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- LEFT HAND

LOW POINT

LIGHTWEIGHT

LIVE LOAD

LOUVER

MASONRY

MATERIAL

MAXIMUM

MINIMUM

MOUNT(ED)

NUMBER

OVERALL

OPENING

OPPOSITE

PARTITION

PAVEMENT

ALL INCLUSIVE MASTER LIST USED BY THIS FIRM. THE INCLUSION OF THESE LEGENDS INTO

THESE DOCUMENTS DOES NOT IMPLY THAT ALL THE SYMBOLS OR MATERIALS INCLUDED IN THESE

PIECE

THE MATERIALS, ABBREVIATIONS, AND DRAFTING SYMBOLS LEGEND ARE EACH AN

ON CENTER

NIC

OD

OPN'G

PAV'T

LEGENDS ARE INCORPORATED INTO THIS PROJECT.

MECHANICAL

MANUFACTURER

NOT IN CONTRACT

OUTSIDE DIAMETER

OUTSIDE FACE

OPPOSITE HAND

PRESSURE TREATED

PERMANENT FLOOR MAT

- POUNDS PER SQUARE FOOT

- POUNDS PER SQUARE INCH

NOT TO SCALE

MISCELLANEOUS

LONG LEG HORIZONTAL

LONG LEG VERTICAL

MASONRY OPENING

METAL THRESHOLD

MARKERBOARD— (LENGTH)

MECHANICAL CONTRACTOR

MOP SERVICE BASIN (SINK)

SUSP SUSPEND(ED) SYMMETRICAL TREAD DISCONTINUOUS TONGUE AND GROOVE WOOD BLOCKING IN TOP OF BEAM SECTION TOP OF CURB TOP OF FOUNDATION CONTINUOUS WOOD TOP OF SLAB BLOCKING IN TOP OF STEEL TOP OF WALL TACKBOARD (LENGTH) FINISHED WOOD IN TOP OF MASONRY SECTION DETAIL - UNLESS NOTED OTHERWISE VINYL BASE COVED RIGID BOARD VINYL BASE STRAIGHT INSULATION - VINYL COMPOSITION TILE VENEER PLASTER (TYPE) VERTICAL RIGID BOARD WIDE OR WIDTH INSULATION (ROOFING) WITHOUT WALL CORNER GUARD BATT INSULATION WDN WINDOW WEIGHT WATER PROOF WELDED WIRE FABRIC GYPSUM BOARD WALL SERVICE BASIN ACOUSTICAL CEILING PANEL BITUMINOUS CONCRETE (ASPHALT) PAVING



**PROJECT** 

**BUILDING 'S' HVAC** UNIT REPLACEMENT JOLIET JUNIOR COLLEGE 1215 HOUBOLT ROAD **JOLIET, IL 60431** 

OWNER

JOLIET JUNIOR COLLEGE 1215 HOUBOLT ROAD **JOLIET, IL 60431** 

ARCHITECT/ **ENGINEER** 

**KLUBER ARCHITECTS + ENGINEERS** 10 S. SHUMWAY AVE. **BATAVIA, ILLINOIS 60510** TEL 630-406-1213 630-406-9472 www.kluberinc.com

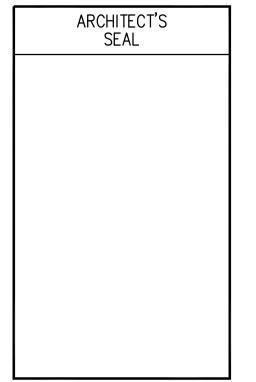
### **BUILDING CODE DATA**

2015 INTERNATIONAL BUILDING CODE 2014 ILLINOIS STATE PLUMBING CODE 2015 INTERNATIONAL MECHANICAL CODE 2015 INTERNATIONAL FUEL AND GAS CODE 2015 INTERNATIONAL ENERGY CODE 2015 INTERNATIONAL FIRE PREVENTION CODE

2018 IL ACCESSIBILITY CODE 2014 NATIONAL ELECTRIC CODE LOCAL AMENDMENTS TO THE ABOVE CODES

**SEALS & CERTIFICATES** 

I HAVE PREPARED, OR CAUSED TO BE PREPARED UNDER MY DIRECT SUPERVISION, THE ATTACHED PLANS AND SPECIFICATIONS AND STATE THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF, AND TO THE EXTENT OF MY CONTRACTUAL OBLIGATION, THEY ARE IN COMPLIANCE WITH IBC 2009 EDITION THE ENVIRONMENTAL BARRIERS ACT AND THE ILLINOIS ACCESSIBILITY



MECHANICAL ENGINEER'S

SEAL

ELECTRICAL ENGINEER'S SEAL

"G" SERIES

JOB NO. 18-292-1195 CHECKED APPROVED

SHEET TITLE COVER SHEET, **GENERAL NOTES** SYMBOLS AND **DRAWING INDEX** 

SHEET NUMBER

- CONCRETE MASONRY UNIT

COLUMN

COMBINATION

COMPRESSIBL

COMPACTED

CONCRETE

CONDITION

- COUNTER

- CENTER(S)

DIAMETER

DIMENSION

DRAWINGS

ELEVATION

ELEVATOR

EMBEDMENT

– EMERGENCY

EPOXY PAINT

EACH WAY

EXISTING

EQUAL

EXPANSION JOINT

ELECTRIC/ELECTRICAL

ELECTRICAL CONTRACTOR

ELECTRIC WATER COOLER

ELECTRIC WATER HEATER

EXHIBIT RAIL (LENGTH)

DOWN

- DOOR

DOWELS

EACH

CONTINUOUS

CONTRACT (OR

– CARPET (TYPE)

COUNTER SINK

CONCRETE OPENING

CERAMIC TILE (TYPE)

CABINET ÚNIT HEATER

CABINET UNIT VENTILATOR

COMB COMP

CONC

CONT

CONTR

CPT-(1

CTR SK

DWG'S

DWL'S

ELEC CONTR

EMBED

EMER

EWC

EWH

EXIST

ER-(26)

CTR `

COMPT'D

CONC OPNG

UNDISTURBED EARTH EARTH BACKFILL

AGGREGATE

BACKFILL IN

SECTION

BALLAST, FILL OR

CODE. KLUBER, INC. ILLINOIS PROFESSIONAL DESIGN FIRM LICENSE #184-001284

"G" SERIES "M" SERIES

"G" SERIES "M" SERIES

"E" SERIES

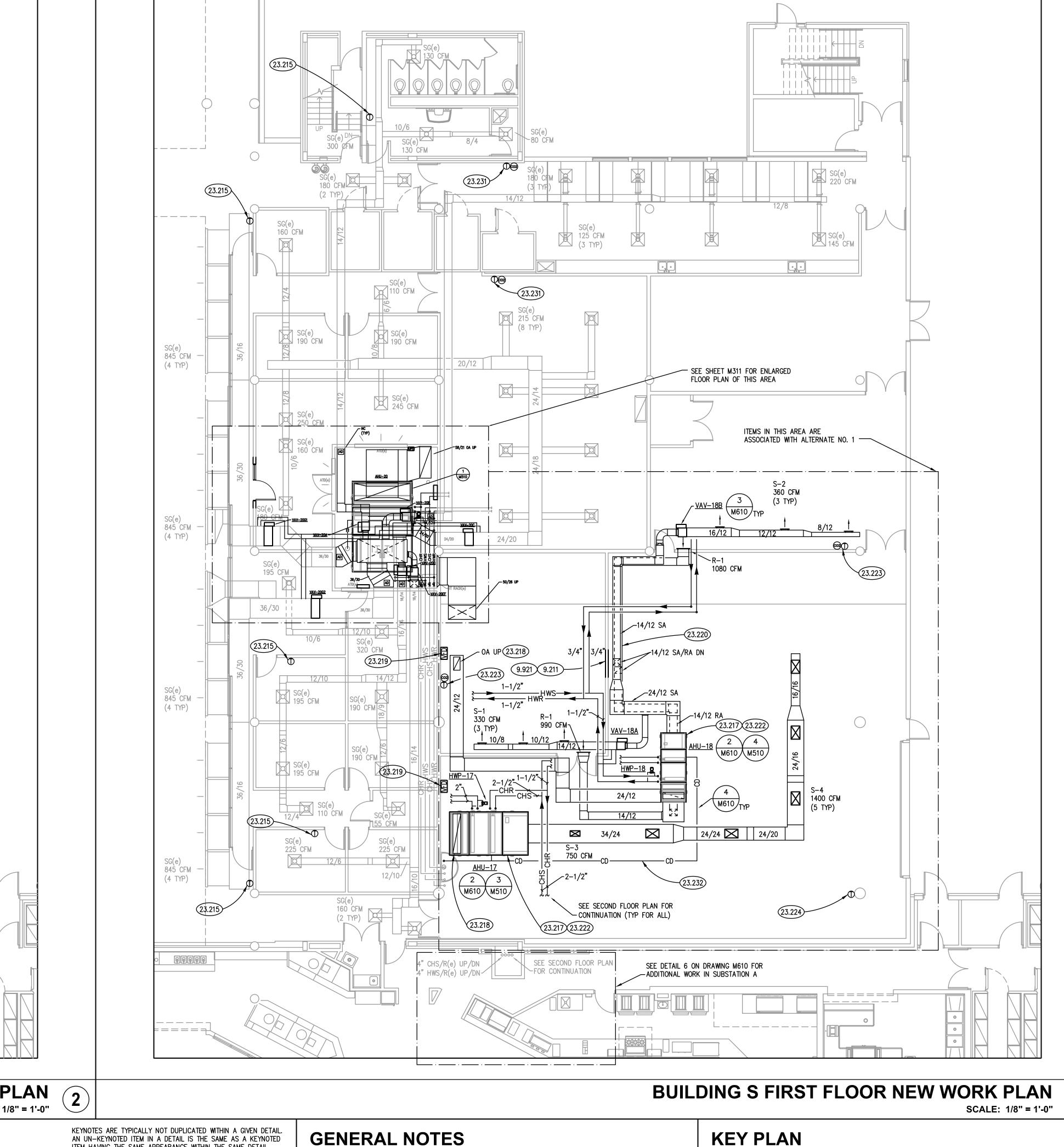
23.223 ALTERNATE NO. 1: PROVIDE NEW THERMOSTAT AND CO2 SENSOR FOR VAV BOX.

23.231 PROVIDE NEW THERMOSTAT AND CO2 SENSOR FOR VAV BOX.

FOR EXACT ROUTING OF CONDENSATE PIPING.

23.224 ALTERNATE NO. 1: PROVIDE NEW THERMOSTAT FOR AIR HANDLING UNIT. COORDINATE EXACT LOCATION WITH

23.232 PROVIDE CONDENSATE PIPING FOR AIR HANDLING UNITS. DISCHARGE IN WASH SINK. COORDINATE WITH OWNER



BUILDING S FIRST FLOOR DEMOLITION PLAN (2) **KEYNOTES** 

2.401 ALTERNATE NO. 1: CREATE OPENING(S) IN STEEL-STUD-FRAMED DRYWALL CONSTRUCTION FOR NEW MECHANICAL DUCT(S)/PIPE(S) TO TIGHTLY FIT TO SIZE(S) OF DUCT(S)/PIPES(S) TO BE PROVIDED; REFER TO NEW

23.105 ALTERNATE NO. 1: REMOVE SUSPENDED AIR HANDLING UNIT AND ASSOCIATED DUCTWORK AS SHOWN. REMOVE

BACK TO WALL AND PROVIDE PERMANENT CAP ON PIPING. REMOVE ASSOCIATED THERMOSTAT AND PROVIDE CAP

23.106 ALTERNATE NO. 1: REMOVE UNIT HEATER AND ALL ASSOCIATED PIPING AND SPECIALITIES. REMOVE PIPING

23.112 REMOVE THERMOSTAT FOR AIR HANDLING UNIT. REMOVE NIGHT SETBACK THERMOSTAT AND PROVIDE CAP ON

23.217 ALTERNATE NO. 1: PROVIDE NEW SUSPENDED AIR HANDLING UNIT. PROVIDE ALL DUCTWORK AND PIPING AS

23.218 ALTERNATE NO. 1: PROVIDE ALL MATERIALS AND LABOR TO CONNECT OUTSIDE AIR DUCTWORK TO EXISTING

23.220 ALTERNATE NO. 1: PROVIDE DUCTWORK FOR AIR HANDLING UNIT. ROUTE RETURN DUCTWORK DIRECTLY BELOW

23.219 ALTERNATE NO. 1: PROVIDE VARIABLE FREQUENCY DRIVE FOR AIR HANDLING UNITS IN PLACE OF LOCAL

PIPING AND SPECIALITIES BACK TO WALL. PROVIDE TEMPORARY CAP FOR NEW CONNECTION.

9.921 ALTERNATE NO. 1: PAINT PATCHED AREA AND BLEND INTO EXISTING WALL SURFACE.

SEE SHEET M311 FOR ENLARGED FLOOR PLAN OF THIS AREA

23.115 9.921 9.211

FOR CONTINUATION

ON WALL.

23.111 REMOVE THERMOSTAT FOR AIR HANDLING UNIT.

23.115 ALTERNATE NO. 1: REMOVE AIR TRANSFER DUCT.

23.215 PROVIDE NEW THERMOSTAT FOR VAV BOX.

GRAVITY VENTILATOR ON ROOF.

SUPPLY DUCTWORK.

23.113 ALTERNATE NO. 1: REMOVE THERMOSTAT FOR AIR HANDLING UNIT.

ITEMS IN THIS AREA ARE

ASSOCIATED WITH ALTERNATE NO. 1 -

20/12

# **GENERAL NOTES**

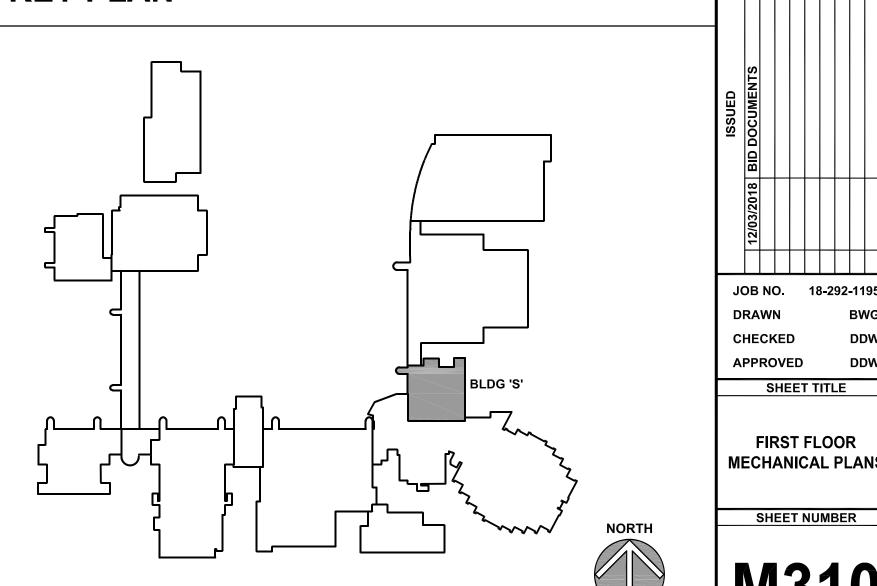
### REFER TO DRAWING G100 FOR PROJECT GENERAL NOTES.

ALL PIPING AND DUCTWORK IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL REQUIRED FITTINGS, OFFSETS, DROPS AND RISES. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL MATERIAL AND LABOR FOR A COMPLETE AND WORKING SYSTEM. COORDINATE WITH OTHER TRADES FOR SPACE AVAILABLE AND RELATIVE LOCATIONS OF

- ALL TAPES AND MASTICS USED TO SEAL DUCTWORK LISTED AND LABELED IN ACCORDANCE WITH UL 181A SHALL BE MARKED ACCORDINGLY. ALL TAPES AND MASTICS USED TO SEAL FLEXIBLE DUCTS AND AIR CONNECTORS SHALL COMPLY WITH UL 181B AND MARKED ACCORDINGLY.
- 4. THERMOSTATIC CONTROLS OF EQUIPMENT SHALL HAVE A 5° F DEADBAND.

PERFORMANCE REQUIREMENTS AND AFOREMENTIONED COORDINATION.

- 5. GENERALLY, SMALL DIAMETER PIPE RUNS FROM DRIPS, CONDENSATE PANS AND OTHER SERVICES ARE NOT SHOWN
- BUT MUST BE PROVIDED. 6. SPACE ALLOCATION, COORDINATION WITH ELECTRICAL, ARCHITECTURAL & OTHER MECHANICAL COMPONENTS HAVE BEEN MADE WITH RESPECT TO ALL EQUIPMENT SCHEDULED ON THESE DRAWINGS AND IN THE SPECIFICATIONS OF THE FIRST NAMED MANUFACTURER ONLY. OTHER MANUFACTURERS ARE ACCEPTABLE PROVIDED THEY MEET
- . DO NOT CUT THROUGH THE MASONRY BOND BEAMS OR OTHER STRUCTURAL ELEMENT WHEN INSTALLING OPENINGS REQUIRED FOR ALL DUCTWORK, PIPING, CONDUITS OR OTHER WORK. CONTRACTOR CUTTING THROUGH OR OTHERWISE DAMAGING THESE ELEMENTS WILL BE RESPONSIBLE FOR ALL ASSOCIATED ENGINEERING FEES AND SUBSEQUENT RETRO-FIT/REINFORCING DEEMED NECESSARY TO REINSTATE THE CONTINUITY OF THE DISRUPTED
- 3. HEATING AND COOLING DESIGN LOADS FOR THE BUILDING HAVE BEEN CALCULATED WITH ELITE SOFTWARE, COMMERCIAL HVAC LOADS PROGRAM, VERSION 8.02.34, IN ACCORDANCE WITH ASHRAE STANDARDS. INTERIOR DESIGN TEMPERATURES ARE MAXIMUM 72 DEGREES F FOR HEATING AND A MINIMUM OF 75 DEGREES F FOR
- 9. OBTAIN AND PAY ALL COSTS FOR PERMITS, LICENSES, CERTIFICATE FILING AND ALL INSPECTIONS BY AUTHORITIES HAVING JURISDICTION.



