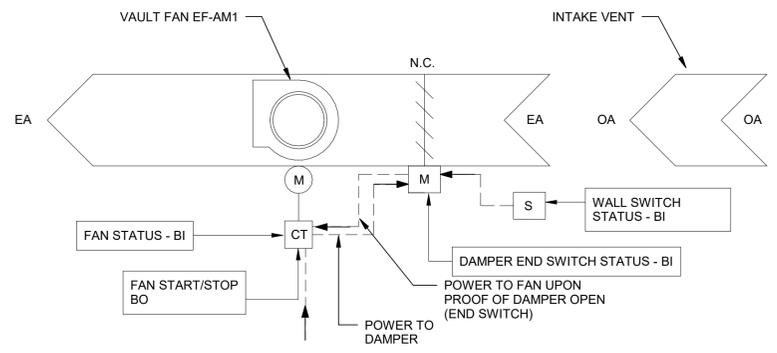
**SUPPLY AIR TEMPERATURE:**  
 THE CONTROLLER SHALL MONITOR THE SUPPLY AIR TEMPERATURE AND SHALL RELAY THIS POINT TO THE SCADA OPERATOR WORKSTATION.



**SODIUM HYDROXIDE VAULT EXHAUST FAN (EF-NA1) SEQUENCE OF OPERATIONS**

**THE CONTROL OF EF-NA1. INSTRUMENTS, GAUGES, CONTROL VALVES, AND ACCESSORIES SHALL UTILIZE THE CONTROL SYSTEM PROVIDED BY THE CONTRACTOR. CONTRACTOR SHALL PROVIDE ALL NECESSARY WIRING AND CONDUIT, DEVICES, CONTROLLERS, INTERLOCKS, AND SWITCHES AS NECESSARY TO MEET THE INTENT OF THESE SEQUENCES AND THE CONTROL DIAGRAMS SHOWN. CONTRACTOR SHALL COORDINATE FOR A FULLY FUNCTIONAL SYSTEM.**

- FAN SHALL RUN CONTINUOUSLY WHEN FAN IS IN AUTO MODE, SODIUM HYDROXIDE VAULT HATCH IS OPEN, AND THE VAULT IS OCCUPIED. FAN WILL ALSO RUN CONTINUOUSLY WHEN FAN IS SET TO HAND MODE, EVEN IF HATCH IS CLOSED.
- WHEN THE VAULT HATCH IS OPENED (OR FAN IS IN HAND MODE), THE FAN SHALL BE COMMANDED TO RUN. THE EXHAUST DAMPER SHALL OPEN. UPON HARDWIRE PROOF OF DAMPER OPEN (ENDSWITCH), THE FAN SHALL START.
- WHEN THE VAULT HATCH IS CLOSED, THE FAN SHALL BE COMMANDED TO STOP. THE FAN SHALL STOP AND THE DAMPER SHALL CLOSE (POWER INTERLOCK).
- ALARMS:
  - IF THE VAULT HATCH STATUS IS "OPEN" AND STATUS OF FAN IS "OFF" OR DAMPER IS "CLOSED".
  - IF THE VAULT HATCH STATUS IS "CLOSED" AND STATUS OF FAN IS "ON" OR DAMPER IS "OPEN".

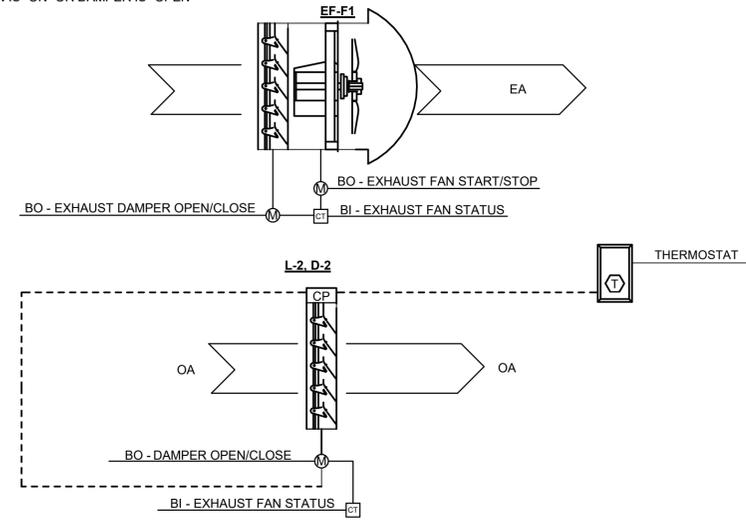


**AMMONIA BUILDING EXHAUST FAN (EF-AM1) SEQUENCE OF OPERATIONS**

**THE CONTROL OF EF-AM1. INSTRUMENTS, GAUGES, CONTROL VALVES, AND ACCESSORIES SHALL UTILIZE THE CONTROL SYSTEM PROVIDED BY THE CONTRACTOR. CONTRACTOR SHALL PROVIDE ALL NECESSARY WIRING AND CONDUIT, DEVICES, CONTROLLERS, INTERLOCKS, AND SWITCHES AS NECESSARY TO MEET THE INTENT OF THESE SEQUENCES AND THE CONTROL DIAGRAMS SHOWN. CONTRACTOR SHALL COORDINATE FOR A FULLY FUNCTIONAL SYSTEM.**

- FAN SHALL RUN CONTINUOUSLY WHEN MANUAL SWITCH IS ON AND THE BUILDING IS OCCUPIED
- WHEN THE MANUAL SWITCH IS ON, THE FAN SHALL BE COMMANDED TO RUN. THE EXHAUST DAMPER SHALL OPEN. UPON HARDWIRE PROOF OF DAMPER OPEN (ENDSWITCH), THE FAN SHALL START.
- WHEN THE MANUAL SWITCH IS OFF, THE FAN SHALL BE COMMANDED TO STOP. THE FAN SHALL STOP AND THE DAMPER SHALL CLOSE (POWER INTERLOCK).
- ALARMS:
  - IF THE VAULT HATCH STATUS IS "OPEN" AND STATUS OF FAN IS "OFF" OR DAMPER IS "CLOSED".
  - IF THE VAULT HATCH STATUS IS "CLOSED" AND STATUS OF FAN IS "ON" OR DAMPER IS "OPEN".

THE AMMONIA BUILDING IS ALSO SERVED BY A PACKAGED HIGH STATIC GAS FIRED UNIT HEATER THAT CONDITIONS THE SPACE. FIELD VERIFY THAT THIS EQUIPMENT OPERATES INDEPENDENTLY FROM THE EXHAUST FAN AND INTAKE VENT SHOWN ABOVE.



