# BARTLETT REGIONAL HOSPITAL (BRH)
# OPERATING ROOM (OR)
# VENTILATION UPGRADES

## VOLUME II of II

## Contract No. E16-095

File No. 1905

ENGINEERING DEPARTMENT

# BARTLETT REGIONAL HOSPITAL
# OR SURGERY VENTILATION SYSTEM UPGRADES
## CBJ PROJECT NO. EI6-095

JUNEAU ALASKA

CONSTRUCTION DOCUMENTS - JANUARY 2016


MECHANICAL ENGINEER

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## DRAWINGS

## SYMBOLS

| | | |
|---|---|---|
| LCWR | LCWR | LOW TEMP CHILLED WATER RETURN |
| LCWS | LCWS | LOW TEMP CHILLER WATER SUPPLY |
| CWR | CWR | CHILLED WATER RETURN |
| CWS | CWS | CHILLER WATER SUPPLY |
| CW | CW | COLD WATER |
| HR | HR | HEATING RETURN |
| HS | HS | HEATING SUPPLY |
| S | S | STEAM |
| CR | CR | CONDENSATE RETURN |
| V | V | VENT |
| | | AIR VENT |
| | | ISOLATING VALVE – GATE OR BALL |
| | | UNION |
| DV | DV | DRAIN VALVE |
| | | CHECK VALVE |
| | | CAPPED OR PLUGGED |
| | | STRAINER |
| T | | TEMPERATURE SENSOR |
| S | | SMOKE DAMPER |
| | | THERMOMETER |
| FS | | FLOW SWITCH |
| DP | | DIFFERENTIAL PRESSURE SWITCH |
| P-1 | | PUMP |
| AV | | AUTOMATIC VALVE – 3-WAY, 2-WAY |
| | | PRESSURE GAGE |
| | | TEST PORT |
| | | DIRECTION OF FLOW |
| | | PITCHED DOWN IN DIRECTION OF ARROW |
| | | FLOWSETTER |
| | | ROOM THERMOSTAT |
| 1 | | CONSTRUCTION NOTE |
| A | | ACCESS DOOR |
| | | POINT OF CONNECTION OR REMOVAL |
| E | | EXISTING |
| R | | RELOCATE |
| X | | REMOVE |
| ø | | DIAMETER |

| | |
|---|---|
| AAV | AUTOMATIC AIR VENT |
| AFF | ABOVE FINISHED FLOOR |
| ASU | AIR SUPPLY UNIT |
| AV | AUTOMATIC VALVE |
| B | MANUAL DAMPER |
| BAS | BUILDING AUTOMATION SYSTEM |
| BFP | BACKFLOW PREVENTER |
| C | COMMON |
| CC | COOLING COIL |
| CWP | CHILLED WATER PUMP |
| DU | DIELECTRIC UNION |
| EA | EXHAUST AIR |
| EF | EXHAUST FAN |
| EG | EXHAUST GRILLE |
| EIFS | EXTERIOR INSULATION FINISHING SYSTEM |
| ET | EXPANSION TANK |
| F&T | FLOAT THERMOSTATIC STEAM TRAP |
| FCV | FLOW CONTROL VALVE |
| FD | FLOOR DRAIN |
| FS | FLOOR SINK |
| GPM | GALLONS PER MINUTE |
| HC | HEATING COIL |
| HU | HUMIDIFIER |
| LRG | LOW RETURN GRILLE |
| MB | MULTI-BLADE MANUAL DAMPER |
| NC | NORMALLY CLOSED |
| NO | NORMALLY OPEN |
| OR | OPERATING ROOM |
| OSA | OUTSIDE AIR |
| PRV | PRESSURE REDUCING VALVE |
| RA | RETURN AIR |
| RD | ROOF DRAIN |
| RF | RETURN FAN |
| RG | RETURN GRILLE |
| RPBP | REDUCED PRESSURE BACKFLOW PREVENTER |
| SA | SUPPLY AIR |
| SF | SUPPLY FAN |
| SG | SUPPLY GRILLE |
| TF | HEPA TERMINAL FILTER |
| TU | TERMINAL HEATING UNIT (VAV BOX) |
| UH | UNIT HEATER |
| VAV | VARIABLE AIR VOLUME |
| VTR | VENT THROUGH ROOF |
| WCU | WATER CHILLER UNIT |
| WWCU | WATER-WATER CHILLER UNIT |

## CHILLER SCHEDULE

| EQUIPMENT | FUNCTION | DESIGN MANUFACTURER AND MODEL | MINIMUM HORSEPOWER ELECTRICAL CHARACTERISTICS | EVAPORATOR | CONDENSER | DESCRIPTION/FEATURES |
|---|---|---|---|---|---|---|
| WATER-WATER CHILLER WWCU-1 | ASU-11 SURGERY COOLING | ARCTICHILL 20 TON UNIT | 30 AMPS MCA 460/60/3 | 29.5°F LWT<br>42.0°F EWT<br>40 GPM, 30% PROPYLENE GLYCOL<br>4.6 PSI MAX. PRESSURE DROP | 42.0°F EWT<br>55.3°F LWT<br>40 GPM, WATER<br>3.5 PSI MAX. PRESSURE DROP | WATER COOLED CHILLER. 316 STAINLESS STEEL BRAZED PLATE EVAPORATORS AND CONDENSERS. SCROLL COMPRESSORS. 22" WIDE X 52" LONG X 68" HIGH CABINET. MOUNTED ON CONCRETE BASE WITH RUBBER IN SHEAR ISOLATORS. STRAINER AND FLOW SWITCH ON BOTH THE EVAPORATOR AND CONDENSER BRANCH PIPING. INDIVIDUAL SERVICE ISOLATION VALVES AND ELECTRONIC VALVE ON THE EVAPORATOR BRANCH LINES, ELECTRONIC AND MANUAL VALVES ON THE CONDENSER BRANCH LINE FOR HEAD PRESSURE CONTROL. MICROPROCESSOR CONTROL WITH BAS INTERFACE. FACTORY START-UP. DIGITAL SCROLL COMPRESSOR ON LEAD REFRIGERATION CIRCUIT FOR CLOSE TEMPERATURE CONTROL AND UNLOADING TO 15% OF CHILLER CAPACITY. |