JOB NO. 18-292-1195 DRAWN CHECKED APPROVED SHEET TITLE FIRST FLOOR

MECHANICAL PLANS

(4 TYP)

SG(e) 845 CFM -(4 TYP)

SG(e) 845 CFM

(4 TYP)

(4 TYP)

====+

KEYNOTES ARE TYPICALLY NOT DUPLICATED WITHIN A GIVEN DETAIL.

AN UN-KEYNOTED ITEM IN A DETAIL IS THE SAME AS A KEYNOTED ITEM HAVING THE SAME APPEARANCE WITHIN THE SAME DETAIL.

AUTOMATION SYSTEM.

23.208 PROVIDE NEW VAV BOXES. PROVIDE ALL REQUIRED TRANSITIONS AND FITTINGS. MAINTAIN CLEARANCE AROUND BOXES FOR SERVICING.

23.211 PROVIDE NEW RETROFIT VAV BOX FOR THIS ZONE; FIELD VERIFY EXACT DUCT DIMENSIONS PRIOR TO CONSTRUCTION; REINSTALL SALVAGED ACOUSTICAL CEILING PANELS AND GRID MEMBERS.

23.226 PROVIDE FLARED AND SCREENED OPENING ON EXHAUST OPENING TO ROOM.

**GENERAL NOTES** 

REFER TO DRAWING G100 FOR PROJECT GENERAL NOTES.

ALL PIPING AND DUCTWORK IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL REQUIRED FITTINGS, OFFSETS, DROPS AND RISES. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL MATERIAL AND LABOR FOR A COMPLETE AND WORKING SYSTEM. COORDINATE WITH OTHER TRADES FOR SPACE AVAILABLE AND RELATIVE LOCATIONS OF EQUIPMENT, PIPING, DUCTWORK, ETC.

ALL TAPES AND MASTICS USED TO SEAL DUCTWORK LISTED AND LABELED IN ACCORDANCE WITH UL 181A SHALL BE MARKED ACCORDINGLY. ALL TAPES AND MASTICS USED TO SEAL FLEXIBLE DUCTS AND AIR CONNECTORS SHALL COMPLY WITH UL 181B AND MARKED ACCORDINGLY.

4. THERMOSTATIC CONTROLS OF EQUIPMENT SHALL HAVE A 5° F DEADBAND.

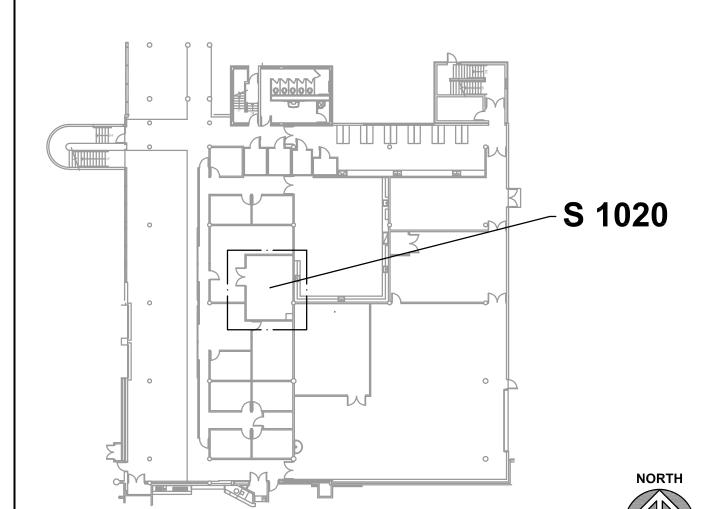
GENERALLY, SMALL DIAMETER PIPE RUNS FROM DRIPS, CONDENSATE PANS AND OTHER SERVICES ARE NOT SHOWN BUT MUST BE PROVIDED.

6. SPACE ALLOCATION, COORDINATION WITH ELECTRICAL, ARCHITECTURAL & OTHER MECHANICAL COMPONENTS HAVE BEEN MADE WITH RESPECT TO ALL EQUIPMENT SCHEDULED ON THESE DRAWINGS AND IN THE SPECIFICATIONS OF THE FIRST NAMED MANUFACTURER ONLY. OTHER MANUFACTURERS ARE ACCEPTABLE PROVIDED THEY MEET PERFORMANCE REQUIREMENTS AND AFOREMENTIONED COORDINATION.

DO NOT CUT THROUGH THE MASONRY BOND BEAMS OR OTHER STRUCTURAL ELEMENT WHEN INSTALLING OPENINGS REQUIRED FOR ALL DUCTWORK, PIPING, CONDUITS OR OTHER WORK. CONTRACTOR CUTTING THROUGH OR OTHERWISE DAMAGING THESE ELEMENTS WILL BE RESPONSIBLE FOR ALL ASSOCIATED ENGINEERING FEES AND SUBSEQUENT RETRO-FIT/REINFORCING DEEMED NECESSARY TO REINSTATE THE CONTINUITY OF THE DISRUPTED

HEATING AND COOLING DESIGN LOADS FOR THE BUILDING HAVE BEEN CALCULATED WITH ELITE SOFTWARE, COMMERCIAL HVAC LOADS PROGRAM, VERSION 8.02.34, IN ACCORDANCE WITH ASHRAE STANDARDS. INTERIOR DESIGN TEMPERATURES ARE MAXIMUM 72 DEGREES F FOR HEATING AND A MINIMUM OF 75 DEGREES F FOR

9. OBTAIN AND PAY ALL COSTS FOR PERMITS, LICENSES, CERTIFICATE FILING AND ALL INSPECTIONS BY AUTHORITIES HAVING JURISDICTION.



SHEET NUMBER M311

SHEET TITLE

FIRST FLOOR **ENLARGED MECHANICAL PLANS** 

2.402 DEMOLISH PORTION OF EXISTING STEEL-STUD-FRAMED DRYWALL; CAREFULLY REMOVE ELEMENTS TO PERMIT SALVAGING OF EXISTING DOOR, FRAME AND HARDWARE; DEMOLISH WALL BASE. 2.410 SALVAGE EXISTING DOOR, FRAME AND HARDWARE. 2.413 CREATE OPENING IN EXISTING STEEL-STUD-FRAMED FIRE-RATED GYPSUM DRYWALL CONSTRUCTION FOR FOR NEW MECHANICAL DUCT TO TIGHTLY FIT SIZE OF DUCT. REFER TO NEW WORK PLAN.

7.840 FIRESTOPPING: FIRESTOP NEW PENETRATION(S) THROUGH EXISTING FIRE-RATED GYPSUM DRYWALL ASSEMBLY; REFER TO SPECIFICATIONS.

8.100 REINSTALL SALVAGED EXISTING DOOR, FRAME AND HARDWARE.

**KEYNOTES** 

9.212 GYPSUM BOARD ASSEMBLY: RECONSTRUCT DEMOLISHED PORTION OF STEEL-STUD-FRAMED GYPSUM DRYWALL, USING LIKE MATERIALS, TO PERMIT REINSTALLATION OF SALVAGED DOOR, FRAME AND HARDWARE; PROVIDE NEW WALL BASE TO MATCH EXISTING.

9.922 RE-PAINT ENTIRE WALL SURFACE, TOP TO BOTTOM, COLUMN TO COLUMN; BLEND PATCHED AREA AROUND DOOR FRAME INTO EXISTING WALL SURFACE. 9.923 RE-PAINT ALL SURFACES OF EXISTING DOOR AND FRAME.

23.100 REMOVE AIR HANDLING UNIT AND ASSOCIATED DUCTWORK AS SHOWN.

23.101 DEMOLISH SECTION OF DUCTWORK AS REQUIRED FOR INSTALLATION OF NEW RETRO-FIT VAV BOX AND HEATING COIL; SALVAGE EXISTING ACOUSTICAL CEILING PANELS AND GRID MEMBERS TO PERMIT DEMOLITION AND NEW CONSTRUCTION; SAVE AND PROTECT SALVAGED CEILING COMPONENTS FOR REINSTALLATION.

23.103 REMOVE PNEUMATIC CONTROL PANEL AND ALL ASSOCIATED END DEVICES. VERIFY ONLY POINTS IN PANEL ARE ASSOCIATED WITH AHU-20. IF OTHER CONTROLS ARE IN PANEL AFFECTING OTHER EQUIPMENT NOTIFY OWNER. COORDINATE WITH OWNER FOR REMOVAL OF ANY GRAPHICS IN JCI SYSTEM.

23.109 EXISTING PIPING INTO MECHANICAL ROOM DOES NOT HAVE ISOLATION VALVES. CHILLED WATER PIPING CONTAINS 30% GLYCOL.

23.110 COORDINATE WITH OWNER FOR DRAINING PIPES. OWNER TO DRAIN AND FILL CHILLED WATER AND HEATING

23.114 REMOVE HWS/R AND CHS/R PIPING AND COIL SPECIALITIES BACK TO WALL AS SHOWN. PROVIDE TEMPORARY CAP FOR NEW CONNECTION.

23.200 EXISTING IT RACK. PROTECT RACK AND ALL ASSOCIATED WIRING THROUGHOUT ALL PHASES OF CONSTRUCTION. 23.201 PROVIDE NEW CONNECTION BETWEEN OUTSIDE AIR DUCTWORK AND AIR HANDLING UNIT. PROVIDE ALL REQUIRED TRANSITIONS AND FITTINGS TO MAKE THE CONNECTION. 23.202 PROVIDE NEW HWS/R AND CHS/R PIPING AND COIL SPECIALITIES TO AHU.

23.203 PROVIDE 7'-6" X 3'-6" PLENUM BOX FOR AIR HANDLING UNIT. PROVIDE ALL CONNECTIONS TO VAV BOXES AS SHOWN. PLENUM BOX TO BE INSTALLED UP TO CEILING 23.204 PROVIDE VAV BOX. MOUNT VAV BOX LOWER THAN VAV-20D TO ALLOW FOR SERVICING OF UNIT.

23.205 PROVIDE NEW DDC CONTROLLER FOR AHU. PROVIDE GRAPHICS AND INTERFACE INTO CAMPUS BUILDING

23.206 PROVIDE VARIABLE FREQUENCY DRIVE FOR NEW AHU IN PLACE OF LOCAL DISCONNECT. 23.207 PROPOSED ROUTE OF CONDENSATE PIPING. DISCHARGE IN NEAREST FLOOR DRAIN.

23.209 PROVIDE NEW HWS/R PIPING AND ASSOCIATED SPECIALITIES FOR VAV BOXES.

S1020 VENTILATION PLAN

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

A A / \(\gamma\)

23.109

" CHS/R(e)

S1020 PIPING DEMOLITION PLAN
SCALE: 1/4" = 1'-0"

245 CFM

14/12 AD

**2.413 7.840** 

S1020 VENTILATION DEMOLITION PLAN
SCALE: 1/4" = 1'-0"

ATD(e)

14/12

<u>VAV-20G1</u>¬ TYP M610 3" HWS/R(e) 4" CHS/R(e)

245 CFM

<u>AHU-20</u>

ATD(e)

TYP 23.208

<u>VAV-20A</u> —

36/30

23.205

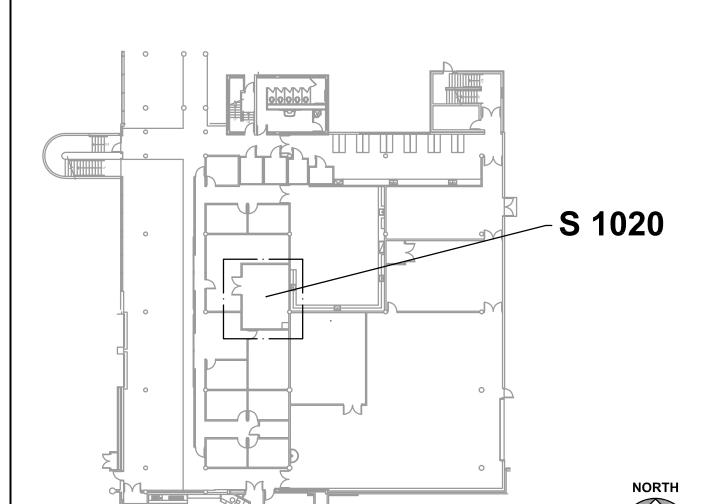
320 CFM

9.922 9.212

9.923 8.100

9.922 9.212

**KEY PLAN** 



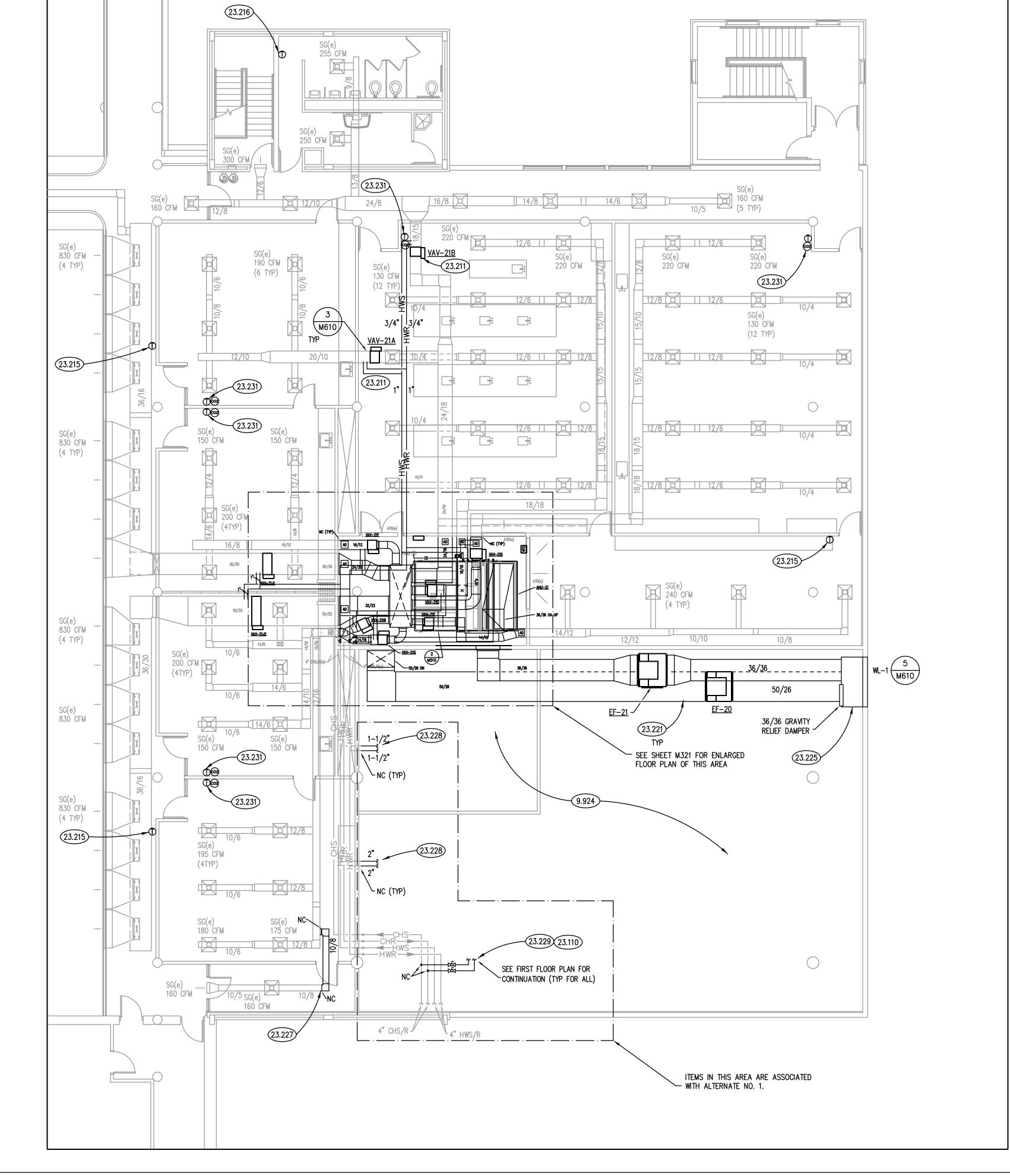
\$1020 PIPING PLAN SCALE: 1/4" = 1'-0"

**BUILDING S** 

2.402

2.410

2.402



BUILDING S SECOND FLOOR DEMOLITION PLAN

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

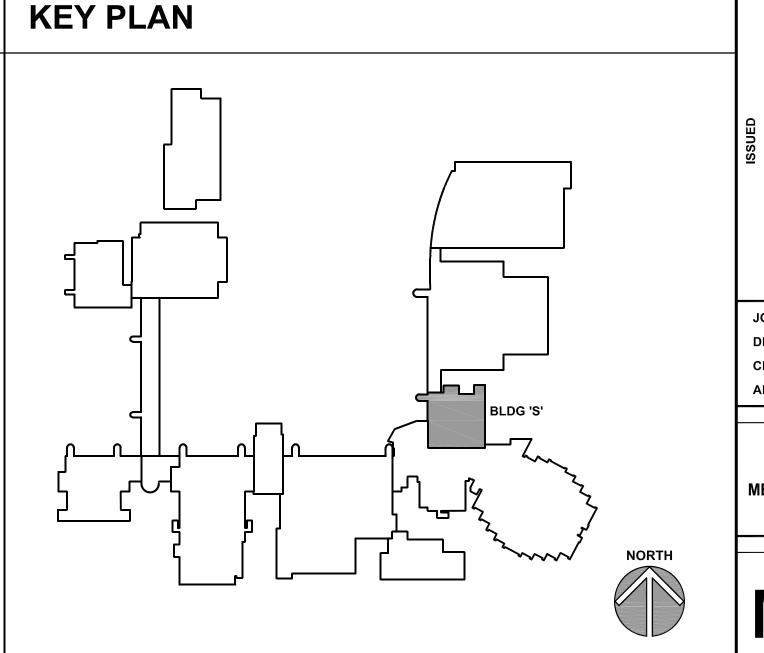
# **GENERAL NOTES**

- ALL PIPING AND DUCTWORK IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL REQUIRED FITTINGS, OFFSETS, DROPS AND RISES. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL MATERIAL AND LABOR FOR A COMPLETE AND WORKING SYSTEM. COORDINATE WITH OTHER TRADES FOR SPACE AVAILABLE AND RELATIVE LOCATIONS OF
- ALL TAPES AND MASTICS USED TO SEAL DUCTWORK LISTED AND LABELED IN ACCORDANCE WITH UL 181A SHALL BE MARKED ACCORDINGLY. ALL TAPES AND MASTICS USED TO SEAL FLEXIBLE DUCTS AND AIR CONNECTORS SHALL COMPLY WITH UL 181B AND MARKED ACCORDINGLY.
- 4. THERMOSTATIC CONTROLS OF EQUIPMENT SHALL HAVE A 5° F DEADBAND.