**FILTER GALLERY COOLING AND VENTILATION (L-2, EF-F1)**

**SEQUENCE SUMMARY:**  
 L-2 IN CONJUNCTION WITH EF-2 SHALL PROVIDE COOLING AND VENTILATION TO THE FILTER GALLERY. WHEN THE TEMPERATURE IN THE SPACE REACHES 85°F (ADJ.) EF-2 SHALL TURN ON AND D-2 SHALL OPEN IN CONJUNCTION TO PROVIDE NATURAL VENTILATION TO THE ROOM. ALL BINARY INPUTS AND OUTPUTS TO BE WIRED BACK TO MAIN HV CONTROL PANEL.

**THE CONTROL OF L-2 AND EF-2. INSTRUMENTS, GAUGES, CONTROL VALVES, AND ACCESSORIES SHALL UTILIZE THE CONTROL SYSTEM PROVIDED BY THE CONTRACTOR. CONTRACTOR SHALL PROVIDE ALL NECESSARY WIRING AND CONDUIT, DEVICES, CONTROLLERS, INTERLOCKS, AND SWITCHES AS NECESSARY TO MEET THE INTENT OF THESE SEQUENCES AND THE CONTROL DIAGRAMS SHOWN. CONTRACTOR SHALL COORDINATE FOR A FULLY FUNCTIONAL SYSTEM.**

**COOLING:**  
 MOTORIZED CONTROL DAMPER D-2 ON L-2 WILL OPEN. ONCE D-2 IS PROVED TO BE OPEN, EF-F1 SHALL BE ACTIVATED TO INDUCE FAN COOLING IF THE TEMPERATURE (MEASURED VIA SPACE THERMOSTAT) IN THE SPACE REACHES ABOVE 85 °F.

- 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.

**EXHAUST FAN (EF-F1):**  
 THE CONTROLLER SHALL MONITOR THE ZONE TEMPERATURE.

- ALARMS SHALL BE PROVIDED AS FOLLOWS:**
- HIGH ZONE AIR TEMP: IF THE ZONE AIR TEMPERATURE IS GREATER THAN 110 °F (ADJ.)
  - LOW ZONE AIR TEMP: IF THE ZONE AIR TEMPERATURE IS LESS THAN 45 °F (ADJ.)

- ALARMS SHALL BE PROVIDED AS FOLLOWS:**
- EXHAUST FAN FAILURE: COMMANDED ON BUT THE STATUS IS OFF.
  - EXHAUST FAN IN HAND: COMMANDED OFF BUT THE STATUS IS ON.