REFER TO DRAWING G100 FOR PROJECT GENERAL NOTES.

EQUIPMENT, PIPING, DUCTWORK, ETC.

- 5. GENERALLY, SMALL DIAMETER PIPE RUNS FROM DRIPS, CONDENSATE PANS AND OTHER SERVICES ARE NOT SHOWN BUT MUST BE PROVIDED.
- 6. SPACE ALLOCATION, COORDINATION WITH ELECTRICAL, ARCHITECTURAL & OTHER MECHANICAL COMPONENTS HAVE BEEN MADE WITH RESPECT TO ALL EQUIPMENT SCHEDULED ON THESE DRAWINGS AND IN THE SPECIFICATIONS OF THE FIRST NAMED MANUFACTURER ONLY. OTHER MANUFACTURERS ARE ACCEPTABLE PROVIDED THEY MEET PERFORMANCE REQUIREMENTS AND AFOREMENTIONED COORDINATION.
- 7. DO NOT CUT THROUGH THE MASONRY BOND BEAMS OR OTHER STRUCTURAL ELEMENT WHEN INSTALLING OPENINGS REQUIRED FOR ALL DUCTWORK, PIPING, CONDUITS OR OTHER WORK. CONTRACTOR CUTTING THROUGH OR OTHERWISE DAMAGING THESE ELEMENTS WILL BE RESPONSIBLE FOR ALL ASSOCIATED ENGINEERING FEES AND SUBSEQUENT RETRO-FIT/REINFORCING DEEMED NECESSARY TO REINSTATE THE CONTINUITY OF THE DISRUPTED
- . HEATING AND COOLING DESIGN LOADS FOR THE BUILDING HAVE BEEN CALCULATED WITH ELITE SOFTWARE, COMMERCIAL HVAC LOADS PROGRAM, VERSION 8.02.34, IN ACCORDANCE WITH ASHRAE STANDARDS. INTERIOR DESIGN TEMPERATURES ARE MAXIMUM 72 DEGREES F FOR HEATING AND A MINIMUM OF 75 DEGREES F FOR
- 9. OBTAIN AND PAY ALL COSTS FOR PERMITS, LICENSES, CERTIFICATE FILING AND ALL INSPECTIONS BY AUTHORITIES HAVING JURISDICTION.



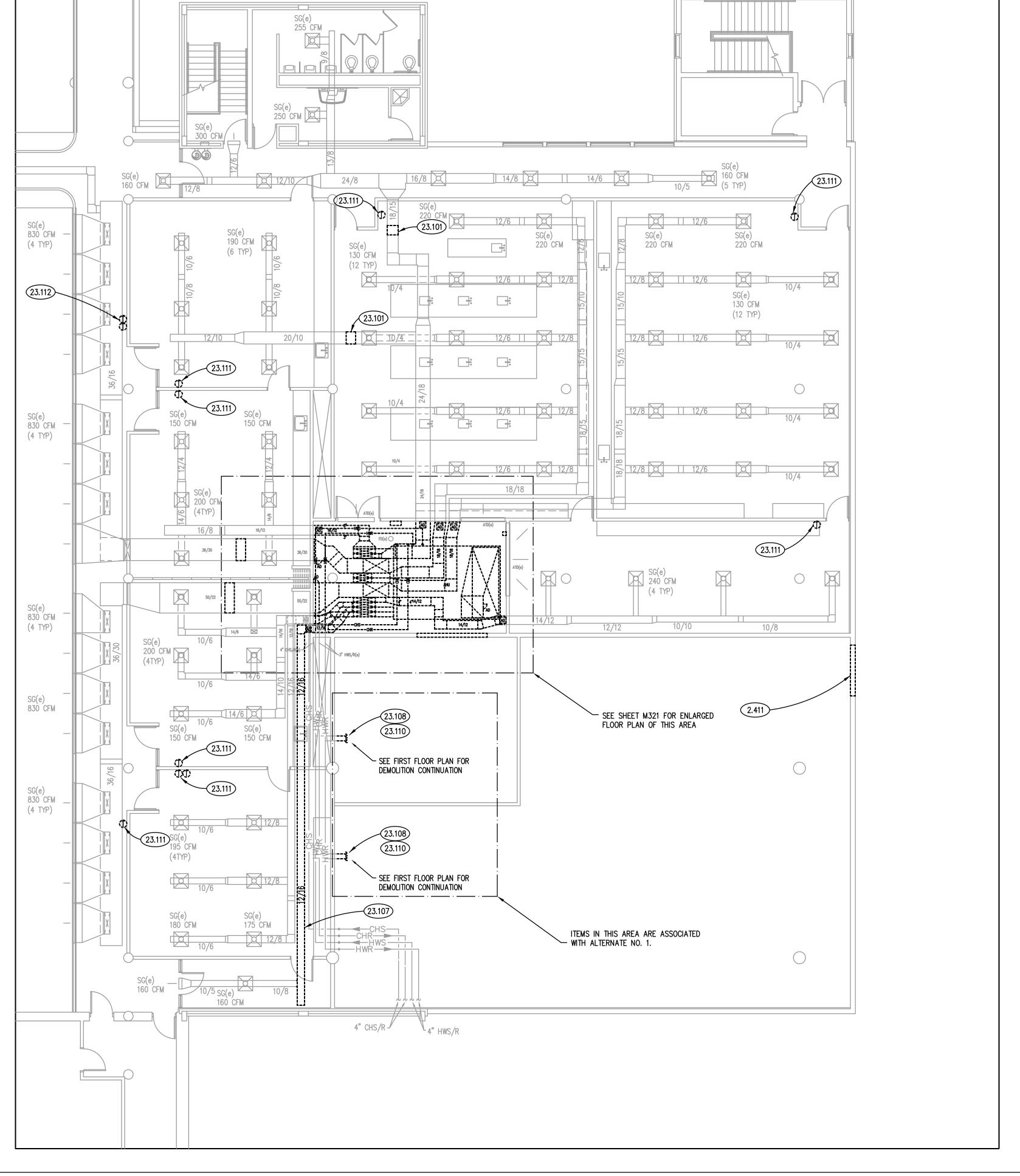
SCALE: 1/8" = 1'-0"

BUILDING S SECOND FLOOR NEW WORK PLAN

JOB NO. 18-292-1195 DRAWN CHECKED **APPROVED** SHEET TITLE

SECOND FLOOR MECHANICAL PLANS

SHEET NUMBER



**KEYNOTES** 

2.411 CREATE OPENING IN EXISTING STEEL-STUD-FRAMED EXTERIOR WALL TO TIGHTLY FIT NEW MECHANICAL LOUVER. 9.924 ALTERNATE NO. 1: PAINT NEW DUCTWORK AND CONDUITS IN THIS SPACE; DRY FALL APPLICATION METHOD; REFER TO SPECIFICATIONS.

23.101 DEMOLISH SECTION OF DUCTWORK AS REQUIRED FOR INSTALLATION OF NEW RETRO-FIT VAV BOX AND HEATING COIL; SALVAGE EXISTING ACOUSTICAL CEILING PANELS AND GRID MEMBERS TO PERMIT DEMOLITION AND NEW CONSTRUCTION; SAVE AND PROTECT SALVAGED CEILING COMPONENTS FOR REINSTALLATION.

23.107 REMOVE DUCTWORK BACK TO WALL AS SHOWN; SALVAGE EXISTING ACOUSTICAL CEILING PANELS AND GRID MEMBERS TO PERMIT DEMOLITION WORK; SAVE AND PROTECT SALVAGED CEILING COMPONENTS FOR REINSTALLATION; REINSTALL SALVAGED ACOUSTICAL CEILING PANELS AND GRID MEMBERS.AFTER DEMOLITION WORK IS COMPLETE.

KEYNOTES ARE TYPICALLY NOT DUPLICATED WITHIN A GIVEN DETAIL. AN UN-KEYNOTED ITEM IN A DETAIL IS THE SAME AS A KEYNOTED

ITEM HAVING THE SAME APPEARANCE WITHIN THE SAME DETAIL.

23.108 ALTERNATE NO. 1: REMOVE PIPING FROM SUSPENDED AIR HANDLING UNITS BACK TO WALL. PROVIDE TEMPORARY CAP ON PIPING FOR NEW CONNECTION. 23.110 COORDINATE WITH OWNER FOR DRAINING PIPES. OWNER TO DRAIN AND FILL CHILLED WATER AND HEATING

WATER PIPING. 23.111 REMOVE THERMOSTAT FOR AIR HANDLING UNIT. 23.112 REMOVE THERMOSTAT FOR AIR HANDLING UNIT. REMOVE NIGHT SETBACK THERMOSTAT AND PROVIDE CAP ON

23.211 PROVIDE NEW RETROFIT VAV BOX FOR THIS ZONE; FIELD VERIFY EXACT DUCT DIMENSIONS PRIOR TO

CONSTRUCTION; REINSTALL SALVAGED ACOUSTICAL CEILING PANELS AND GRID MEMBERS. 23.215 PROVIDE NEW THERMOSTAT FOR VAV BOX. 23.216 PROVIDE NEW THERMOSTAT FOR VAV BOX. COORDINATE WITH OWNER FOR EXACT LOCATION.

23.221 PROVIDE EXHAUST FANS FOR AIR HANDLING UNITS. ROUTE DUCTWORK ON TOP OF EACH OTHER.

23.225 PROVIDE THREE THIRTY-SIX INCH PLENUM BOXES FOR WALL LOUVER. PLENUM BOX FOR EF-21 SHALL BE 84" X 46". PLENUM BOX FOR EF-20 SHALL BE 84" X 44". PLENUM BOX FOR RELIEF DAMPER SHALL BE 84" X 23.227 PROVIDE NEW DUCT CONNECTIONS TO EXISTING DUCTWORK AS SHOWN.

23.231 PROVIDE NEW THERMOSTAT AND CO2 SENSOR FOR VAV BOX.

to existing piping.

23.228 ALTERNATE NO. 1: PROVIDE HOT WATER PIPING TO MECHANICAL EQUIPMENT.

23.229 ALTERNATE NO. 1: PROVIDE CHILLED WATER PIPING TO NEW AIR HANDLING UNITS. PROVIDE CONNECTION

TO TIGHTLY FIT TO SIZE(S) OF DUCT(S)/PIPES(S) TO BE PROVIDED; REFER TO NEW WORK PLAN.

CONSTRUCTION; SAVE AND PROTECT SALVAGED CEILING COMPONENTS FOR REINSTALLATION.

OWNER. COORDINATE WITH OWNER FOR REMOVAL OF ANY GRAPHICS IN JCI SYSTEM.

23.102 REMOVE OUTSIDE AIR DUCTWORK AS SHOWN. REMOVE DUCTWORK BACK TO CEILING AND PROVIDE TEMPORARY

ARE ASSOCIATED WITH AHU-21. IF OTHER CONTROLS ARE IN PANEL AFFECTING OTHER EQUIPMENT NOTIFY

23.104 REMOVE PNEUMATIC CONTROL PANEL AND ALL ASSOCIATED END DEVICES. VERIFY ONLY POINTS IN PANEL

23.114 REMOVE HWS/R AND CHS/R PIPING AND COIL SPECIALITIES BACK TO WALL AS SHOWN. PROVIDE TEMPORARY

23.201 PROVIDE NEW CONNECTION BETWEEN OUTSIDE AIR DUCTWORK AND AIR HANDLING UNIT. PROVIDE ALL REQUIRED

23.109 EXISTING PIPING INTO MECHANICAL ROOM DOES NOT HAVE ISOLATION VALVES. CHILLED WATER PIPING

23.205 PROVIDE NEW DDC CONTROLLER FOR AHU. PROVIDE GRAPHICS AND INTERFACE INTO CAMPUS BUILDING

23.208 PROVIDE NEW VAV BOXES. PROVIDE ALL REQUIRED TRANSITIONS AND FITTINGS. MAINTAIN CLEARANCE

23.211 PROVIDE NEW RETROFIT VAV BOX FOR THIS ZONE; FIELD VERIFY EXACT DUCT DIMENSIONS PRIOR TO CONSTRUCTION; REINSTALL SALVAGED ACOUSTICAL CEILING PANELS AND GRID MEMBERS.

23.212 PROVIDE 8'-9" X 3'-0" PLENUM BOX FOR AIR HANDLING UNIT. PROVIDE ALL CONNECTIONS TO VAV BOXES

23.213 ROUTE DUCTWORK AND MOUNT VAV BOX LOW IN ORDER TO MAINTAIN SERVICE ACCESS AROUND VAV BOX.

23.214 DUCTWORK FOR VAV-21HI SHALL BE MOUNTED LOWER THAN DUCTWORK FOR VAV-21G FOR IN ORDER TO MAINTAIN

OPENING SO AS TO ENCOMPASS EXISTING HOLE IN WALL.

9.920 PAINT PATCHED AREA AND BLEND INTO EXISTING WALL SURFACE.

TRANSITIONS AND FITTINGS TO MAKE THE CONNECTION.

23.202 PROVIDE NEW HWS/R AND CHS/R PIPING AND COIL SPECIALITIES TO AHU.

23.209 PROVIDE NEW HWS/R PIPING AND ASSOCIATED SPECIALITIES FOR VAV BOXES.

AS SHOWN. PLENUM BOX TO BE INSTALLED UP TO CEILING.

SERVICE ACCESS AROUND BOTH VAV-BOXES.

23.226 PROVIDE SCREENED OPENING ON EXHAUST OPENING TO ROOM.

23.206 PROVIDE VARIABLE FREQUENCY DRIVE FOR NEW AHU IN PLACE OF LOCAL DISCONNECT. 23.207 PROPOSED ROUTE OF CONDENSATE PIPING. DISCHARGE IN NEAREST FLOOR DRAIN.

23.100 REMOVE AIR HANDLING UNIT AND ASSOCIATED DUCTWORK AS SHOWN.

AND RESILIENT CHANNELS ON AHU SIDE OF WALL.

CAP FOR NEW CONNECTION.

CONTAINS 30% GLYCOL.

AUTOMATION SYSTEM.

AROUND BOXES FOR SERVICING.

CAP FOR NEW CONNECTION.

REMOVAL OF EXISTING MECHANICAL AHU AND INSTALLATION OF NEW MECHANICAL AHU; LOCATE AND SIZE

DRYWALL, USING LIKE MATERIALS, INCLUDING ACOUSTIC INSULATION BATTS, AND ACOUSTICAL FIBERBOARD

REFER TO DRAWING G100 FOR PROJECT GENERAL NOTES. ALL PIPING AND DUCTWORK IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL REQUIRED FITTINGS, OFFSETS, DROPS AND RISES. THE CONTRACTOR IS RESPONSIBLE TO PROVIDE ALL MATERIAL AND LABOR FOR A COMPLETE AND WORKING SYSTEM. COORDINATE WITH OTHER TRADES FOR SPACE AVAILABLE AND RELATIVE LOCATIONS OF

ALL TAPES AND MASTICS USED TO SEAL DUCTWORK LISTED AND LABELED IN ACCORDANCE WITH UL 181A SHALL BE MARKED ACCORDINGLY. ALL TAPES AND MASTICS USED TO SEAL FLEXIBLE DUCTS AND AIR CONNECTORS SHALL COMPLY WITH UL 181B AND MARKED ACCORDINGLY.

4. THERMOSTATIC CONTROLS OF EQUIPMENT SHALL HAVE A 5° F DEADBAND.

**GENERAL NOTES** 

EQUIPMENT, PIPING, DUCTWORK, ETC.

GENERALLY, SMALL DIAMETER PIPE RUNS FROM DRIPS, CONDENSATE PANS AND OTHER SERVICES ARE NOT SHOWN BUT MUST BE PROVIDED.

SPACE ALLOCATION, COORDINATION WITH ELECTRICAL, ARCHITECTURAL & OTHER MECHANICAL COMPONENTS HAVE BEEN MADE WITH RESPECT TO ALL EQUIPMENT SCHEDULED ON THESE DRAWINGS AND IN THE SPECIFICATIONS OF THE FIRST NAMED MANUFACTURER ONLY. OTHER MANUFACTURERS ARE ACCEPTABLE PROVIDED THEY MEET PERFORMANCE REQUIREMENTS AND AFOREMENTIONED COORDINATION.

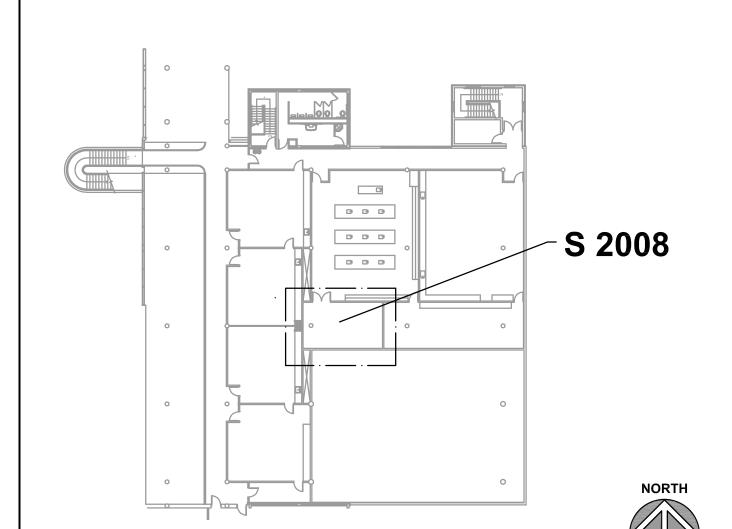
THROUGH THE MASONRY BOND BEAMS OR OTHER STRUCTURAL ELEMENT WHEN INSTALLING OPENINGS REQUIRED FOR ALL DUCTWORK, PIPING, CONDUITS OR OTHER WORK. CONTRACTOR CUTTING THROUGH OR OTHERWISE DAMAGING THESE ELEMENTS WILL BE RESPONSIBLE FOR ALL ASSOCIATED ENGINEERING FEES AND SUBSEQUENT RETRO-FIT/REINFORCING DEEMED NECESSARY TO REINSTATE THE CONTINUITY OF THE DISRUPTED

HEATING AND COOLING DESIGN LOADS FOR THE BUILDING HAVE BEEN CALCULATED WITH ELITE SOFTWARE, COMMERCIAL HVAC LOADS PROGRAM, VERSION 8.02.34, IN ACCORDANCE WITH ASHRAE STANDARDS. INTERIOR DESIGN TEMPERATURES ARE MAXIMUM 72 DEGREES F FOR HEATING AND A MINIMUM OF 75 DEGREES F FOR

9. OBTAIN AND PAY ALL COSTS FOR PERMITS, LICENSES, CERTIFICATE FILING AND ALL INSPECTIONS BY AUTHORITIES HAVING JURISDICTION.

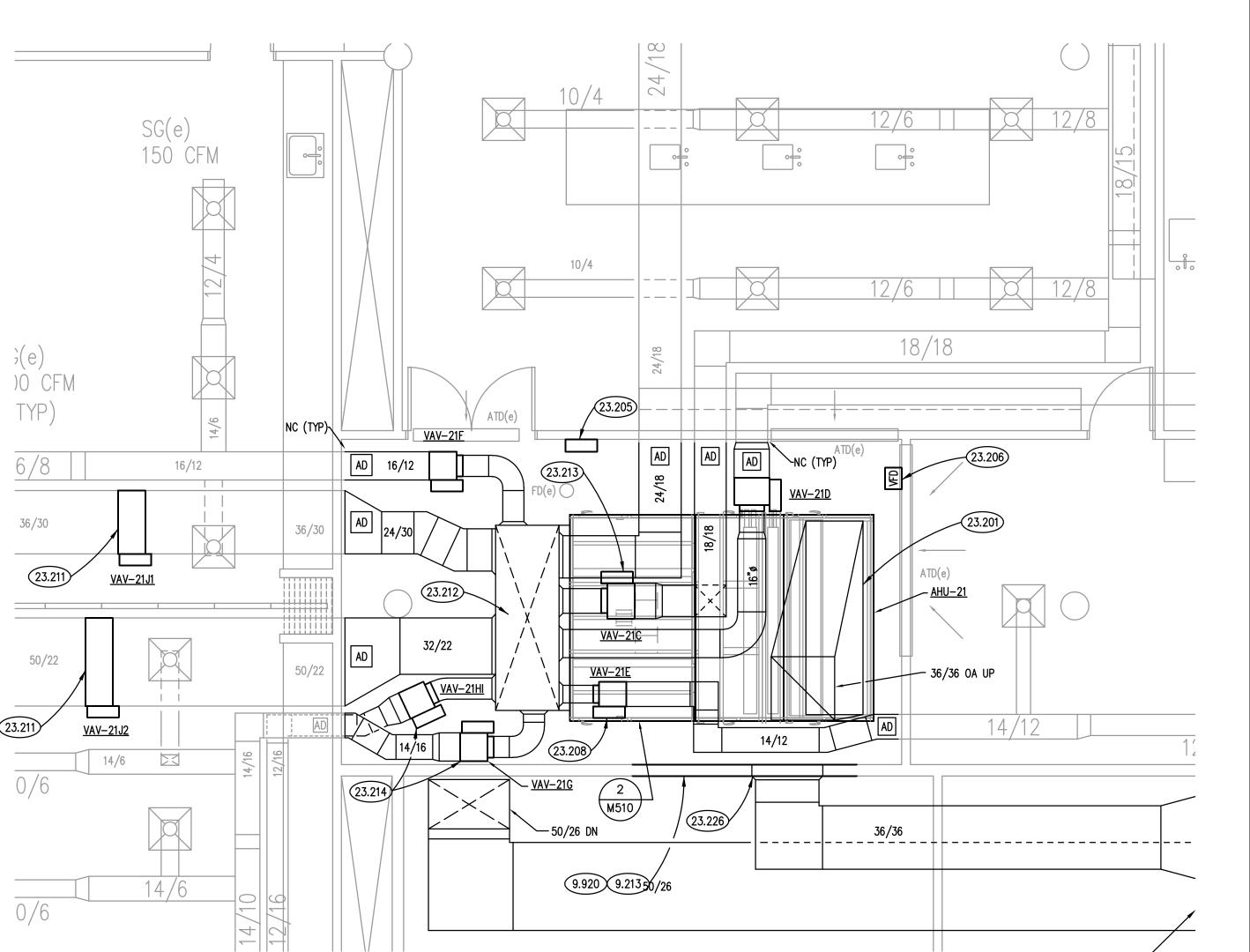
### **KEY PLAN**

**KEYNOTES** 



SECOND FLOOR **ENLARGED MECHANICAL PLANS** 

SHEET NUMBER



S2008 VENTILATION DEMOLITION PLAN
SCALE: 1/4" = 1'-0"

14/12

14/12

000

S2008 VENTILATION PLAN
SCALE: 1/4" = 1'-0"

- SEE DRAWING M320 FOR CONTINUATION 23.209 <u>VAV–21J2</u>

S2008 PPIPING DEMOLITION PLAN SCALE: 1/4" = 1'-0"

S2008 PIPING PLAN SCALE: 1/4" = 1'-0" 2

SEE DRAWING M320 FOR CONTINUATION -

**BUILDING S** 

**M321** 

150 CFM

16/12

)O CFM

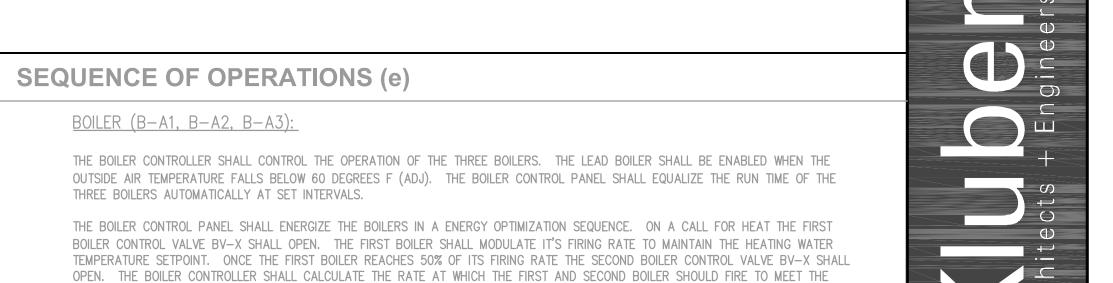
6/8

36/30

50/22

14/6

SHEET TITLE



THE HEATING WATER TEMPERATURE SHALL BE RESET BASED ON OUTDOOR AIR TEMPERATURE. THE WATER TEMPERATURE SHALL BE 180 DEGREES F WHEN THE OUTDOOR AIR TEMPERATURE IS O DEGREES F. THE WATER TEMPERATURE SHALL BE 100 DEGREES F WHEN THE OUTDOOR AIR TEMPERATURE IS 60 DEGREES F. TEMPERATURE RESET CURVES AND SETPOINTS SHALL BE ADJUSTABLE.

BUILDING LOAD. THE BOILERS SHALL THEN MODULATE THEIR FIRING RATE TOGETHER TO MAINTAIN THE HEATING WATER TEMPERATURE SETPOINT. ONCE THE FIRST AND SECOND BOILERS REACH 50% OF ITS FIRING RATE, THE THIRD BOILER CONTROL VALVE BY-X SHALL

OPEN. THE BOILER CONTROLLER SHALL CALCULATE THE RATE AT WHICH THE FIRST, SECOND, AND THIRD BOILER SHOULD FIRE TO MEET THE BUILDING LOAD. THE BOILER SHALL THEN MODULATE THEIR FIRING RATE TOGETHER TO MAINTAIN THE HEATING WATER TEMPERATURE

AS THE HEATING DEMAND DECREASES, THE BOILERS FIRING RATE SHALL MODULATE DOWN TOGETHER UNTIL THEY REACH A MINIMUM OF 10% OF THEIR FIRING RATE AT WHICH TIME THE THIRD BOILER SHALL BE DE-ENERGIZED AND THE ASSOCIATED BOILER CONTROL VALVE BV-X SHALL CLOSE. THE FIRST AND SECOND BOILER FIRING RATE SHALL THEN MODULATE TO MEET THE HEATING LOAD. WHEN THE FIRST AND SECOND BOILER REACH A MINIMUM OF 10% OF THEIR FIRING RATE, THE SECOND BOILER SHALL BE DE-ENERGIZED AND THE ASSOCIATED BOILER CONTROL VALVE BV-X SHALL CLOSE. THE FIRST BOILER FIRING RATE SHALL THEN MODULATE TO MEET THE HEATING

AN ALARM SHALL BE GENERATED IF THERE IS A BOILER ALARM OR A LOW WATER LEVEL ALARM.

IF THE BOILER EMERGENCY SHUTDOWN SWITCH IS ACTIVATED. ALL OF THE BOILERS SHALL BE IMMEDIATELY DE-ENERGIZED AND AN ALARM SHALL BE GENERATED.

### PUMP (HWP-A1, HWP-A2)

SETPOINT.

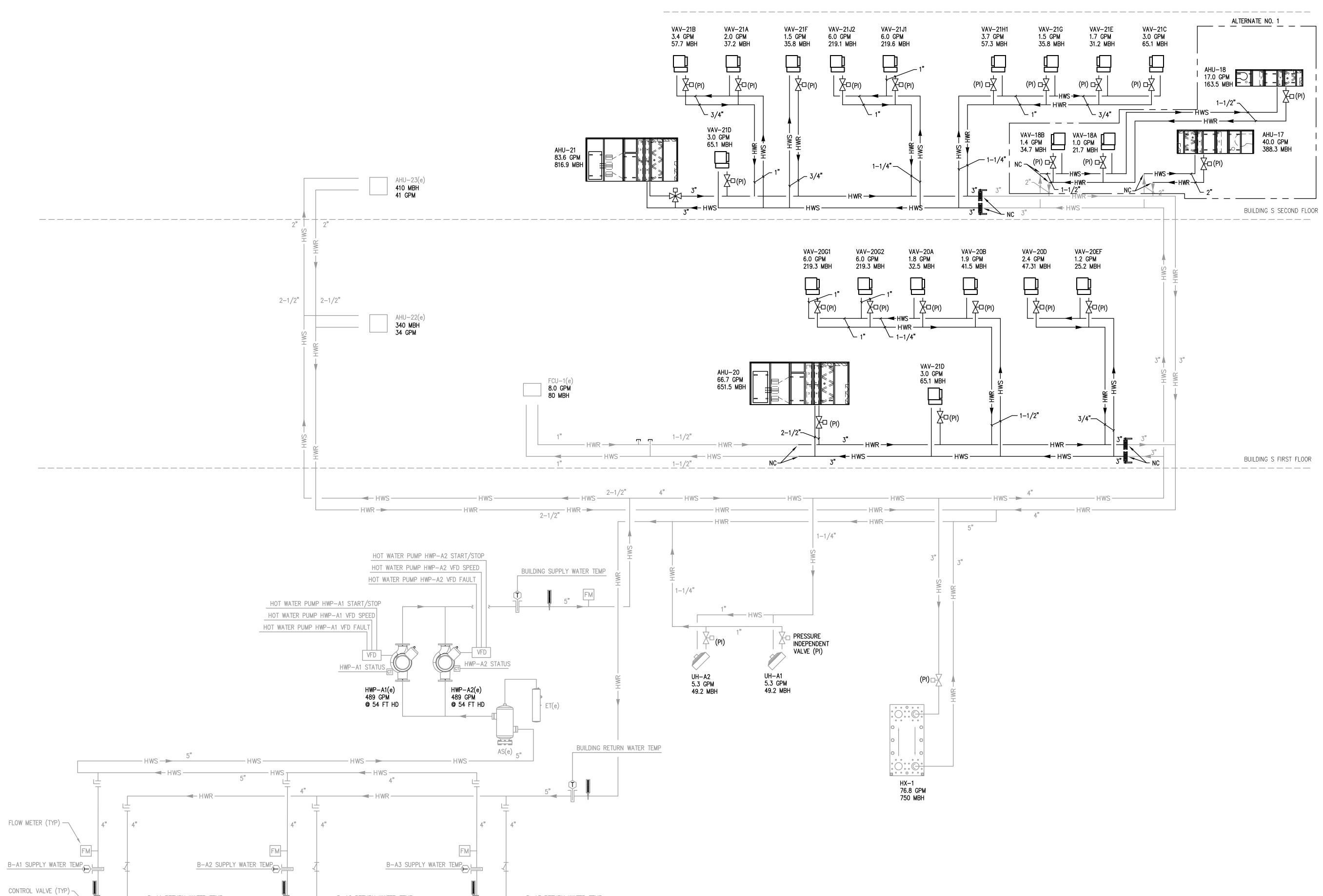
THE HEATING WATER PUMPS SHALL OPERATE IN A LEAD/LAG SEQUENCE. IF THE LEAD PUMP FAILS, THE LAG PUMP SHALL BE ENERGIZED. THE PUMPS SHALL BE ALTERNATED AS LEAD AT SET INTERVALS.

UPON A CALL FOR HEAT THE LEAD PUMP SHALL BE ENERGIZED. THE PUMP SPEED SHALL MODULATE TO MEET SYSTEM DEMAND BASED ON SENSORLESS SYSTEM PRESSURE CONTROL.

AN ALARM SHALL BE GENERATED UPON A PUMP OR A VFD FAULT STATUS.

NOTE: UNTIL THE SYSTEM IS CHANGED OVER TO VARIABLE FLOW, ALL BOILER VALVES (BV-1, BV-2, BV-3) SHALL REMAIN OPEN.

		SOFTWARE						
	Al	AO	DI	DO	SCHED	TREND	ALARM	GRAPHI
BOILER ENABLE (B-A1, B-A2, B-A3)				Х	Х			Χ
BOILER STATUS (B-A1, B-A2, B-A3)			Х				X	X
BOILER ALARM (B-A1, B-A2, B-A3)			Х				X	X
BUILDING HOT WATER FLOW RATE (FM)	X					Х		X
HOT WATER PUMP START/STOP (HWP-A1, HWP-A2)				Х				X
HOT WATER PUMP STATUS (HWP-A1, HWP-A2)			Х				X	X
HOT WATER PUMP VFD SPEED (HWP-A1, HWP-A2)		Х				Χ		X
HOT WATER PUMP VFD FAULT (HWP-A1, HWP-A2)			Χ				X	X
BUILDING SUPPLY WATER TEMPERATURE	Х					Χ		X
BUILDING RETURN WATER TEMPERATURE	Х					Χ		X
BUILDING HOT WATER SETPOINT		Х					X	X
BOILER SUPPLY WATER TEMPERATURE (B-A1, B-A2, B-A3)	X					Х		X
BOILER RETURN WATER TEMPERATURE (B-A1, B-A2, B-A3)	X					Х		X
OUTSIDE AIR TEMPERATURE	Х					Χ		X
GAS FLOW MEASUREMENT	Х					Χ		X
BOILER KILL SWITCH STATUS			Х				X	X
BOILER CONTROL VALVE (BV-1, BV-2, BV-3)			Х					X
BOILER FLOW RATE FM (B-A1, B-A2, B-A3)	X					Х		X



B-A2 RETURN WATER TEMP B-A1 RETURN WATER TEMP B-A3 RETURN WATER TEMP BV-1 STATUS BV-2 STATUS BV-3 STATUS BOILER A1(e) LOCHINVAR FBN2001 BOILER A2(e) LOCHINVAR FBN2001 BOILER A3(e) LOCHINVAR FBN2001 MINIMUM FLOW RATE 25 GPM MINIMUM FLOW RATE 25 GPM MINIMUM FLOW RATE 25 GPM BOILER B-A2 ENABLE BOILER B-A3 ENABLE BOILER B-A3 ALARM BOILER B-A1 ALARM BOILER B-A2 ALARM BOILER B-A3 STATUS BOILER B-A1 STATUS BOILER B-A2 STATUS

				BOI	LER S	CHEDU	JLE				
MARK	TYPE	WATER FLOW RATE (GPM)	MAX PRESS DROP (FT)	GAS INPUT (MBH)	GAS OUPUT (MBH)	EWT / LWT (°F)	ELECTRICAL (V/PH/HZ)	MINIMUM EFFICIENCY	MODEL	LOCATION	NOTES
B-A1(e)	CONDENSING	162	3.5	2,000	1,874	180 / 160	120/1/60	93.7	EDR-2000	SUB A	1
B-A2(e)	CONDENSING	162	3.5	2,000	1,874	180 / 160	120/1/60	93.7	EDR-2000	SUB A	1
B-A3(e)	CONDENSING	162	3.5	2,000	1,874	180 / 160	120/1/60	93.7	EDR-2000	SUB A	1
NOTES 1. BOII	LERS ARE SHOV	MN FOR INFORM	ATION PURPOS	ES ONLY. ALL	BOILERS ARE E	EXISTING.					

SUBSTATION A PIPING SCHEMATIC

PIPING SCHEMATIC

SHEET NUMBER

SHEET TITLE

# **SEQUENCE OF OPERATIONS**

AIR HANDLING UNIT (AHU-20, AHU-21):

HARDWARE

X

X

X

| X | |

| X | |

| X | |

X

l x l

l x l

SOFTWARE

X

Х

| X |

Х

Х

Х

X

| X | X | X

| X | X

X

AI AO DI DO SCHED TREND ALARM GRAPH

THE OCCUPIED/UNOCCUPIED MODE SCHEDULING SHALL BE MADE AT THE BUILDING AUTOMATION SYSTEM. PROVISIONS SHALL BE MADE FOR MANUAL SHUTDOWN OF EQUIPMENT. ALL SETPOINTS SHALL BE ADJUSTABLE. UNOCCUPIED SPACE TEMPERATURE SETPOINTS SHALL BE 80 DEGREES F COOLING AND 65 DEGREES F HEATING.

SUPPLY FAN — THE SUPPLY FAN SHALL RUN CONTINUOUSLY DURING OCCUPIED MODE AND INTERMITTENTLY DURING UNOCCUPIED MODE. THE SUPPLY FAN VARIABLE FREQUENCY DRIVE SHALL MODULATE THE SPEED OF THE FAN TO MAINTAIN THE DUCT STATIC PRESSURE SETPOINT. IF AIRFLOW IS NOT DETECTED WITHIN TWO MINUTES AFTER A START COMMAND THE FAN MOTOR SHALL BE DE-ENERGIZED AND AN AUDIBLE ALARM SHALL BE ACTIVATED. IF A HIGH STATIC PRESSURE IS SENSED IN THE SUPPLY AIR THE SUPPLY FAN SHALL BE DE-ENERGIZED AND SIGNAL AN ALARM CONDITION.