**TETRA TECH**  
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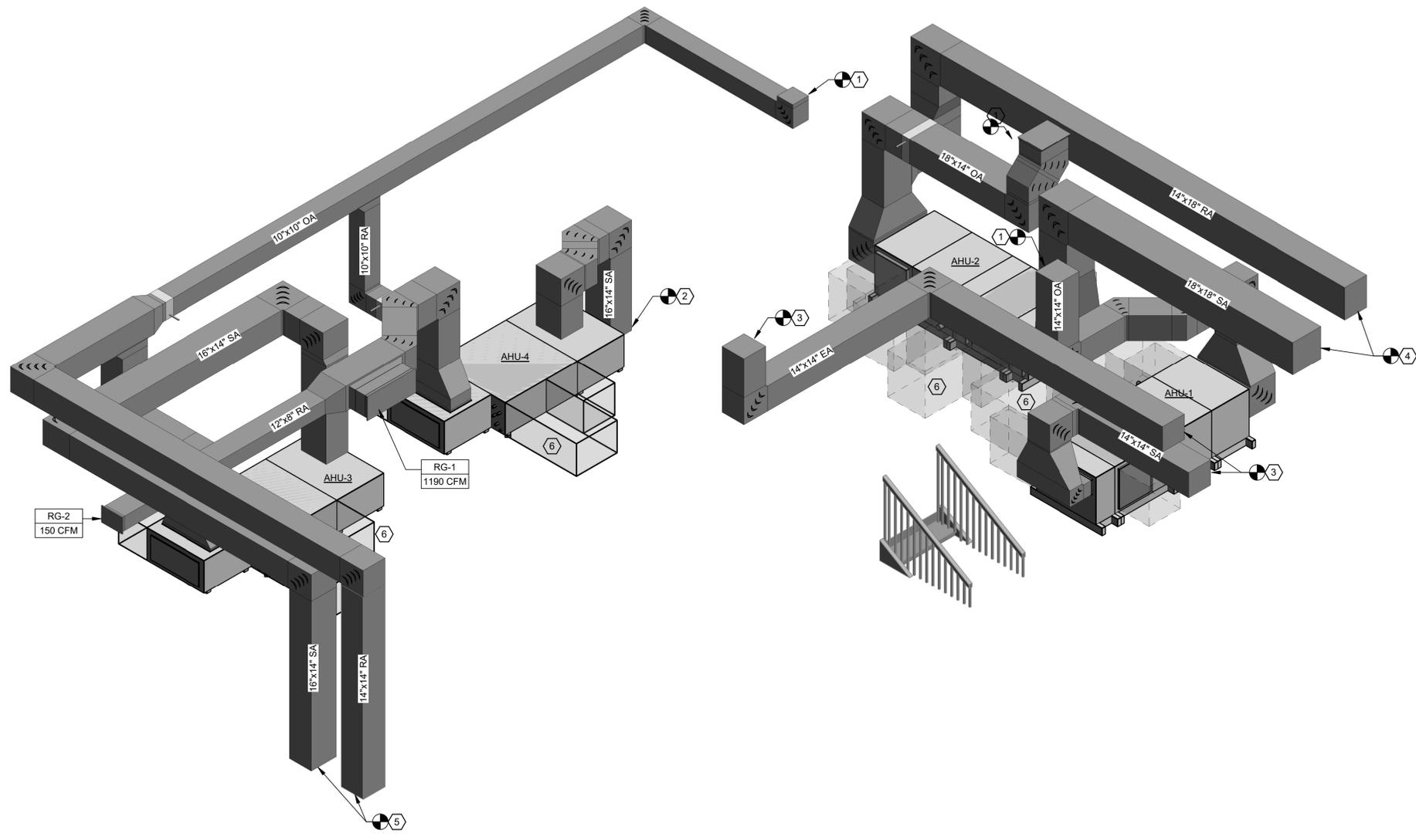


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CHKD:	KK

**M-704**



**MECHANICAL MEZZANINE ISOMETRIC VIEW**  
SCALE: N.T.S.

# KEYNOTES

- 1 CONNECT OUTSIDE AIR INTAKE DUCT UP TO EXISTING GRAVITY INTAKE VENTILATORS ON ROOF. PROVIDE MOTORIZED, INSULATED, LOW LEAK DAMPERS IF NOT PRESENT.
- 2 CONNECT SUPPLY DUCTWORK FROM AHU-4 TO SUPPLY DUCTWORK SERVING FOURTH FLOOR BELOW MEZZANINE.
- 3 CONNECT SUPPLY FROM AHU-1 TO DUCT RISER IN CHASE DOWN TO LOCKER ROOMS ON SECOND AND THIRD FLOORS. CONNECT EXHAUST DUCTWORK FROM DUCT RISER IN CHASE UP TO NEW EXHAUST FAN ON ROOF. RE-USE EXISTING ROOF PENETRATION.
- 4 CONNECT SUPPLY AND RETURN DUCTWORK FROM AHU-2 TO DUCT RISERS IN CHASE DOWN TO BASEMENT AND GROUND FLOORS.
- 5 CONNECT SUPPLY AND RETURN DUCTWORK FROM AHU-3 TO DUCT RISERS IN CHASE DOWN TO SECOND AND THIRD FLOORS.
- 6 MANUFACTURER SUGGESTED CLEARANCE FOR ACCESS AND MAINTENANCE, TYPICAL.

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STATE OF MICHIGAN  
LUKE ESTEBAN RAMIREZ  
ENGINEER  
No. 6201310438  
LICENSED PROFESSIONAL ENGINEER

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**ELECTRICAL SYMBOLS**

	DUPLEX RECEPTACLE 20A, 125V 18" AFF UON
WP	DUPLEX RECEPTACLE 20A, 125V 18" AFF UON WITH GFI AND WEATHERPROOF WHILE IN USE COVER
GFI	DUPLEX RECEPTACLE 20A, 125V 18" AFF UON WITH GROUND FAULT PROTECTION
CH	DUPLEX RECEPTACLE 20A, 125V, ABOVE COUNTER BACKSPASH
	SPECIAL PURPOSE RECEPTACLE - WALL MOUNTED, TYPE NOTED ON PLANS
	SPECIAL PURPOSE RECEPTACLE - CEILING MOUNTED, TYPE NOTED ON PLANS
	QUADPLEX RECEPTACLE 20 AMP 125V - 18" AFF UON
	CORD REEL MOUNTED DUPLEX RECEPTACLE
	FLUSH MOUNTED POWER/DATA FLOOR BOX, SEE PLANS FOR TYPE
	FLUSH MOUNTED POWER/DATA FLOOR BOX, SEE PLANS FOR TYPE
	CEILING MOUNTED DUPLEX RECEPTACLE
	LIGHT SWITCH (WALL MOUNTED 48" AFF, UON) SINGLE POLE 20A 120/277V
	LIGHT SWITCH (WALL MOUNTED 48" AFF, UON) LOW VOLTAGE DIGITAL, SEE DETAIL 1/E-501
	LIGHT SWITCH FOR CONFERENCE ROOMS (WALL MOUNTED 48" AFF, UON) LOW VOLTAGE DIGITAL, SEE DETAIL 2/E-501
	VACANCY/OCCUPANCY SENSOR, CEILING MOUNTED. WIRE PER DETAIL 1/E-501
	VACANCY/OCCUPANCY SENSOR FOR CONFERENCE ROOM, CEILING MOUNTED. WIRE PER DETAIL 2/E-501
	FIRE ALARM CONTROL PANEL, PROVIDE 120VAC CIRCUIT
	INTRUSION DETECTION PANEL, PROVIDE 120VAC CIRCUIT
	ACCESS CONTROL PANEL, PROVIDE 120VAC CIRCUIT
	REMOTE ANNUNCIATOR PANEL
	MOTOR STARTER, COMBINATION TYPE STARTER & DISCONNECT, NEMA 3R UON
	DISCONNECT SWITCH, FUSIBLE 3/30/25 INDICATES 30A 3P 25A FUSE, NEMA 3R UON
	DISCONNECT SWITCH, NON-FUSIBLE 30/3 INDICATES 30A 3P, NEMA 3R UON
	MOTOR CONNECTION (X HORSE POWER)
	MOTOR RATED SWITCH
	CONTROL SWITCH FOR MOTORS
	DRY-TYPE TRANSFORMER
	PAD MOUNT TRANSFORMER
	HIGH VOLTAGE SWITCH
	PANELBOARD
	METER
	JUNCTION BOX
	ELECTRICAL CONNECTION TO EQUIPMENT FURNISHED BY OTHERS
	STATIC GROUNDING POINT GROUND MOUNTED
	GROUND BUS BAR
	GROUND ROD
	GROUND ROD TEST WELL
	BONDING CLAMP
	AIR TERMINAL
	UNDERGROUND GROUND CONDUCTOR
	UNDERGROUND ELECTRICAL SECONDARY CONDUCTOR
	OVERHEAD ELECTRICAL PRIMARY CONDUCTOR
	UNDEGROUND ELECTRICAL PRIMARY CONDUCTOR