STATIC PRESSURE/SUPPLY AIR TEMPERATURE RESET - THE SUPPLY FAN VFDs SHALL MODULATE THE FANS TO MAINTAIN A DUCT STATIC PRESSURE SETPOINT. THE BAS SHALL CONTROL SUPPLY FAN SPEED TO MAINTAIN A CRITICAL STATIC PRESSURE SETPOINT. UPON FAILURE OF COMMUNICATION THE AHUS SHALL OPERATE ON THEIR OWN STATIC PRESSURE CONTROL IN STAND ALONE MODE. THE SETPOINT SHALL RESET TO OPTIMIZE FAN SPEED AS FOLLOWS: 1. THE BUILDING AUTOMATION SYSTEM SHALL MONITOR THE DAMPER POSITION OF ALL VAV TERMINAL UNITS AND DETERMINE THE

- CRITICAL ZONE (CZ), WHICH IS THE VAV TERMINAL UNIT THAT IS WIDEST OPEN. 2. WHEN THE CZ IS MORE THAN 95% OPEN, THE SUPPLY FAN DISCHARGE STATIC PRESSURE SETPOINT SHALL BE RESET DOWNWARD
- 10% OF THE PREVIOUS SETPOINT A FREQUENCY OF 10 MINUTES UNTIL THE CZ IS MORE THAN 97% OPEN OR THE STATIC PRESSURE SETPOINT HAS RESET DOWNWARD TO THE SYSTEM MINIMUM SETTING. 3. WHEN THE CZ IS LESS THAN 95% OPEN AND THE STATIC PRESSURE SETPOINT IS AT THE MINIMUM SETTING, THE DISCHARGE AIR
- TEMPERATURE SETPOINT SHALL BE RESET UPWARD IN INCREMENTS OF 0.5° F AT A FREQUENCY OF 10 MINUTES AND THE STATIC PRESSURE SETPOINT HELD CONSTANT UNTIL THE CZ IS MORE THAN 97% OPEN OR THE DISCHARGE AIR TEMPERATURE IS RESET TO IT'S MAXIMUM SETTING OF 10° F (ADJ) ABOVE THE DISCHARGE AIR TEMPERATURE SETPOINT.
- 4. THE REVERSE CONTROL SEQUENCE SHALL OCCUR WHEN THE CZ IS 98% OPEN UNTIL THE DISCHARGE AIR TEMPERATURE AND STATIC TEMPERATURE SETPOINTS ARE A THEIR DESIGN SETPOINT.

SMOKE DETECTORS - UPON DETECTION OF SMOKE THE FANS SHALL BE DE-ENERGIZED, CLOSE OUTSIDE AIR DAMPER, AND SIGNAL ALARM LOCALLY AND AT FIRE ALARM PANEL.

OA/RA DAMPERS - AN AIRFLOW MEASURING STATION/DAMPER SENSOR SHALL MODULATE THE OUTSIDE AIR DAMPERS TO MAINTAIN THE MINIMUM OUTSIDE AIR CFM SETPOINT. AN ECONOMIZER SHALL MODULATE THE DAMPERS BASED ON DIFFERENTIAL ENTHALPY OF THE RETURN AIR AND OUTSIDE AIR TO MAINTAIN A SUPPLY AIR TEMPERATURE OF 55 DEGREES F. THE ECONOMIZER SHALL HAVE A MAXIMUM OUTSIDE AIR INTAKE OF 5,000 CFM. IN UNOCCUPIED MODE THE OUTSIDE AIR DAMPER SHALL BE FULLY CLOSED. THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED AND RETURN AIR DAMPER OPEN DURING OPTIMIZED START.

DEMAND CONTROLLED VENTILATION - THE AIR HANDLING UNIT SHALL UTILIZE A CO2 BASED DEMAND CONTROLLED VENTILATION WITH VENTILATION RESET. THE B.A.S. SHALL CALCULATE THE AMOUNT OF VENTILATION (Vot) REQUIRED TO SATISFY THE CRITICAL ZONE BASED ON ASHRAE STANDARD 62.1 CALCULATIONS. THE BUILDING AUTOMATION SYSTEM SHALL MONITOR THE PRIMARY AIRFLOW FOR EACH VAV BOX AND TOTAL THE PRIMARY AIRFLOW (Vpz) AND REQUIRED OUTDOOR AIRFLOW (Voz) TO DETERMINE THE HIGHEST OUTDOOR AIR FRACTION (Zpz) REQUIRED. THE B.A.S. SHALL THEN CALCULATE THE SYSTEM VENTILATION EFFICIENCY (Evz) AND THE REQUIRED CORRECTED OUTDOOR AIR INTAKE FLOW (Vot). FOR ZONES WITH CO2 SENSORS, THE ZONE CO2 CONCENTRATION SHALL DETERMINE THE REQUIRED AMOUNT OF OUTDOOR AIR REQUIRED FOR THAT ZONE BASED ON A CO2 SETPOINT. AS ZONE CO2 CONCENTRATION CHANGES. OR AS ZONE VENTILATION EFFICIENCIES CHANGE. THE CORRECTED OUTDOOR AIR AMOUNT SHALL BE RESET TO MEET THE REQUIRED VENTILATION FOR THE CRITICAL ZONE. WHEN THE UNIT IS IN ECONOMIZER MODE, DEMAND CONTROL VENTILATION SHALL BE DISABLED.

ECONOMIZER — AN ECONOMIZER SHALL MODULATE THE DAMPERS BASED ON DIFFERENTIAL ENTHALPY OF THE RETURN AIR AND THE OUTSIDE AIR TO MAINTAIN A SUPPLY AIR TEMPERATURE 55 DEGREES F. THE ECONOMIZER SHALL HAVE FAULT AND DETECTION DIAGNOSTICS (FDD). THE FDD SHALL ALARM IF IS AIR TEMPERATURE SENSOR FAILURE, NO ECONOMIZER WHEN ENABLED, ECONOMIZING WHEN DISABLED, DAMPERS NOT MODULATING AND EXCESS OUTDOOR AIR. THE FDD SHALL ALARM WITH ANY OF THE FOLLOWING FAULTS:

- 1. AIR TEMPERATURE SENSOR FAILURE/FAULT 2. NOT ECONOMIZING WHEN THE UNIT SHOULD BE ECONOMIZING . ECONOMIZING WHEN THE UNIT SHOULD NOT BE ECONOMIZING
- EXCESS OUTDOOR AIR

OUTSIDE AIR TO THE PUMP SHALL BE OFF.

CORRIDOR IN RELATION TO OUTDOORS.

4. DAMPER NOT MODULATING

COOLING MODE - THE COOLING COIL CONTROL VALVE SHALL MODULATE TO MAINTAIN A SUPPLY AIR TEMPERATURE OF 55 DEGREES F WHEN THE OUTSIDE AIR TEMPERATURE IS ABOVE 60 DEGREES F. THE AHU SHALL BEGIN A MORNING COOL-DOWN AT LEAST ONE HOUR BEFORE OCCUPIED MODE.

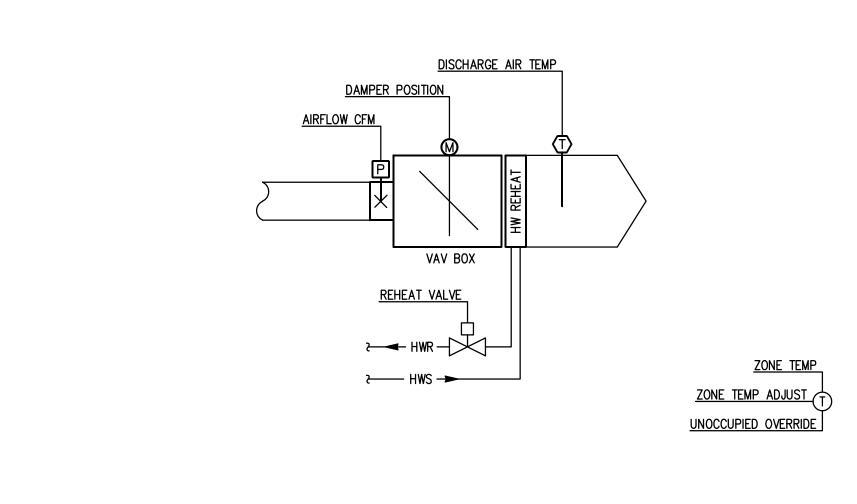
HEATING MODE - THE HOT WATER COIL CONTROL VALVE SHALL MODULATE TO MAINTAIN A DISCHARGE TEMPERATURE SETPOINT OF 65 DEGREES F WHEN IN THE OCCUPIED MODE. THE AHU SHALL BEGIN A MORNING WARM-UP AT LEAST ONE HOUR BEFORE OCCUPIED MODE. AFTER SPACE TEMPERATURE REACHES 70 DEGREES F IN ALL ZONES THE AHU SHALL OPERATE IN OCCUPIED MODE.

HWP-1, PUMP CONTROL - THE PUMP SHALL RUN CONTINUOUSLY WHEN THE OUTSIDE AIR IS BELOW 40 DEG F. ABOVE 40 DEG F

OPTIMIZED START - THE AHU SHALL BEGIN A MORNING WARM-UP/COOL DOWN BEFORE OCCUPIED MODE AS CALCULATED BY THE BAS FOR THE SPACE TO BE AT OCCUPIED TEMPERATURE SETPOINT AT THE START OF THE OCCUPIED MODE. AFTER SPACE TEMPERATURE

REACHES THE OCCUPIED SETPOINT THE AHU SHALL OPERATE IN OCCUPIED MODE. THE EXHAUST AIR DAMPER SHALL OPEN AND THE EXHAUST FAN SHALL BE ENERGIZED WHEN THE AIR HANDLING UNIT IS IN ECONOMIZER MODE. THE EXHAUST FAN ECM MOTOR SHALL MODULATE TO MAINTAIN A CORRIDOR POSITIVE PRESSURE OF 0.05 IN WG (ADJ) IN THE

# VARIABLE AIR VOLUME BOX CONTROL SCHEMATIC



AHU-20, AHU-21 TEMPERATURE CONTROL SCHEMATIC

AI - SPACE STATIC PRESSURE

AI - OUTSIDE AIR TEMPERATURE

NORTH

WALL

ROOM NOUTDOORS

Inside 🛭 Outside

<u>DI - HIGH STATIC SHUTDOWN</u>

AI - SUPPLY AIR TEMP

CT DI - SUPPLY FAN STATUS

DO - SUPPLY FAN START/STOP

AO - SUPPLY FAN VFD SPEED

<u>DI — SUPPLY FAN VFD FAULT</u>

TO ENSURE A COMPLETE OPERATING SYSTEM.

3. SMOKE DETECTORS EXISTING TO BE REUSED.

1. COMPONENTS AND INTERCONNECTIONS SHOWN ARE SCHEMATIC ONLY.

2. CONTRACTOR IS RESPONSIBLE FOR PROVIDING COMPONENTS, SENSORS, RELAYS, ETC,

**POINTS LIST** 

OCCUPIED/UNOCCUPIED MODE

SUPPLY FAN START/STOP

SUPPLY FAN STATUS

SUPPLY FAN VFD SPEED

SUPPLY FAN VFD FAULT

OUTSIDE AIR TEMPERATURE

SUPPLY AIR TEMPERATURE

RETURN AIR TEMPERATURE

MIXED AIR TEMPERATURE

OUTSIDE AIR HUMIDITY

LOW LIMIT TEMPERATURE

RETURN AIR HUMIDITY

OUTSIDE AIR DAMPER

RETURN AIR DAMPER

HOT WATER COIL CONTROL VALVE

CHILLED WATER COIL CONTROL VALVE

RETURN AIR SMOKE DETECTOR STATUS

DUCT STATIC PRESSURE SETPOINT

HIGH STATIC PRESSURE SHUTDOWN

EXHAUST FAN STATUS (EF-20, EF-21)

EXHAUST FAN SPEED (EF-20, EF-21)

EXHAUST FAN START/STOP (EF-20, EF-21

SPACE CO2 LEVEL SETPOINT HIGH / LOW

OUTSIDE AIR DAMPER POSITION SETPOINT HIGH / LOW

1. HEATING CONTROL VALVE SHALL HAVE SPRING RETURN ACTUATORS TO FAIL OPEN DURING LOSS OF POWER.

2. Outside air dampers shall have spring return actuators to fail in close position during loss of power.

OUTSIDE AIR CFM

FILTER STATUS

PUMP STATUS

AI - SUPPLY AIR STATIC PRESSURE

<u>L</u> TO 1.2 IN. W.C.

ZONE TEMP

ZONE TEMP ADJUST

UNOCCUPIED OVERRIDE

LOCATE SUCH THAT CONTROLLER

SETPOINT IS LESS THAN OR EQUAL

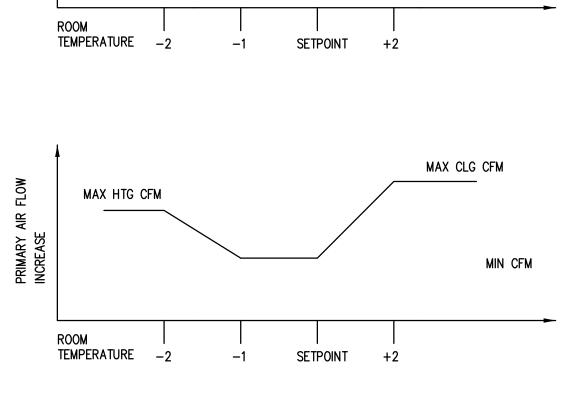
PUMP START/STOP

ECONOMIZER STATUS DUCT STATIC PRESSURE

SPACE STATIC PRESSURE

SPACE CO2 DETECTOR LEVEL

AIR HANDLING UNIT (AHU-20, AHU-21)



MODULATE PRIMARY VALVE FULLY OPEN WHEN ROOM AIR TEMPERATURE IS 2 DEGREES ABOVE SETPOINT. MODULATE PRIMARY AIR VALVE AND HEATING VALVE AS REQUIRED TO MAINTAIN 95 DEGRESS F DISHARGE AIR TEMPERATURE.

CLOSED

## **SEQUENCE OF OPERATIONS**

PRESSURE INDEPENDENT AIR TERMINAL SHALL MAINTAIN ZONE TEMPERATURE HEAT/COOL SETPOINTS OF 72/75 DEGREES F (ADJ) AND UNOCCUPIED COOL/HEAT SETPOINTS OF 80/65 DEGREES F. ALL SETPOINTS SHALL BE

COOLING - THE TERMINAL UNIT DAMPER SHALL MODULATE TO MAINTAIN THE ZONE COOLING TEMPERATURE SETPOINT BY MODULATING SUPPLY AIR FLOW. WHEN THE ZONE TEMPERATURE IS ABOVE SETPOINT THE DAMPER SHALL MODULATE TO THE MAXIMUM COOLING CFM POSITION. WHEN THE ZONE TEMPERATURE IS BELOW SETPOINT THE DAMPER SHALL MODULATE TO THE MINIMUM CFM POSITION.

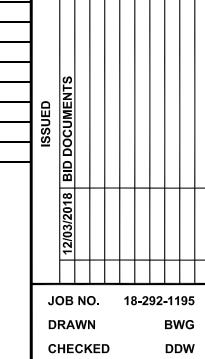
HEATING — WHEN THE TERMINAL UNIT DAMPER HAS REACHED THE MINIMUM CFM POSITION AND THE ZONE TEMPERATURE IS BELOW SETPOINT THE VALVE SHALL MODULATE OPEN TO PROVIDE A DISCHARGE AIR TEMPERATURE OF 95 DEGREES F. IF THE ZONE CONTINUES TO REMAIN BELOW SETPOINT THE TERMINAL UNIT DAMPER SHALL MODULATE OPEN TO THE HEATING CFM MAXIMUM CFM. THE VALVE SHALL MODULATE IN UNISON WITH THE DAMPER TO MAINTAIN A 95° F DISCHARGE AIR TEMPERATURE. AS THE ZONE TEMPERATURE INCREASES THE DAMPER AND VALVE SHALL REACT IN A REVERSE MANNER.

THE TERMINAL UNIT DAMPER AND REHEAT SHALL OPERATE AS DESCRIBED ABOVE WHEN THE ASSOCIATED AIR HANDLING UNIT IS ENERGIZED. THE UNIT SHALL OPERATE TO MAINTAIN THE UNOCCUPIED HEATING/COOLING SETPOINTS.

ZONE THERMOSTAT SHALL HAVE PLUS/MINUS 2° F TEMPERATURE SETPOINT ADJUSTMENT OF THE SETPOINT SET AT THE BAS AND TIMED UNOCCUPIED OVERRIDE BUTTON.

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P		NT	S	L	

VARIABLE AIR VOLUME BOX			WARE		ا عر	OFTWAF	て上	
	Al	AO	BI	BO	SCHED	TREND	ALARM	GRA
DISCHARGE AIR TEMPERATURE	Χ					Х		
ZONE AIR TEMPERATURE	Х					Х		
ZONE TEMPERATURE ADJUSTMENT	Х					Χ		
HEATING SETPOINT		Χ						
COOLING SETPOINT		Χ						
DAMPER POSITION		Χ						
AIRFLOW CFM	Х					Х		
MINIMUM AIRFLOW SETPOINT		Χ						
MAXIMUM COOLING AIRFLOW SETPOINT		Χ						
MAXIMUM HEATING AIRFLOW SETPOINT		Χ						
ZONE HIGH TEMPERATURE ALARM			Χ				Х	
ZONE LOW TEMPERATURE ALARM			Χ				Х	
REHEAT COIL 2-WAY VALVE		Χ				Х		
UNOCCUPIED MODE OVERRIDE			Χ					



SHEET TITLE **TEMPERATURE** CONTROLS

SHEET NUMBER

ECM CT EXHAUST FAN STATUS

AO — RETURN AIR DAMPER

AO — OUTSIDE AIR DAMPER

<u>AI - OUTSIDE AIRFLOW</u>

<u>AI - OUTSIDE AIR HUMIDITY</u>

EXHAUST FAN START/STOP

RETURN AIR HUMIDITY

RETURN AIR TEMP

DI - FILTER STATUS

DI-PUMP STATUS

DO-PUMP START/STOP

AO - HEATING VALVE

AHU-20 SHALL BE A 2-WAY VALVE -AHU-21 SHALL BE A 3-WAY VALVE

<u>DI – RETURN AIR SMOKE DETECTOR</u>

DI - LOW LIMIT TEMP

AO - COOLING VALVE

└─CHR →

———— CHS ——— S

EXHAUST FAN SPEED

AIR HANDLING UNIT (AHU-17):

THE OCCUPIED/UNOCCUPIED MODE SCHEDULING SHALL BE MADE AT THE BUILDING AUTOMATION SYSTEM. PROVISIONS SHALL BE MADE FOR MANUAL SHUTDOWN OF EQUIPMENT. ALL SETPOINTS SHALL BE ADJUSTABLE. UNOCCUPIED SPACE TEMPERATURE SETPOINTS SHALL 80 DEGREES F COOLING AND 65 DEGREES F HEATING.

SUPPLY FAN - DURING THE OCCUPIED MODE THE SUPPLY FAN SHALL RUN CONTINUOUSLY. THE OUTSIDE AIR DAMPERS SHALL MODULATE TO A MINIMUM OUTSIDE AIR SETPOINT. DURING THE UNOCCUPIED MODE, THE SUPPLY FAN WILL CYCLE INTERMITTENTLY TO MAINTAIN A NIGHT SETPOINT. THE OUTSIDE AIR DAMPERS SHALL REMAIN CLOSED. IN HEATING MODE THE VALVE SHALL BE FULL OPEN.

OA/RA DAMPERS - THE OUTSIDE AIR DAMPERS SHALL OPEN TO A MINIMUM POSITION WHEN THE UNIT IS IN OCCUPIED MODE. AN ECONOMIZER SHALL MODULATE THE DAMPERS BASED ON DIFFERENTIAL ENTHALPY OF THE RETURN AIR AND OUTSIDE AIR TO MAINTAIN A SUPPLY AIR TEMPERATURE OF 55 DEGREES F WHEN IN COOLING MODE. IN UNOCCUPIED MODE THE OUTSIDE AIR DAMPER SHALL BE FULLY CLOSED. THE ECONOMIZER SHALL HAVE FAULT AND DETECTION DIAGNOSTICS (FDD). THE FDD SHALL ALARM IF THERE IS AIR TEMPERATURE SENSOR FAILURE, NO ECONOMIZING WHEN ENABLED, ECONOMIZING WHEN DISABLED, DAMPERS NOT MODULATING AND EXCESS

THE AIR HANDLING UNIT SHALL HAVE OPERATE AS SINGLE ZONE VARIABLE AIR UNIT.

### SINGLE ZONE VARIABLE AIR;

1. COOLING MODE — DURING THE COOLING MODE OF OPERATION THE SUPPLY FAN SPEED SHALL VARY BETWEEN MINIMUM SPEED AND 100% SPEED AS NEEDED TO MAINTAIN THE SPACE TEMPERATURE. THE COOLING VALVE SHALL MODULATE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT OF 55 DEGREES.

2. HEATING MODE — DURING THE HEATING MODE OF OPERATION THE SUPPLY FAN SHALL MODULATE BETWEEN 50% AND 100% AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE. THE HEATING VALVE SHALL MODULATE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT OF 90 DEGREES.

HWP-1, PUMP CONTROL - THE PUMP SHALL RUN CONTINUOUSLY WHEN THE OUTSIDE AIR IS BELOW 40 DEG F. ABOVE 40 DEG F OUTSIDE AIR THE PUMP SHALL BE OFF.

OPTIMIZED START - THE AHU SHALL BEGIN A MORNING WARM-UP/COOL DOWN BEFORE OCCUPIED MODE AS CALCULATED BY THE BAS. AFTER SPACE TEMPERATURE REACHES THE OCCUPIED SETPOINT THE AHU SHALL OPERATE IN OCCUPIED MODE.

# **POINTS LIST** AIR HANDLING UNIT (AHU-17)

,				7				
	Al	AO	DI	DO	SCHED	TREND	ALARM	GR
OCCUPIED/UNOCCUPIED MODE			Х		X			
SUPPLY FAN START/STOP				Х	X			
SUPPLY FAN STATUS			Х				Х	
SUPPLY FAN VFD SPEED		Χ				Х		
SUPPLY FAN VFD FAULT			Χ				Χ	
OUTSIDE AIR TEMPERATURE	Χ					X		
SUPPLY AIR TEMPERATURE	Χ					Х		
RETURN AIR TEMPERATURE	Χ					Χ		
MIXED AIR TEMPERATURE	Χ					Χ		
OUTSIDE AIR HUMIDITY	Χ					Χ		
RETURN AIR HUMIDITY	Χ					Χ		
ZONE TEMPERATURE	Χ					Χ		
ZONE TEMPERATURE SETPOINT	Χ					Х		
LOW LIMIT TEMPERATURE			Χ				Χ	
OUTSIDE AIR DAMPER		Χ				Х	Χ	
RETURN AIR DAMPER		Χ				Х	Χ	
EXHAUST AIR DAMPER		Χ				Х	Χ	
HOT WATER COIL CONTROL VALVE		Χ				Х		
CHILLED WATER COIL CONTROL VALVE		Χ				X		
FILTER STATUS			Χ				Χ	
RETURN AIR SMOKE DETECTOR STATUS			Χ				Х	
PUMP STATUS		<u> </u>	Χ			<u> </u>		
PUMP START/STOP				Χ			Х	
FCONOMIZER STATUS		1	Х				Х	1

HARDWARE

SOFTWARE

1. HEATING CONTROL VALVE SHALL HAVE SPRING RETURN ACTUATORS TO FAIL OPEN DURING LOSS OF POWER. 2. OUTSIDE AIR DAMPERS SHALL HAVE SPRING RETURN ACTUATORS TO FAIL IN CLOSE POSITION DURING LOSS OF POWER.

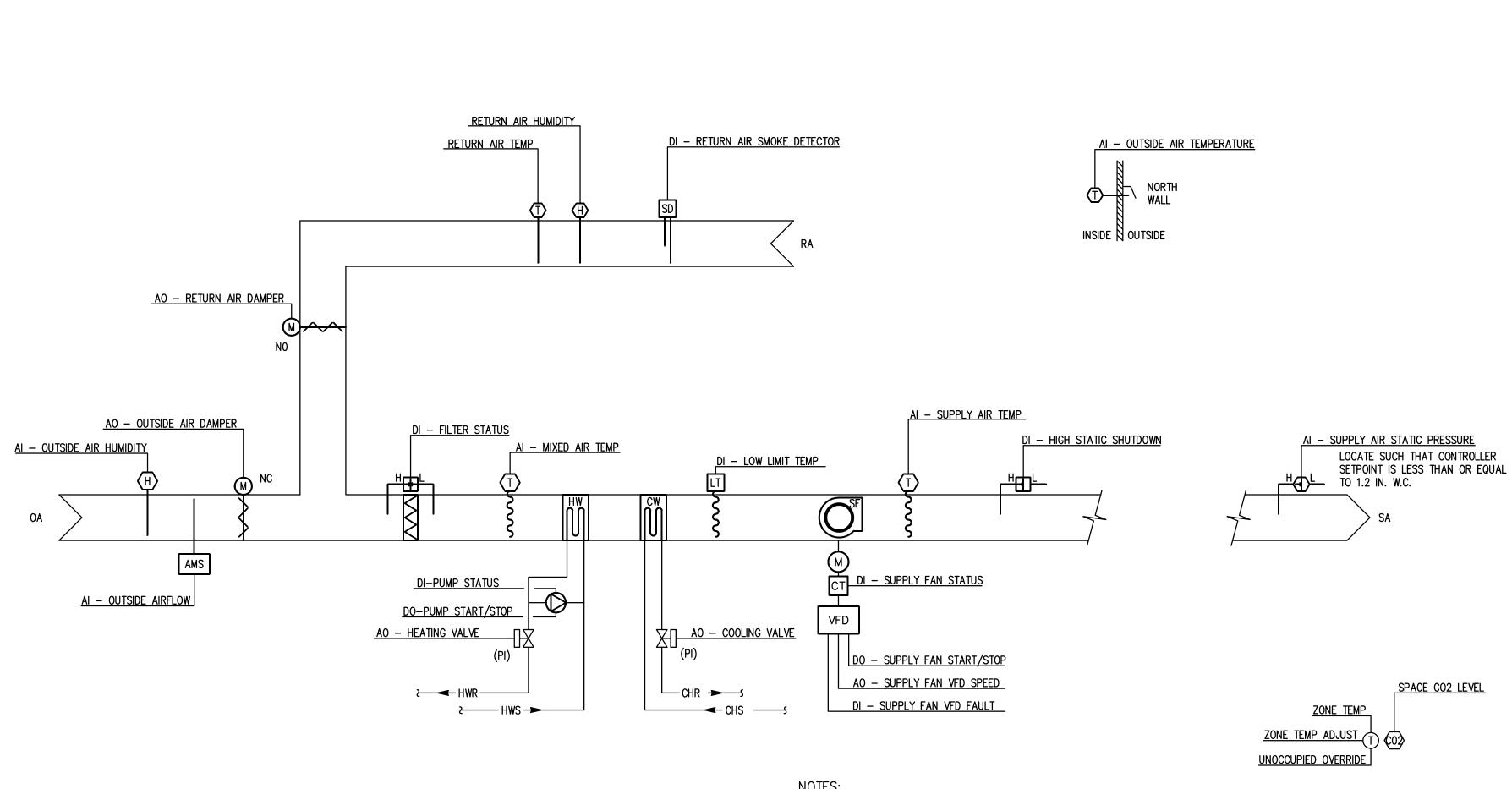
### **ALTERNATE NO. 1: AHU-18 TEMPERATURE CONTROL SCHEMATIC**

**POINTS LIST** 

ZONE TEMP

ZONE TEMP ADJUST

UNOCCUPIED OVERRIDE



DI - RETURN AIR SMOKE DETECTOR

<u>DI – LOW LIMIT TEMP</u>

AI - OUTSIDE AIR TEMPERATURE

NORTH

INSIDE NOUTSIDE

<u> AI - SUPPLY AIR TEMP</u>

CT DI - SUPPLY FAN STATUS

DO - SUPPLY FAN START/STOP

AO - SUPPLY FAN VFD SPEED DI — SUPPLY FAN VFD FAULT

1. COMPONENTS AND INTERCONNECTIONS SHOWN ARE SCHEMATIC ONLY.

TO ENSURE A COMPLETE OPERATING SYSTEM.

1. COMPONENTS AND INTERCONNECTIONS SHOWN ARE SCHEMATIC ONLY.

TO ENSURE A COMPLETE OPERATING SYSTEM.

2. CONTRACTOR IS RESPONSIBLE FOR PROVIDING COMPONENTS, SENSORS, RELAYS, ETC,

3. SMOKE DETECTORS ARE TO BE SUPPLIED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.

2. CONTRACTOR IS RESPONSIBLE FOR PROVIDING COMPONENTS, SENSORS, RELAYS, ETC,

3. SMOKE DETECTORS ARE TO BE SUPPLIED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.

<u>AI - RETURN AIR HUMIDITY</u>

AO — RETURN AIR DAMPER

AO - OUTSIDE AIR DAMPER

AI - OUTSIDE AIR HUMIDITY

<u>ai — return air temp</u>

AI - MIXED AIR TEMP

DI-PUMP STATUS

DO-PUMP START/STOP

AO – HEATING VALVE

AIR HANDLING UNIT (AHU-18)		HARD	WARE	-		SOFT	WARE	
	Al	AO	DI	DO	SCHED	TREND	ALARM	GRAPHI
OCCUPIED/UNOCCUPIED MODE			Χ		Χ			Χ
SUPPLY FAN START/STOP				Χ	Χ			
SUPPLY FAN STATUS			Χ				Χ	Χ
SUPPLY FAN VFD SPEED		Χ				X		Χ
SUPPLY FAN VFD FAULT			Χ				Χ	
OUTSIDE AIR TEMPERATURE	Х					Χ		Χ
SUPPLY AIR TEMPERATURE	Χ					Χ		Χ
RETURN AIR TEMPERATURE	Х					Χ		Χ
MIXED AIR TEMPERATURE	Χ					Χ		Χ
OUTSIDE AIR HUMIDITY	Χ					Χ		Χ
RETURN AIR HUMIDITY	Х					Χ		Χ
LOW LIMIT TEMPERATURE			Χ				Χ	Χ
OUTSIDE AIR DAMPER		Χ				Χ	Χ	Χ
OUTSIDE AIR CFM	Х					Х		Χ
RETURN AIR DAMPER		Χ				Χ	Χ	Χ
HOT WATER COIL CONTROL VALVE		Χ				Х		Χ
CHILLED WATER COIL CONTROL VALVE		Χ				Х		Χ
FILTER STATUS			Χ				Χ	Χ
RETURN AIR SMOKE DETECTOR STATUS			Χ				Χ	Χ
PUMP STATUS			Χ					
PUMP START/STOP				Χ			Χ	Χ
ECONOMIZER STATUS			Χ				Χ	Χ
DUCT STATIC PRESSURE	Х					Х		Χ
DUCT STATIC PRESSURE SETPOINT	X					Χ		Χ
HIGH STATIC PRESSURE SHUTDOWN			Χ				Χ	Χ
SPACE CO2 DETECTOR LEVEL	Х					Х		Χ
SPACE CO2 LEVEL SETPOINT HIGH / LOW		Χ						Χ
OUTSIDE AIR DAMPER POSITION SETPOINT HIGH / LOW		Χ				Χ		Χ

1. HEATING CONTROL VALVE SHALL HAVE SPRING RETURN ACTUATORS TO FAIL OPEN DURING LOSS OF POWER. 2. OUTSIDE AIR DAMPERS SHALL HAVE SPRING RETURN ACTUATORS TO FAIL IN CLOSE POSITION DURING LOSS OF POWER.

## **SEQUENCE OF OPERATIONS**

BE 80 DEGREES F COOLING AND 65 DEGREES F HEATING.

<u>AIR HANDLING UNIT (AHU-18):</u>

THE OCCUPIED/UNOCCUPIED MODE SCHEDULING SHALL BE MADE AT THE BUILDING AUTOMATION SYSTEM. PROVISIONS SHALL BE MADE FOR MANUAL SHUTDOWN OF EQUIPMENT. ALL SETPOINTS SHALL BE ADJUSTABLE. UNOCCUPIED SPACE TEMPERATURE SETPOINTS SHALL

SUPPLY FAN — THE SUPPLY FAN SHALL RUN CONTINUOUSLY DURING OCCUPIED MODE AND INTERMITTENTLY DURING UNOCCUPIED MODE. THE SUPPLY FAN VARIABLE FREQUENCY DRIVE SHALL MODULATE THE SPEED OF THE FAN TO MAINTAIN THE DUCT STATIC PRESSURE SETPOINT. IF AIRFLOW IS NOT DETECTED WITHIN TWO MINUTES AFTER A START COMMAND THE FAN MOTOR SHALL BE DE-ENERGIZED AND AN AUDIBLE ALARM SHALL BE ACTIVATED. IF A HIGH STATIC PRESSURE IS SENSED IN THE SUPPLY AIR THE SUPPLY FAN SHALL BE DE-ENERGIZED AND SIGNAL AN ALARM CONDITION.

STATIC PRESSURE/SUPPLY AIR TEMPERATURE RESET — THE SUPPLY FAN VFDs SHALL MODULATE THE FANS TO MAINTAIN A DUCT STATIC PRESSURE SETPOINT. THE BAS SHALL CONTROL SUPPLY FAN SPEED TO MAINTAIN A CRITICAL STATIC PRESSURE SETPOINT. UPON FAILURE OF COMMUNICATION THE AHUS SHALL OPERATE ON THEIR OWN STATIC PRESSURE CONTROL IN STAND ALONE MODE. THE SETPOINT SHALL RESET TO OPTIMIZE FAN SPEED AS FOLLOWS; 1. THE BUILDING AUTOMATION SYSTEM SHALL MONITOR THE DAMPER POSITION OF ALL VAV TERMINAL UNITS AND DETERMINE THE

- CRITICAL ZONE (CZ), WHICH IS THE VAV TERMINAL UNIT THAT IS WIDEST OPEN. 2. WHEN THE CZ IS MORE THAN 95% OPEN, THE SUPPLY FAN DISCHARGE STATIC PRESSURE SETPOINT SHALL BE RESET DOWNWARD
- 10% OF THE PREVIOUS SETPOINT A FREQUENCY OF 10 MINUTES UNTIL THE CZ IS MORE THAN 97% OPEN OR THE STATIC PRESSURE SETPOINT HAS RESET DOWNWARD TO THE SYSTEM MINIMUM SETTING. 3. WHEN THE CZ IS LESS THAN 95% OPEN AND THE STATIC PRESSURE SETPOINT IS AT THE MINIMUM SETTING, THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE RESET UPWARD IN INCREMENTS OF 0.5° F AT A FREQUENCY OF 10 MINUTES AND THE STATIC
- PRESSURE SETPOINT HELD CONSTANT UNTIL THE CZ IS MORE THAN 97% OPEN OR THE DISCHARGE AIR TEMPERATURE IS RESET TO IT'S MAXIMUM SETTING OF 10° F (ADJ) ABOVE THE DISCHARGE AIR TEMPERATURE SETPOINT. 4. THE REVERSE CONTROL SEQUENCE SHALL OCCUR WHEN THE CZ IS 98% OPEN UNTIL THE DISCHARGE AIR TEMPERATURE AND STATIC TEMPERATURE SETPOINTS ARE A THEIR DESIGN SETPOINT.

SMOKE DETECTORS - UPON DETECTION OF SMOKE THE FANS SHALL BE DE-ENERGIZED, CLOSE OUTSIDE AIR DAMPER, AND SIGNAL ALARM LOCALLY AND AT FIRE ALARM PANEL.

OA/RA DAMPERS - AN AIRFLOW MEASURING STATION/DAMPER SENSOR SHALL MODULATE THE OUTSIDE AIR DAMPERS TO MAINTAIN THE MINIMUM OUTSIDE AIR CFM SETPOINT. AN ECONOMIZER SHALL MODULATE THE DAMPERS BASED ON DIFFERENTIAL ENTHALPY OF THE RETURN AIR AND OUTSIDE AIR TO MAINTAIN A SUPPLY AIR TEMPERATURE OF 55 DEGREES F. THE ECONOMIZER SHALL HAVE A MAXIMUM OUTSIDE AIR INTAKE OF 5,000 CFM. IN UNOCCUPIED MODE THE OUTSIDE AIR DAMPER SHALL BE FULLY CLOSED. THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED AND RETURN AIR DAMPER OPEN DURING OPTIMIZED START.