**ELECTRICAL SYMBOLS (CONTINUED)**

	RECESSED DOWN LIGHT, CONTROLLED BY SWITCH 'a' IF INDICATED
	RECESSED DOWN LIGHT WITH BATTERY BACKUP, CONTROLLED BY SWITCH 'a' IF INDICATED
	PENDANT MOUNTED ROUND FIXTURE, CONTROLLED BY SWITCH 'a' IF INDICATED.
	PENDANT MOUNTED ROUND FIXTURE WITH BATTERY BACKUP, CONTROLLED BY SWITCH 'a' IF INDICATED.
	SURFACE MOUNT FIXTURE, CONTROLLED BY SWITCH 'a' IF INDICATED.
	SURFACE MOUNT FIXTURE WITH BATTERY BACKUP, CONTROLLED BY SWITCH 'a' IF INDICATED.
	PENDANT STRIP LIGHT FIXTURE, CONTROLLED BY SWITCH 'a' IF INDICATED.
	PENDANT STRIP LIGHT FIXTURE WITH BATTERY BACKUP, CONTROLLED BY SWITCH 'a' IF INDICATED.
	RECESSED LIGHT FIXTURE 2X4, CONTROLLED BY SWITCH 'a' IF INDICATED.
	RECESSED LIGHT FIXTURE 2X4 WITH BATTERY BACKUP, CONTROLLED BY SWITCH 'a' IF INDICATED.
	SUSPENDED LIGHT FIXTURE, SIZED PER PHYSICAL DIMENSIONS OF FIXTURE, CONTROLLED BY SWITCH 'a' IF INDICATED.
	SUSPENDED LIGHT FIXTURE WITH BATTERY BACKUP, SIZED PER PHYSICAL DIMENSIONS OF FIXTURE, CONTROLLED BY SWITCH 'a' IF INDICATED.
	WALL MOUNTED LIGHT SEE SCHEDULE FOR TYPE, CONTROLLED BY SWITCH 'a' IF INDICATED.
	EXIT LIGHT WITH BATTERY BACKUP SEE SCHEDULE. PROVIDE AN UNSWITCHED CONDUCTOR TO EACH EMERGENCY UNIT.
	WALL MOUNTED EXIT LIGHT WITH BATTERY BACKUP SEE SCHEDULE. PROVIDE AN UNSWITCHED CONDUCTOR TO EACH EMERGENCY UNIT.
	BUG-EYE STYLE EMERGENCY LIGHT WITH BATTERY BACKUP. PROVIDE AN UNSWITCHED CONDUCTOR TO EACH EMERGENCY UNIT.
	POLE MOUNTED PARKING LOT LIGHT, SEE SCHEDULE FOR TYPE
	PHOTOCELL
	LIGHTING CONTACTOR
	TELECOMMUNICATIONS BACKBOARD
	TELECOMMUNICATIONS TWO POST RACK
	CONDUIT TURN UP
	CONDUIT TURN DOWN
	CONDUIT STUB-UP AND CAP, TERMINATION
	BRANCH CIRCUIT, UNDERGROUND OR CONCEALED BELOW SLAB.
	BRANCH CIRCUIT, HOMERUN, 2#12, #12GND, 1/2" MIN UON
	BRANCH CIRCUIT, CONCEALED ABOVE CEILING OR IN WALL WHERE POSSIBLE, WHERE EXPOSED ROUTE PARALLEL OR PERPENDICULAR TO STRUCTURE.
	CEILING FAN, SEE MECHANICAL DRAWINGS FOR TYPE

**ABBREVIATIONS**

#	NUMBER
Φ	PHASE
A	AMPERE
A/C	AIR CONDITIONING
AFB	ABOVE FINISHED FLOOR TO CENTERLINE
AFG	ABOVE FINISHED GRADE TO CENTERLINE
AHU	AIR HANDLING UNIT
AL	ALUMINUM
ANN	ANNUNCIATOR
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
ARNEC	U.S. ARMY RESERVE NETWORK ENTERPRISE CENTER
ATS	AUTOMATIC TRANSFER SWITCH
AUTO	AUTOMATIC
AWG	AMERICAN WIRE GAUGE
BAS	BUILDING AUTOMATION SYSTEM
BC	BELOW COUNTER
BCG	BARE COPPER GROUNDING/BONDING CONDUCTOR
BLDG	BUILDING
C	CONDUIT
CB	CIRCUIT BREAKER
cd	CANDELA RATING
CFCI	CONTRACTOR FURNISHED, CONTRACTOR INSTALLED
CFGI	CONTRACTOR FURNISHED, GOVERNMENT INSTALLED
CH	COUNTER HEIGHT
CKT	CIRCUIT
CLG	CEILING
CO	CONTRACTING OFFICER
COMM	COMMUNICATION
CP	CONTROL PANEL
CU	COPPER
DACT	DIGITAL ALARM COMMUNICATOR TRANSMITTER
DDC	DIRECT DIGITAL CONTROL
DISC	DISCONNECT
DN	DOWN
DP	DISTRIBUTION PANEL BOARD
ECU	ENERGY CONTROL UNIT
EF	EXHAUST FAN (MECHANICAL EQUIPMENT)
EGB	ELECTRIC GROUND BOX
EIA	ELECTRONIC INDUSTRIES ALLIANCE
ELCU	ELECTRICAL LOAD CONTROL UNIT
ELEC	ELECTRICAL
ELEV	ELEVATOR
EM	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
EUH	ELECTRICAL UNIT HEATER
EWX	ELECTRIC WATER HEATER
EX	EXISTING DEVICE TO REMAIN
EXT	EXTERIOR
FAAP	FIRE ALARM ANNUNCIATION PANEL
FACP	FIRE ALARM CONTROL PANEL
FATR	FIRE ALARM TRANSMITTER
FLA	FULL LOAD AMPERES
FLR	FLOOR
FMC	FLEXIBLE METALLIC CONDUIT
FMCP	FIRE ALARM & MASS NOTIFICATION CONTROL PANEL
FPC	FIRE PUMP CONTROL
FRPS	FIRE ALARM REMOTE POWER SUPPLY
FT	FEET
GEN	GENERATOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFGI	GROUND FAULT PROTECTION
GFI	GROUND FAULT INTERRUPTER
GFP	GROUND FAULT PROTECTION
GND	GROUND
HP	HORSEPOWER
I/O	INPUT/OUTPUT
IAW	IN ACCORDANCE WITH
IEEE	INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS
JB	JUNCTION BOX

**ABBREVIATIONS**

JPC	JOCKEY PUMP CONTROL
KVA	KILOVOLT AMPERE
KW	KILOWATT
KWH	KILOWATT HOUR
LB	POUND
LCU	LIGHTING CONTROL UNIT
LM	LUMEN
LPS	LIGHTNING PROTECTION SYSTEM
LSIG	LONG TIME, SHORT TIME, INSTANTANEOUS, AND GROUND FAULT ADJUSTABLE LIGHTING
LTG	LIGHTING
MAX	MAXIMUM
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCP	MAIN CONTROL PANEL
MECH	MECHANICAL
MGB	MAIN GROUND BAR
MGE	MOTOR GENERATOR EQUIPMENT
MIN	MINIMUM
MLO	MAIN LUGS ONLY
MM	MULTI MODE
MOD	MOTOR OPERATED DAMPER
MOV	METAL-OXIDE-VARISTOR
MPZ	MINI POWER ZONE
MTS	MANUAL TRANSFER SWITCH
N	NEUTRAL
N1	NEMA 1 ENCLOSURE
N/A	NOT APPLICABLE
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NF	NON-FUSED
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OH	OVERHEAD
OSP	OUTSIDE PLANT
PDA	POWER DISTRIBUTION ASSEMBLY
PF	POWER FACTOR
PNL	PANEL
RCP	REFLECTED CEILING PLAN
RE	RELOCATED
RECP	RECEPTACLE
RGS	RIGID STEEL CONDUIT
RM	ROOM
RMC	RIGID METALLIC CONDUIT
RO	REVERSE OSMOSIS
RSFACU	RELEASING SERVICE FIRE ALARM CONTROL UNIT
RT	REMOTE TRANSMITTER
SPD	SURGE PROTECTION DEVICE
SSU	SYSTEM SUPPORT UNIT
SWBD	SWITCHBOARD
TBB	TELECOMMUNICATIONS BACKBOARD
TGB	TELECOMMUNICATIONS GROUND BAR
TMGB	TELECOMMUNICATIONS MAIN GROUND BAR
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
TYP	TYPICAL
UFC	UNIFIED FACILITIES CRITERIA
UG	UNDERGROUND
UH	UNIT HEATER
UL	UNDERWRITERS LABORATORIES
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLTAGE
VA	VOLT AMPERE
VFD	VARIABLE FREQUENCY DRIVE
W	WATT
W/	WITH
WKST	WORKSTATION
WP	WEATHERPROOF
XFMR	TRANSFORMER