DEMAND CONTROLLED VENTILATION - THE OUTSIDE AIR DAMPER POSITION IS VARIED BETWEEN THE MINIMUM VENTILATION LEVEL BASED ON THE AREA OUTDOOR AIRFLOW RATE, AND THE MAXIMUM DESIGN VENTILATION LEVEL BASED ON THE AREA AND PEOPLE OUTDOOR AIRFLOW RATE. THE ZONE CO2 CONCENTRATION SHALL BE MONITORED BY CO2 SENSORS LOCATED IN THE SPACE. IN OCCUPIED MODE IF ALL OF THE SPACE CO2 SENSORS READ A CO2 CONCENTRATION LEVEL BELOW THE SPACE CO2 MINIMUM SETPOINT OF 800 PPM (ADJ), THEN THE OUTSIDE AIR DAMPER SHALL OPEN TO THE MINIMUM OA DAMPER POSITION SETPOINT. THE MINIMUM DAMPER POSITION SHALL BE MAINTAINED AS LONG AS THE SPACE CO2 LEVELS REMAIN BELOW THE SETPOINT. IF ANY OF THE SPACE CO2 SENSORS READ A CO2 CONCENTRATION ABOVE THE MINIMUM SPACE CO2 SETPOINT, THE OUTSIDE AIR DAMPERS SHALL MODULATE TO ALLOW MORE VENTILATION AIR IN. AS THE SPACE CO2 LEVEL APPROACHES THE MAXIMUM SPACE CO2 SETPOINT OF 1000 PPM (ADJ), THE OUTSIDE AIR DAMPER POSITION WILL REACH THE MAXIMUM OA DAMPER POSITION SETPOINT. THE DAMPER POSITION SHALL BE MODULATED IN A DIRECTLY PROPORTIONAL RELATIONSHIP BETWEEN THE CO2 SETPOINT LIMITS AND THEIR CORRESPONDING DAMPER POSITION LIMITS. IN UNOCCUPIED MODE, THE OUTSIDE AIR DAMPERS SHALL BE FULLY CLOSED.

ECONOMIZER — AN ECONOMIZER SHALL MODULATE THE DAMPERS BASED ON DIFFERENTIAL ENTHALPY OF THE RETURN AIR AND THE OUTSIDE AIR TO MAINTAIN A SUPPLY AIR TEMPERATURE 55 DEGREES F. THE ECONOMIZER SHALL HAVE FAULT AND DETECTION DIAGNOSTICS (FDD). THE FDD SHALL ALARM IF IS AIR TEMPERATURE SENSOR FAILURE, NO ECONOMIZER WHEN ENABLED, ECONOMIZING WHEN DISABLED, DAMPERS NOT MODULATING AND EXCESS OUTDOOR AIR. THE FDD SHALL ALARM WITH ANY OF THE FOLLOWING FAULTS:

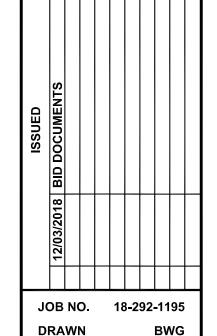
- 1. AIR TEMPERATURE SENSOR FAILURE/FAULT 2. NOT ECONOMIZING WHEN THE UNIT SHOULD BE ECONOMIZING
- 3. ECONOMIZING WHEN THE UNIT SHOULD NOT BE ECONOMIZING 4. DAMPER NOT MODULATING EXCESS OUTDOOR AIR

COOLING MODE — THE COOLING COIL CONTROL VALVE SHALL MODULATE TO MAINTAIN A SUPPLY AIR TEMPERATURE OF 55 DEGREES F WHEN THE OUTSIDE AIR TEMPERATURE IS ABOVE 60 DEGREES F. THE AHU SHALL BEGIN A MORNING COOL-DOWN AT LEAST ONE HOUR BEFORE OCCUPIED MODE.

HEATING MODE - THE HOT WATER COIL CONTROL VALVE SHALL MODULATE TO MAINTAIN A DISCHARGE TEMPERATURE SETPOINT OF 65 DEGREES F WHEN IN THE OCCUPIED MODE. THE AHU SHALL BEGIN A MORNING WARM-UP AT LEAST ONE HOUR BEFORE OCCUPIED MODE.

AFTER SPACE TEMPERATURE REACHES 70 DEGREES F IN ALL ZONES THE AHU SHALL OPERATE IN OCCUPIED MODE. HWP-1. PUMP CONTROL - THE PUMP SHALL RUN CONTINUOUSLY WHEN THE OUTSIDE AIR IS BELOW 40 DEG F. ABOVE 40 DEG F OUTSIDE AIR TO THE PUMP SHALL BE OFF.

OPTIMIZED START - THE AHU SHALL BEGIN A MORNING WARM-UP/COOL DOWN BEFORE OCCUPIED MODE AS CALCULATED BY THE BAS FOR THE SPACE TO BE AT OCCUPIED TEMPERATURE SETPOINT AT THE START OF THE OCCUPIED MODE. AFTER SPACE TEMPERATURE REACHES THE OCCUPIED SETPOINT THE AHU SHALL OPERATE IN OCCUPIED MODE.

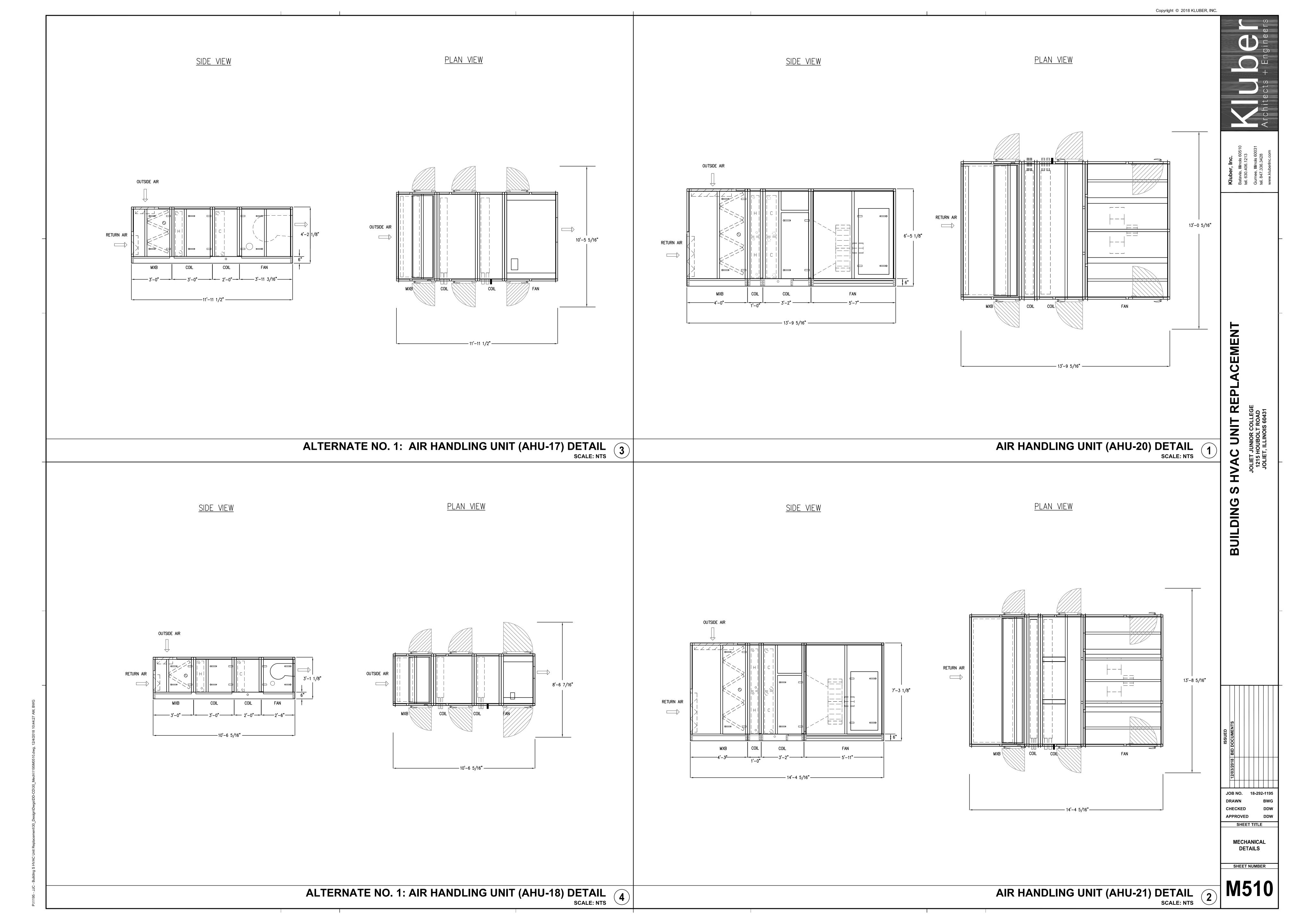


APPROVED SHEET TITLE **ALTERNATE NO. 1 -TEMPERATURE** 

CHECKED

SHEET NUMBER

CONTROLS



SHEET TITLE

**MECHANICAL SCHEDULES AND DETAILS** 

SHEET NUMBER

M610

**AIR HANDLING UNIT SCHEDULE** SUPPLY EXTERNAL ELECTRICAL ENT AIR TEMP LVG AIR TEMP EWT / LWT SENS CAP TOTAL CAP WATER FLOW WATER PRES TOTAL CAP EWT / LWT EAT / LAT WATER FLOW WATER PRESS (db / wb °F) (db / wb °F) (°F) (MBH) (MBH) RATE (GPM) DROP (FT) (MBH) (°F) (°F) RATE (GPM) DROP (FT) STATIC PRESS V/PH/HZ 3,500 | 78.3 / 65.5 | 54.7 / 54.7 | 45.0 / 54.3 | 527.0 678.8 160.0 10.3 651.5 180 / 160 48 / 85 66.7 1.5 460/3/60 33.8 39MN-40W 1, 2, 3 816.9 | 180 / 160 | 45 / 83 | 83.6 5,100 | 79.1 / 66.2 | 54.2 / 54.2 | 45.0 / 54.4 | 651.2 875.4 204.0 12.9 9.3 1.5 460/3/60 42.5 39MN-50W 1, 2, 4 57.0 8.5 388.3 180 / 160 50 / 94.4 40 0.75 | 460/3/60 | 12.1 | 39MN-17W | 1, 2, 5 1,500 | 79.0 / 66.0 | 54.9 / 54.6 | 45.0 / 55.0 | 198.6 260.1 6.1 7.5 2.5 2.0 1.5 460/3/60 3.6 39MN-06W 1, 2, 5 AHU-18 | 2,070 | 1,000 | 81.4 / 68.5 | 54.6 / 54.5 | 45.0 / 55.0 | 58.7 | 87.1 | 19.0 | 9.3 | 163.5 | 180 / 160 | 0.0 / 63.6 | 17 MODEL BASED ON CARRIER. COOLING COIL BASED ON 30% EG. HEATING CFM = 15,920. 4. HEATING CFM = 18,970. 5. ALTERNATE NO. 1.

> 1. MODEL BASED ON TITUS. 2. ALTERNATE NO. 1.

MARK	AIR FLOW	MIN AIR FLOW					REHE	AT COIL				MODEL	AREA	
	(CFM)	(CFM)	(IN)	AIR FLOW (CFM)	MAX APD (IN WG)	EAT / LAT (°F)	WATER (GPM)	EWT/LWT (°F)	MAX WPD (FT)	ROWS/ FPI	CAPACITY (MBH)		SERVED	
VAV-20A	1000	750	10	750	0.28	55 / 95	1.8	180 / 143	0.22	2 / 10	32.5	DESV	-	1
VAV-20B	1280	425	12	960	0.25	55 / 95	1.9	180 / 134	0.28	2 / 10	41.5	DESV	_	1
VAV-20C	3205	1050	24/20	2400	0.48	55 / 94	4.5	180 / 134	2.6	2 / 8	100.9	DQCV	-	1
VAV-20D	1450	485	12	1090	0.31	55 / 95	2.4	180 / 139	0.45	2 / 10	47.3	DESV	-	1
VAV-20EF	770	250	10	580	0.18	55 / 95	1.2	180 / 134	0.16	2 / 10	25.2	DESV	-	1
VAV-20G1	6760	2250	36/30	5070	0.53	55 / 95	6.0	180 / 106	8.4	2 / 10	219.3	DQCV	-	1
VAV-20G2	6760	2250	36/30	5070	0.53	55 / 95	6.0	180 / 160	8.4	2 / 10	219.3	DQCV	-	1
VAV-21A	1140	380	20/10	855	0.34	55 / 95	2.0	180 / 142	0.4	2 / 8	37.2	DQCV	-	1
VAV-21B	1765	1325	18/15	1325	0.46	55 / 95	3.4	180 / 145	1.0	2 / 8	57.7	DQCV	-	1
VAV-21C	2000	675	14	1500	0.28	55 / 95	3.0	180 / 135	0.39	2 / 10	65.1	DESV	-	1
VAV-21D	2000	675	14	1500	0.28	55 / 95	3.0	180 / 135	0.39	2 / 10	65.1	DESV	-	1
VAV-21E	960	325	10	720	0.26	55 / 95	1.7	180 / 141	0.21	2 / 10	31.2	DESV	-	1
VAV-21F	1100	370	12	825	0.19	55 / 95	1.5	180 / 131	0.24	2 / 10	35.8	DESV	-	1
VAV-21G	1100	370	12	825	0.19	55 / 95	1.5	180 / 131	0.24	2 / 10	35.8	DESV	_	1
VAV-21H1	1455	485	12	1320	0.31	55 / 95	3.7	180 / 148	1.0	2 / 10	57.3	DESV	_	1
VAV-21J1	6810	2270	36/30	5100	0.54	55 / 95	6.0	180 / 106	8.0	2 / 10	219.6	DQCV	_	1
VAV-21J2	6640	2215	50/22	5000	0.51	55 / 95	6.0	180 / 106	7.3	2 / 10	219.1	DQCV	_	1
VAV-18A	990	330	10	500	0.27	55 / 95	1.0	180 / 136	0.12	2 / 10	21.7	DESV	-	1,
VAV-18B	1080	360	12	800	0.12	55 / 95	1.4	180 / 129.9	0.22	2 / 10	34.7	DESV	_	1,

				FAN	SCHED	ULE				
MARK	AIR FLOW RATE (CFM)	EXTERNAL S.P. (IN WG)	TYPE	MOTOR (HP)	ELECTRICAL (V/PH/HZ)	AREA SERVED	LOCATION	MODEL	NOTES	
EF-20	15,000	0.75	CENTRIFUGAL	7.5	208/3/60	AHU-20	RM S1020	SQN-B	1, 2, 3	
EF-21	17,000	0.75	CENTRIFUGAL	7.5	208/1/60	AHU-21	RM S2008	SQN-B	1, 2, 3	

MODEL BASED ON COOK.
 PROVIDE WITH SPACE STATIC PRESSURE SPEED CONTROL.

				PUMP	SCHE	DULE			
MARK	WATER FLOW RATE (GPM)	HEAD (FT)	TYPE	MOTOR POWER (HP)	ELECTRICAL (V/PH/HZ)	MOTOR SPEED (RPM)	SERVICE	MODEL	NOTES
HWP-20	15	15	INLINE	1/6	115/1/60	2963	AHU-20	ECOCIRC-XL	1
HWP-21	20	15	INLINE	1/6	115/1/60	3086	AHU-21	ECOCIRC-XL	1
HWP-17	15	10	INLINE	1/6	115/1/60	2963	AHU-17	ECOCIRC-XL	1, 2
HWP-18	10	10	INLINE	1/6	115/1/60	2393	AHU-18	ECOCIRC-XL	1, 2

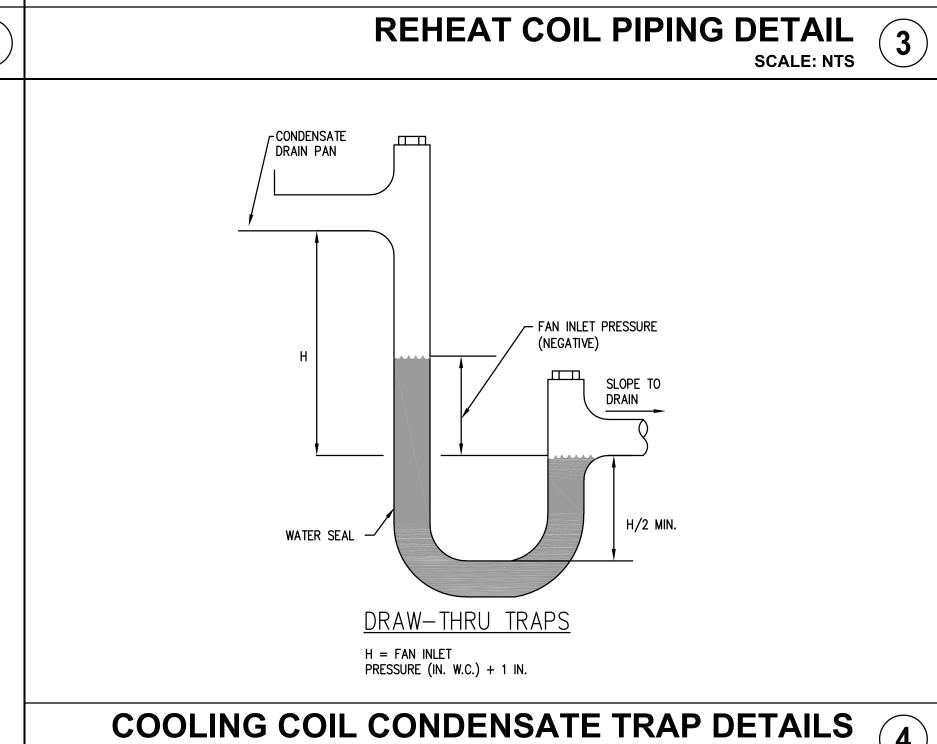
1. MODEL BASED ON BELL & GOSSETT.
2. ALERNATE NO. 1

			WAL	L LOU	VER S	CHEDU	JLE		
MARK	AIR FLOW RATE (CFM)	SIZE H x L (IN x IN)	VELOCITY (FPM)	PRESSURE DROP (IN WG)	APPLICATION	SERVED BY	LOCATION	MODEL	NOTES
WL-1	41,000	127 X 84	912	0.1	EXHAUST	-	AG-SHOP	ELF6375DX	1, 2, 3, 4.