**GENERAL NOTES**

- ALL WORK SHALL BE PERFORMED BY CERTIFIED ELECTRICIANS OR UNDER THE SUPERVISION OF A CERTIFIED ELECTRICIAN. ELECTRICIAN SHALL BE LICENSED IN ACCORDANCE WITH STATE AND LOCAL GOVERNING AUTHORITIES.
- REFER TO THE APPROPRIATE DRAWING FOR THE EXACT LOCATION OF EQUIPMENT INSTALLED UNDER DIVISIONS OF THE DOCUMENTS WHICH REQUIRE ELECTRICAL SERVICE.
- FIELD ADJUST THE LIGHT FIXTURE LAYOUT TO CLEAR ANY BEAMS, COLUMNS, PIPING, ETC. THAT MIGHT BE IN THE WAY.
- VERIFY DOOR SWINGS WITH ARCHITECTURAL PLANS AND MANUFACTURER SHOP DRAWINGS FOR PROPER LOCATION OF SWITCHES.
- FIXTURE FINISHES SHALL BE COORDINATED WITH CONTRACTING OFFICER.
- RECESSED ELECTRICAL BOXES SHALL BE OFFSET 2'-0" MINIMUM IN FIRE RATED WALLS. COORDINATE WITH CONTRACTING OFFICER FOR LOCATION AND TYPES OF FIRE RATED WALLS.
- PENETRATIONS THROUGH FIRE RATED WALLS SHALL BE FIRE STOPPED BY A UL APPROVED FIRE STOP SYSTEM.
- ELECTRICAL WORK SHALL CONFORM TO THE NEC AS A MINIMUM STANDARD. ITEMS SPECIFIED BY BRAND NAME ARE ON AN "OR EQUAL" BASIS, UON.
- ROUTE POWER FEEDING MECHANICAL EQUIPMENT THROUGH MOTOR STARTERS AND/OR VFDs AS INDICATED ON MECHANICAL SCHEDULES AND CONTROLS DRAWINGS. MOTOR STARTERS AND VFDs SHALL BE FURNISHED AND INSTALLED UNDER THIS CONTRACT. CONTRACTOR SHALL COORDINATE ACCORDINGLY.
- PROVIDE ELECTRICAL CONNECTION TO MECHANICAL EQUIPMENT. WIRE AND CONDUIT SHALL BE BASED ON THE NEC, UON.
- THE ELECTRICAL CONTRACTOR SHALL BECOME FAMILIAR WITH THE MECHANICAL AND ARCHITECTURAL DRAWINGS PRIOR TO THE INSTALLATION OF THE ELECTRICAL SYSTEMS.
- PROVIDE GFI PROTECTED RECEPTACLES AT THE FOLLOWING LOCATIONS:
  - EXTERIOR RECEPTACLES.
  - RECEPTACLES WITHIN 6' OF A SINK.
  - RECEPTACLES IN LATRINES OR SHOWER ROOMS.
  - RECEPTACLES LOCATED WITHIN KITCHENS.
  - RECEPTACLES LOCATED WITHIN GARAGES.
- RECEPTACLE AND SWITCH BOXES SHALL BE ROUGHED IN FLUSH WITH WALL SURFACE.
- PROVIDE SUPPORTS AS REQUIRED FOR LIGHT FIXTURES, CONDUIT, DISCONNECTS, ETC.
- ARRANGE LIGHT FIXTURES IN MECHANICAL ROOMS TO PROVIDE MAXIMUM LIGHTING ON FLOOR AND MINIMUM INTERFERENCE WITH MECHANICAL EQUIPMENT AND HEADROOM.
- EXIT SIGNS SHALL BE CIRCUITED AHEAD OF THE SWITCHES.
- EMERGENCY LIGHTING FIXTURES SHALL BE PROVIDED WITH AN UNSWITCHED CONDUCTOR TO EACH BATTERY BACK-UP UNIT.
- PROVIDE JUNCTION BOXES AS INDICATED ON PLANS AND WHERE REQUIRED PER NEC. WHERE NOT SPECIFICALLY INDICATED, SIZE PER NEC ARTICLE 314.
- DISCONNECT SWITCHES FOR MECHANICAL EQUIPMENT SHALL BE MOUNTED TO THE STRUCTURE, NOT TO THE EQUIPMENT. PROVIDE NECESSARY MOUNTING SUPPORT AS REQUIRED.
- LABEL POWER AND SWITCH OUTLETS WITH RESPECT TO CIRCUIT BREAKER AND PANEL LOCATION.
- CONDUITS LEAVING OR ENTERING BUILDING SHALL BE SEALED PER NEC TO PREVENT ENTRANCE OF MOISTURE
- PROVIDE ARC FLASH HAZARD WARNING LABELS ON ELECTRICAL EQUIPMENT IN ACCORDANCE WITH THE REQUIREMENTS OF NFPA 70, ARTICLE 110. LABELS SHALL BE LOCATED SO AS TO BE CLEARLY VISIBLE TO QUALIFIED PERSONS BEFORE EXAMINATION, ADJUSTMENT, SERVICING, OR MAINTENANCE OF EQUIPMENT. LABEL TEMPLATES MAY BE OBTAINED FROM UFC 3-560-01.
- BRANCH CONDUITS SHALL BE RUN HIGH AND TIGHT TOGETHER WHEN FEASIBLE, UON.
- ELECTRICAL LEGEND IS GENERIC. NOT ALL ITEMS NOTED ARE IN THE PROJECT.