1. MODEL BASED ON RUSKIN.
2. PROVIDE INSECT SCREEN.
3. COLOR = WHITE.
4. SERVED BY EF-20, EF-21, AHU-18, AHU-17.

DIFFUSERS, REGISTERS AND GRILLES SCHEDULE										
MARK	MODEL	SIZE	NECK	DAMPER	MATERIAL	REMARKS				
S-1	300RL	12 / 8	-	OBD	ST	1, 2				
S-2	300RL	12 / 10	-	OBD	ST	1, 2				
S-3	300RL	18 / 10	-	OBD	ST	1, 2				
S-4	300RL	24 / 16	-	OBD	ST	1, 2				
R-1	350RL	20 / 20	-	-	ST	1, 2				

MODEL BASED ON TITUS.
 ALTERNATE NO. 1.



- GASKETED STAINLESS STEEL FASTENERS, (TYP. OUTSIDE AIR INTAKE DUCT - SET LOUVER FLANGE IN CONTINUOUS BEAD SLOPE TRANSITION TO -OF CONCEALED JOINT BTM OF LOUVER FOR PROVIDE NEW G90 DRAINAGE GALVANIZED STEEL STUD RUNNER TO MATCH - EXISTING STUCCO FINISH STUD GAGE AND DEPTH STEEL-FRAMED WALL AT PERIMETER OF CONSTRUCTION WALL LOUVER IN STUD WALL DETAIL **AHU-21 COIL PIPING DETAIL** SCALE: NTS ITEM DESCRIPTION

1 BALL VALVE

2 THERMOMETER

3 STRAINER

4 UNION 1. SEPARATE PIPING SPECIALITIES ARE SHOWN. MODULAR COMPONENTS 5 NOT USED
6 PRESSURE GAGE
7 TWO WAY PRESSURE INDEPENDENT CONTROL VALVE ARE ACCEPTABLE. \_\_\_\_\_ 5. AHU-21 HOT WATER COIL RECIRC. PIPING = 1-1/2" 6. ALTERNATE NO. 1: AHU-17 HOT WATER COIL RECIRC. PIPING = 1-1/2" 8 MANUAL AIR VENT 4. ALTERNATE NO. 1: AHU-18 HOT WATER COIL RECIRC. PIPING = 1-1/4" 9 TRIPLE DUTY VALVE AHU-17, AHU-18 & AHU-20 COIL PIPING DETAIL (2) KEYNOTES: 23.110 COORDINATE WITH OWNER FOR DRAINING PIPES. OWNER TO DRAIN AND FILL CHILLED WATER AND HEATING WATER PIPING 23.230 PROVIDE ALL MATERIALS AND LABOR TO INSTALL NEW ISOLATION VALVES ON EXISTING CHILLED WATER RETURN PIPING. NOTES:

1. PIPING TO ALL REHEAT COILS SHALL BE MINIMUM 3/4" UNLESS OTHERWISE NOTED.

2. SEPARATE PIPING SPECIALTIES ARE SHOWN. MODULAR COMPONENTS ARE ACCEPTABLE.

- INSTALL CONTINUOUS

EXPOSED BEAD OF

JOINT SEALANT AT

PERIMETER AFTER

INSTALLING LOUVER IN

- SET LOUVER FLANGE

IN CONTINUOUS BEAD OF CONCEALED JOINT SEALANT

— GASKETED STAINLESS

- INSECT SCREEN

STEEL FASTENERS, (TYP.)

1. SEPARATE PIPING SPECIALITIES ARE SHOWN. MODULAR COMPONENTS

2. AHU-21 HOT WATER COIL RECIRC. PIPING = 1-1/2"

ARE ACCEPTABLE.

PROVIDE NEW G90

GALVANIZED STEEL

MATCH STUD GAGE

STUD RUNNER TO

AND DEPTH AT

PERIMETER OF

OPENING ---

EXTERIOR INSULATION WRAP —

SUBSTATION A NEW WORK PLAN SCALE: NTS 6

SCALE: NTS

ITEM DESCRIPTION

1 BALL VALVE

2 THERMOMETER

3 STRAINER

4 UNION

5 THREE WAY CONTROL VALVE

6 PRESSURE GAGE

7 TWO WAY PRESSURE INDEPENDENT CONTROL VALVE

HEATING

SCALE: NTS

8 MANUAL AIR VENT

9 CIRCUIT SETTER
10 TRIPLE DUTY VALVE

NOTE

**CIRCUIT WIRING** 

3#8,#10G,3/4"C

3#6,#89,1"C

3#12,#12G,1/2"C

3#12,#12G,1/2"C

3#12,#12G,1/2"C

3#12,#12G,1/2"C

2#12,#12G,1/2"C

2#12,#12G,1/2"C

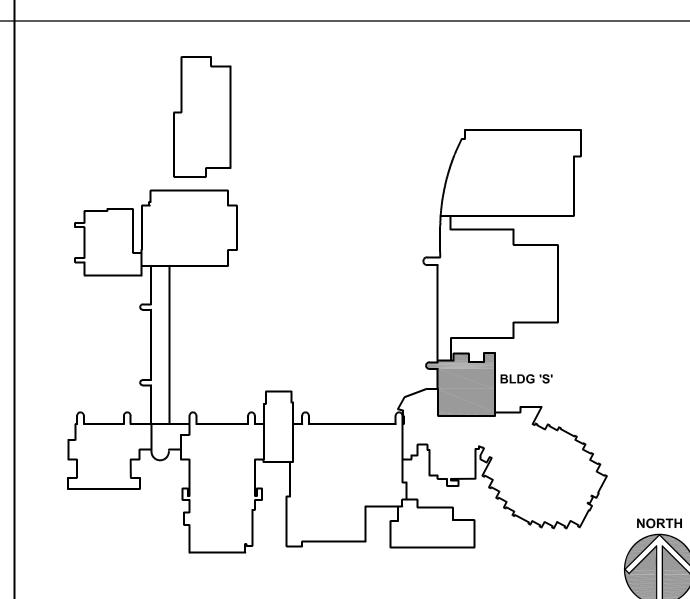
2#12,#12G,1/2"C

2#12,#12G,1/2"C

**S2008 PLAN** SCALE: 1/4" = 1'-0"

**KEY PLAN** 

- PATCH ALL WALLS AFFECTED BY DEMOLITION AND REMODELING. CUT AND PATCH WALLS TO CONCEAL CONDUIT IN NEW CONSTRUCTION AND REMODELING. CUT AND PATCH FLOOR AS NEEDED FOR DEMOLITION OF PEDESTAL POWER AND DATA RECEPTACLES.
- INTENT OF DRAWINGS: THESE DRAWINGS ARE INTENDED TO RELAY TO CONTRACTOR A DESIGN INTENT. INCLUDE IN BID ALL LABOR AND MATERIALS NECESSARY FOR A COMPLETE AND OPERATIONAL SYSTEM AS REASONABLY INFERABLE, AS DETERMINED BY ARCHITECT, TO ACCOMPLISH THE INTENT OF THESE DRAWINGS.
- REFER TO ARCHITECTURAL, MECHANICAL, PLUMBING, FIRE PROTECTION PLANS, SHOP DRAWINGS AND MANUFACTURERS INSTALLATION INSTRUCTIONS FOR ADDITIONAL INFORMATION ON EXACT POWER, WIRING & ROUGH-IN REQUIREMENTS AND LOCATIONS OF DEVICES.
- 6. COMPLETELY REMOVE ALL DISCONNECTED AND ABANDONED LOW VOLTAGE WIRING.



JOB NO. 18-292-1195 DRAWN CHECKED

APPROVED SHEET TITLE

**ELECTRICAL POWER** 

SHEET NUMBER

26.310 DISCONNECT AND RELOCATE EXISTING LUMINAIRE MOUNTED TO AHU UNIT TO BE REMOVED AND REPLACE. REHANG LIGHT FIXTURE, ACORDING TO PROPER MEANS AND METHODS IN A NEW COORDINATED LOCATION. 26.311 EXISTING PDP-4: GENERAL ELECTRIC SWITCHBOARD WITH TYPE QMR FUSIBLE SWITCHES. 26.312 EXISTING PANEL J: GENERAL ELECTRIC PANELBOARD TYPE NHB.

26.200 DEMOLISH EXISTING ELECTRICAL CONNECTION TO MECHANICAL EQUIPMENT TO BE REMOVED. REMOVE ALL 26.313 EXISTING PANEL 20A: SQUARE D PANELBOARD TYPE NQOD. 26.314 EXISTING PANEL 21: GENERAL ELECTRICAL PANELBOARD TYPE NHB. 26.315 EXISTING PANEL K: GENERAL ELECTRICAL PANELBOARD TYPE NHB. 26.317 ALTERNATE NO. 1: DISCONNECT, PROTECT AND RELOCATE EXISTING LUMINAIRES AS NECESSARY FOR COMPLETE AND OPERATIONAL SYSTEM.

INSTALLATION OF NEW AIR HANDLING UNITS AND THEIR ASSOCIATED DUCTWORK.

28.001 LOCATE, DISCONNECT, PRESERVE AND PROTECT EXISTING WIRING FOR DUCT DETECTION AND SAFETY FAN SHUTDOWN IN AIR HANDLING UNITS TO BE REMOVED. DISCONNECT, PRESERVE AND PROTECT EXISTING DUCT SMOKE DETECTOR. REINSTALL EXISTING DUCT DETECTOR IN NEW AIR HANDLING UNIT. CONNECT EXISTING FIRE ALARM WIRING TO NEW DEVICES AND EQUIPMENT.

28.002 ALTERNATE NO. 1: PROVIDE NEW DUCT DETECTOR IN SUPPLY AND RETURN DUCT WORK FOR AIR HANDLING UNITS 17 & 18. INTERCEPT NEAREST SIGNALLING LINE CIRCUIT AND EXTEND TO NEW DEVICES. PROVIDE DUCT

DETECTOR REMOTE TEST STATIONS AS SHOWN.

ALTERNATE NO. 1

HWP-17 HWP-18 1. ALTERNATE NO. 1

CONNECTION/RECEPTACLE

VFD

VFD

VFD

VFD

EC FVNR, NEMA 1 ENCLOSURE, NEMA

EC FVNR, NEMA 1 ENCLOSURE, NEMA 1

EC FVNR, NEMA 1 ENCLOSURE, NEMA 0

EC FVNR, NEMA 1 ENCLOSURE, NEMA 0

EC FVNR, NEMA 1 ENCLOSURE, NEMA

EC FVNR, NEMA 1 ENCLOSURE, NEMA 0

MECHANICAL EQUIPMENT SCHEDULE

MECHANICAL EQUIPMENT SCHEDULE

CCT NO.

PDP4

PDP4

PDP4

PDP4

PANEL J-15/17/19

PANEL 20A

PANEL 21

PANEL 20A

PANEL 20A

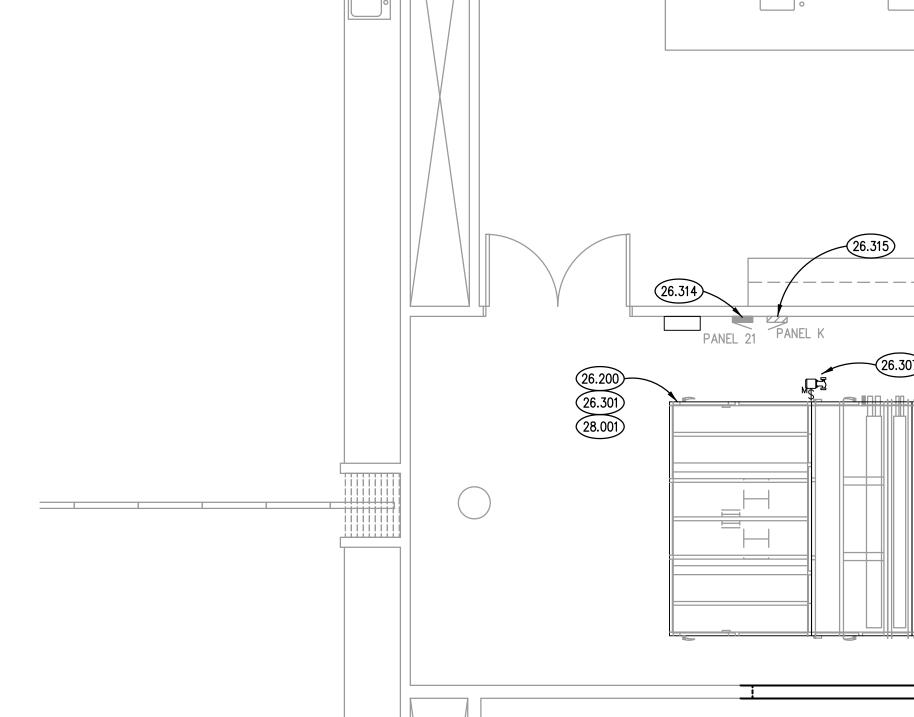
FLA KW HP VOL PH

1/6 120

1/6 120

DISC. FURN

MC



**KEYNOTES** 

ABANDONED BRANCH CIRCUITRY. 26.201 DISCONNECT, PRESERVE, AND PROTECT EXISTING ELECTRICAL CONNECTION TO MECHANICAL EQUIPMENT. EXTEND AND RECONNECT EXISTING TO NEWLY INSTALLED MECHANICAL EQUIPMENT AS NECESSARY FOR A

26.300 PROVIDE ELECTRICAL CONNECTION TO NEW AHU-20. PROVIDE NEW 60 AMPERE, 3 POLE FUSIBLE SWITCH IN PANEL PDP4 FOR NEW AHU CONNECTION. HOMERUN 3#8,#10G,3/4"C.

26.301 PROVIDE ELECTRICAL CONNECTION TO NEW AHU-21. PROVIDE NEW 70 AMPERE, 3 POLE FUSIBLE SWITCH IN PANEL PDP4 FOR NEW AHU CONNECTION. HOMERUN 3#6,#8G,1"C. 26.302 ALTERNATE NO. 1: PROVIDE ELECTRICAL CONNECTION TO NEW AHU-17. EXTEND EXISTING BRANCH CIRCUITRY

TO NEW AIR HANDLING UNIT AS NECESSARY FOR A COMPLETE AND OPERATIONAL SYSTEM. 26.303 ALTERNATE NO. 1: PROVIDE ELECTRICAL CONNECTION TO NEW AHU-18. EXTEND EXISTING BRANCH CIRCUITRY TO NEW AIR HANDLING UNIT AS NECESSARY FOR A COMPLETE AND OPERATIONAL SYSTEM. 26.304 PROVIDE ELECTRICAL CONNECTION TO NEW EXHAUST FAN EF-20. PROVIDE NEW 20 AMPERE, 3 POLE BREAKER

IN PANEL J-15/17/19. HOMERUN 3#12,#12G,3/4"C. 26.305 PROVIDE ELECTRICAL CONNECTION TO NEW EXHAUST FAN EF-21. PROVIDE NEW 20 AMPERE, 3 POLE BREAKER IN PANEL K. RELOCATE CIRCUIT BREAKERS IN PANEL K AS NECESSARY TO MAKE SPACE FOR 3 POLE BREAKER. MAINTAIN PHSASING FOR MULTI-PHASE CIRCUITS. HOMERUN 3#12,#12G,1/2"C.

26.306 PROVIDE ELECTRICAL CONNECTION TO NEW PUMP HWP-20. PROVIDE NEW 20 AMPERE, SINGLE POLE BREAKER IN PANEL 20A. HOMERUN 2#12,#12G,1/2"C. 26.307 PROVIDE ELECTRICAL CONNECTION TO NEW PUMP HWP-21. PROVIDE NEW 20 AMPERE, SINGLE POLE BREAKER IN PANEL 21. HOMERUN 2#12,#12G,1/2"C.

26.308 ALTERNATE NO. 1: PROVIDE ELECTRICAL CONNECTION TO NEW PUMP HWP-17. PROVIDE NEW 20 AMPERE,

SINGLE POLE BREAKER IN PANEL 20A. HOMERUN 2#12,#12G,1/2"C. 26.309 ALTERNATE NO. 1: PROVIDE ELECTRICAL CONNECTION TO NEW PUMP HWP-18. PROVIDE NEW 20 AMPERE, SINGLE POLE BREAKER IN PANEL 20A. HOMERUN 2#12,#12G.1/2"C.

KEYNOTES ARE TYPICALLY NOT DUPLICATED WITHIN A GIVEN DETAIL.
AN UN-KEYNOTED ITEM IN A DETAIL IS THE SAME AS A KEYNOTED ITEM HAVING THE SAME APPEARANCE WITHIN THE SAME DETAIL.

BUILDING S FIRST FLOOR PLAN

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

**ELECTRICAL GENERAL NOTES** 

DESCRIPTION

AIR HANDLING UNIT

AIR HANDLING UNIT

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AIR HANDLING UNIT

**EXHAUST FAN** 

**EXHAUST FAN** 

PUMP

PUMP

PUMP

PUMP

AHU-20

AHU-17

AHU-18

EF-20

EF-21

HWP-20

HWP-21

REFER TO DRAWING G100 FOR PROJECT GENERAL NOTES.

PERFORM SELECTIVE DEMOLITION AS NECESSARY TO ACHIEVE DESIGN INTENT. REMOVE ABANDONED BRANCH CIRCUITRY TO SOURCE OF SUPPLY.

UNLESS NOTED OTHERWISE, ALL HOMERUNS SHALL CONSIST OF A MAXIMUM OF 3 CIRCUITS (PHASE A, B & C, 3 NEUTRALS & GROUND) IN 3/4"C. MINIMUM WIRE SIZE SHALL BE #12 AWG. WIRE SIZE FOR RECEPTACLE HOMERUN CIRCUITS SHALL BE 3#12, 3#12N & 1#12G.) PROVIDE LARGER SIZE WIRE FOR VOLTAGE DROP WHERE REQUIRED.