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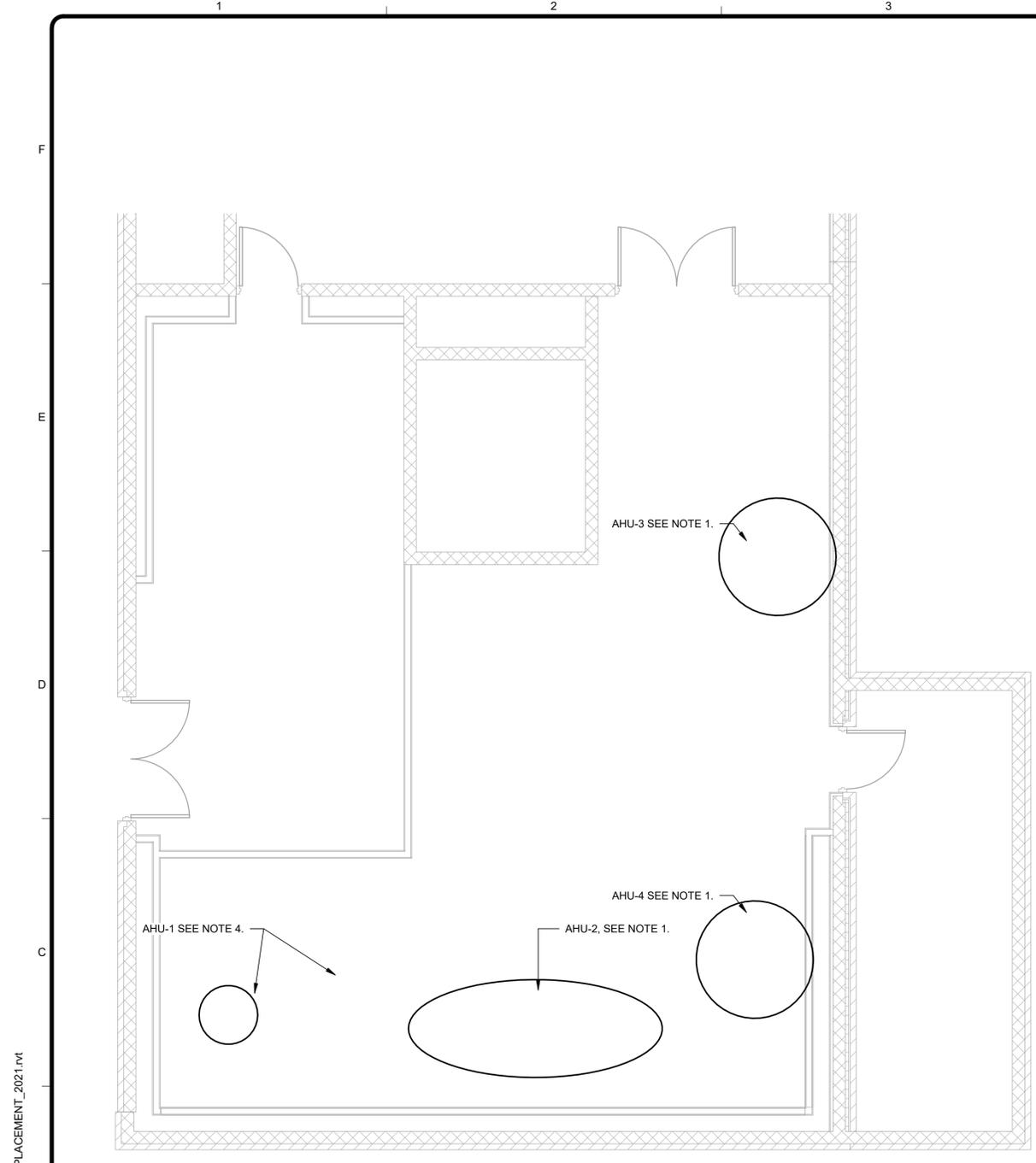
CITY OF ANN ARBOR, MICHIGAN  
WTP HVAC IMPROVEMENTS - PHASE II  
**ELECTRICAL LEGEND, ABBREVIATIONS, AND NOTES**

PROJ:	200-31537-21005
DESN:	WAP
DRWN:	VLM
CHKD:	

**E-001**

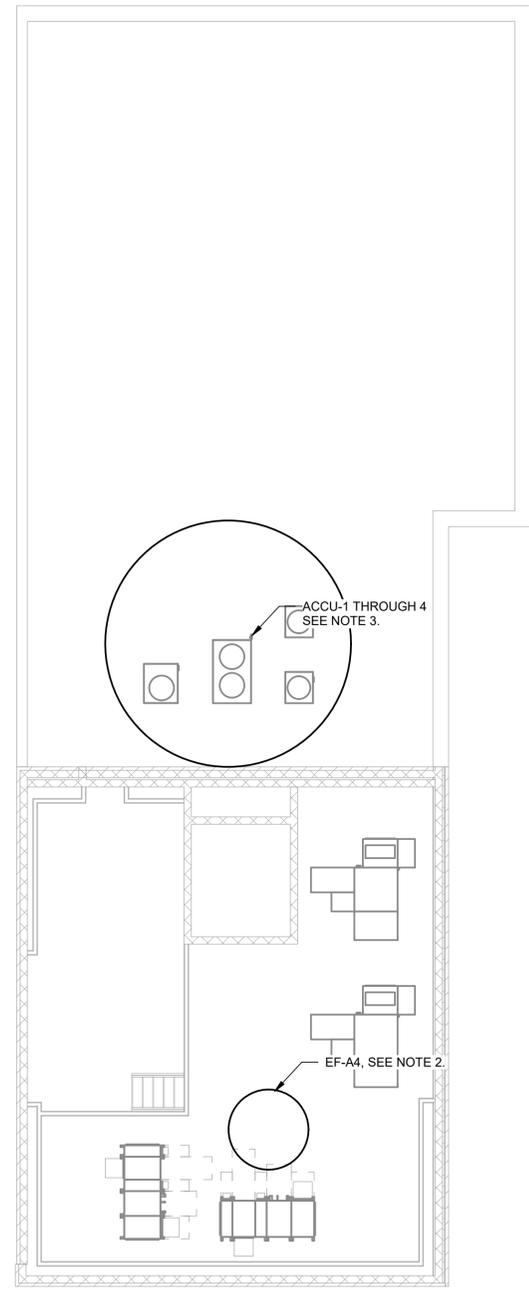






**ELECTRICAL - CHEMICAL FEED BUILDING  
- FOURTH FLOOR/MEZZANINE**

SCALE: 1/4" = 1'-0"



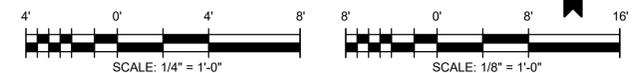
**ELECTRICAL - CHEMICAL FEED BUILDING  
- ROOF**

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

**GENERAL NOTES**

1. DISCONNECT CONDUIT AND WIRE FROM EXISTING AHU. COIL BACK AND PROTECT FOR RECONNECTION TO PROPOSED AHU AFTER DEMOLITION OF EXISTING AHU AND ACCESSORIES. PROVIDE 480V, 30A, 3 PHASE NEMA 12 DISCONNECT FOR THE PROPOSED AHU. RECONNECT CONDUIT/WIRE TO DISCONNECT AND AHU.
2. DISCONNECT CONDUIT AND WIRE FROM EXISTING FAN LOCATED ON MEZZANINE LEVEL. COIL BACK AND PROTECT CONDUIT/WIRE FOR RECONNECTION TO PROPOSED FAN, AFTER DEMOLITION OF EXISTING FAN AND ACCESSORIES. PROVIDE 208V, 30A, 3 PHASE NEMA 12 COMBINATION STARTER FOR THE PROPOSED FAN. EXTEND CONDUIT AND WIRE UP THROUGH ROOF TO PROPOSED FAN LOCATION AND RECONNECT CONDUIT/WIRE TO STARTER AND FAN.
3. DISCONNECT CONDUIT AND WIRE FROM EXISTING ACCU. COIL BACK AND PROTECT FOR RECONNECTION TO PROPOSED CU AFTER DEMOLITION OF EXISTING ACCU AND ACCESSORIES. PROVIDE 480V, 30A, 3 PHASE NEMA 12 DISCONNECT FOR THE PROPOSED ACCU. RECONNECT CONDUIT/WIRE TO DISCONNECT AND CU.
4. DISCONNECT CONDUIT AND WIRE FROM EXISTING AHU. COIL BACK AND PROTECT FOR RECONNECTION TO PROPOSED AHU AFTER DEMOLITION OF EXISTING AHU AND ACCESSORIES. PROVIDE 480V, 30A, 3 PHASE NEMA 12 DISCONNECT FOR THE PROPOSED AHU. RECONNECT CONDUIT/WIRE TO DISCONNECT AND AHU. CONDUIT/WIRE SHALL BE EXTENDED/SHORTENED AS NECESSARY TO CONNECT TO NEW AHU LOCATION.

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CITY OF ANN ARBOR, MICHIGAN  
WTP HVAC IMPROVEMENTS - PHASE II  
**CHEMICAL FEED BUILDING  
FOURTH FLOOR AND ROOF  
PLANS**

PROJ:	200-31537-21005
DESN:	WAP
DRWN:	VLM
CHKD:	

**E-203**

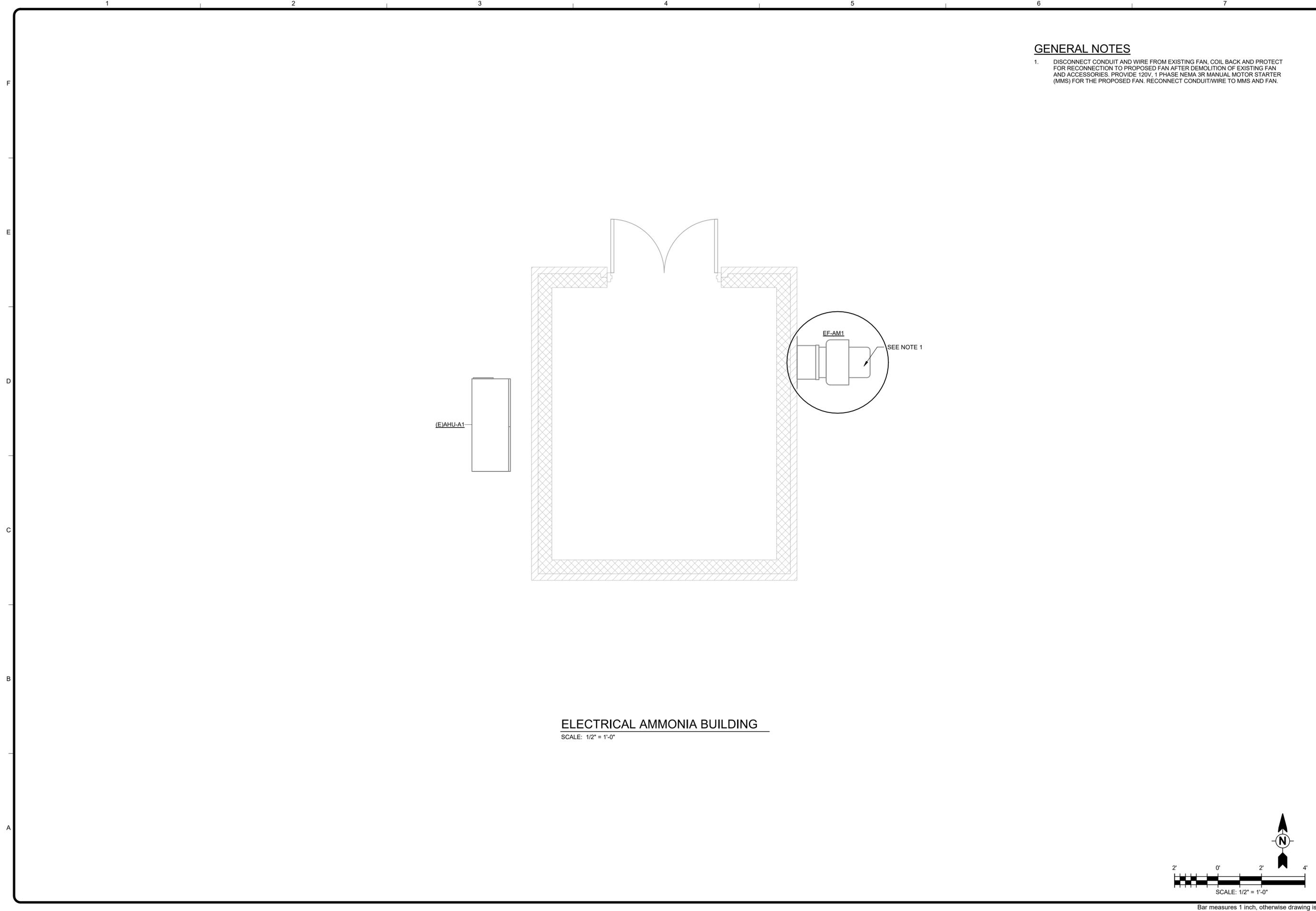
Bar measures 1 inch, otherwise drawing is not to scale

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**GENERAL NOTES**

1. DISCONNECT CONDUIT AND WIRE FROM EXISTING FAN, COIL BACK AND PROTECT FOR RECONNECTION TO PROPOSED FAN AFTER DEMOLITION OF EXISTING FAN AND ACCESSORIES. PROVIDE 120V, 1 PHASE NEMA 3R MANUAL MOTOR STARTER (MMS) FOR THE PROPOSED FAN. RECONNECT CONDUIT/WIRE TO MMS AND FAN.



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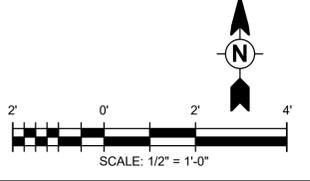
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CITY OF ANN ARBOR, MICHIGAN  
 WTP HVAC IMPROVEMENTS - PHASE II  
 AMMONIA BUILDING NEW  
 WORK

PROJ: 200-31537-21005  
 DESN: WAP  
 DRWN: VLM  
 CHKD:

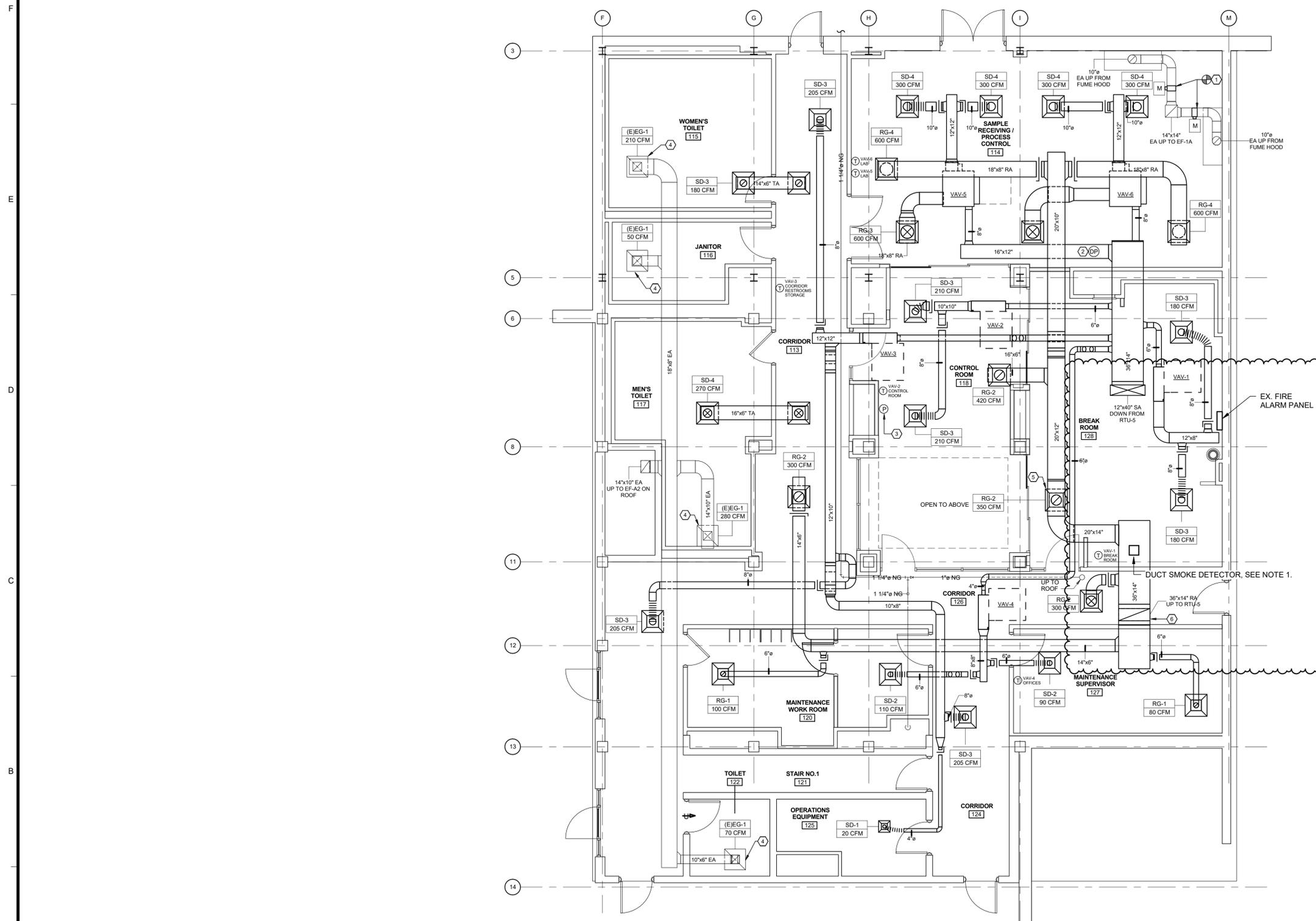
**E-207**

**ELECTRICAL AMMONIA BUILDING**  
 SCALE: 1/2" = 1'-0"





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**ELECTRICAL CONTROL ROOM PLAN**  
SCALE: 3/16" = 1'-0"

- GENERAL NOTES**
- PROVIDE ADDRESSABLE DUCT SMOKE DETECTOR IN SUPPLY DUCT. PROVIDE 3/4" C (FA CLASS 1 CABLE) TO FIRE ALARM PANEL. INSERT DETECTOR INTO EXISTING ADDRESSABLE LOOP. PROGRAM FA PANEL TO MONITOR AND ALARM ON SMOKE DETECTION.
  - PROGRAMMING OF FA PANEL TO MONITOR AND ALARM ON DETECTION OF SMOKE BY DUCT DETECTOR SHALL BE PERFORMED BY JOHNSON CONTROLS. CONTACT NUMBER IS 734-662-7264.

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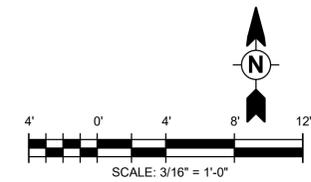


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CITY OF ANN ARBOR, MICHIGAN  
WTP HVAC IMPROVEMENTS - PHASE II  
**ADMINISTRATION BUILDING CONTROL ROOM PLAN**

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DRWN:	VLM
CHKD:	

**E-209**



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