## AUTOMATIC VALVE - FLOWSETTER SCHEDULE

| NUMBER | UNIT SERVED | AREA SERVED | LOCATION | DESIGN GPM | FLOW SETTER SIZE (INCHES) | AUTOMATIC VALVE PRESSURE DROP (PSI) | AUTOMATIC VALVE TYPE | AUTOMATIC VALVE OPERATION | CONTROL TYPE | NORMAL POSITION |
|---|---|---|---|---|---|---|---|---|---|---|
| | WWCU-1 LOW TEMPERATURE CHILLED WATER SYSTEM (CWP-4) | | | | | | | | | |
| 1 | ASU-11 CC | ASU-11 (SURGERY) COOLING | PENTHOUSE Z-3 | 40 | 2 | 2.5 PSI | 3-WAY | MODULATING | DDC | NO |
| | CHILLED WATER SYSTEM (EXISTING CWP-3 SYSTEM) | | | | | | | | | |
| 2 | WWCU-1 CONDENSER | LOW TEMPERATURE LCWS – ASU-11 | PENTHOUSE Z-2 | 40 | 2 | – | 2-WAY FACTORY | MODULATING | INTERNAL | NO |
| 3A | ASU-1 CC | ASU-1 COOLING | PENTHOUSE Z-1 | 60 | EXIST 2-1/2 | – | EXIST 3-WAY | MODULATING | EXIST DDC | NO |
| 3B | ASU-1 CC | ASU-1 COOLING | PENTHOUSE Z-1 | 60 | EXIST 2-1/2 | – | – | – | – | – |
| 4 | ASU-12 CC | ASU-12 (ADMIN/PT) COOLING | PENTHOUSE Z-3 | 34 | EXIST 2 | – | EXIST 2-WAY | MODULATING | EXIST DDC | NO |
| 5 | ASU-13 CC | ASU-13 (RADIOLOGY) COOLING | PENTHOUSE Z-2 | 28 | EXIST 2 | – | EXIST 3-WAY | MODULATING | EXIST DDC | NO |
| 6 | ASU-14 CC | ASU-14 (EMERGENCY) COOLING | PENTHOUSE Z-2 | 20 | EXIST FCV | – | EXIST 2-WAY | MODULATING | EXIST DDC | NO |
| 7 | ASU-17 CC | ASU-17 (OUTPATIENT SURGERY) COOLING | PENTHOUSE Z-4 | 14 | EXIST 2 | – | EXIST 3-WAY | MODULATING | EXIST DDC | NO |
| 8 | PENTHOUSE Z-3 | CHILLED WATER TO PENTHOUSE Z-3 | PENTHOUSE Z-2 | 34 | EXIST 2-1/2 | – | – | – | – | – |
| 9 | PENTHOUSE Z-4 | CHILLED WATER TO PENTHOUSE Z-4 | PENTHOUSE Z-4 | 28 | EXIST 2 | – | – | – | – | – |
| 10 | CWP-3 BYPASS | CWP-3 CHILLED WATER BYPASS | PENTHOUSE Z-4 | 14 | EXIST 2 | – | – | – | – | – |
| 11 | PUMP CWP-3 FLOW | CWS FOR PENTHOUSES Z-2, 3, 4 | PENTHOUSE Z-2 | 270 | EXIST 4 | – | – | – | – | – |

NOTE: DUCT HUMIDIFIER STEAM VALVES SHALL BE SELECTED AND PROVIDED BY DUCT HUMIDIFIER SUPPLIER. CONTROL CONTRACTOR SHALL PROVIDE MODULATING ACTUATOR. COORDINATE.

## EQUIPMENT SCHEDULE

| EQUIPMENT | FUNCTION | LOCATION | SIZE/CAPACITY | DESIGN MANUFACTURE AND MODEL | FEATURES AND ACCESSORIES |
|---|---|---|---|---|---|
| EXPANSION TANK (ET-3) HEATING | CHILLED WATER THERMAL EXPANSION | PENTHOUSE Z-2 | 8 GALLON TANK VOLUME | AMTROL AX-15 | ASME (125 PSI RATED). DIAPHRAGM TYPE. SEISMIC RESTRAINT. HORIZONTAL TANK. |
| AIR/DIRT SEPARATOR, AS-1 | COOLING SYSTEM AIR/DIRT REMOVAL | PENTHOUSE Z-2 | 2 INCH | SPIROTHERM VDR-200 | AIR/DIRT ELIMINATION. |
| GLYCOL FILL TANK, GFT-1 | LOW TEMPERATURE CHILLED WATER SYSTEM | PENTHOUSE Z-2 | 18 GALLON | WESSELS GMP-18 | POLYETHYLENE TANK, PRESSURIZED PUMP & CONTROLS, FULLY AUTOMATED. 110V. |

## PUMP SCHEDULE

| EQUIPMENT | FUNCTION | GPM | HEAD, FT | DESIGN MANUFACTURER AND MODEL | MINIMUM HORSEPOWER ELECTRICAL CHARACTERISTICS | FEATURES |
|---|---|---|---|---|---|---|
| CWP-4 | LOW TEMPERATURE CHILLED WATER PUMP | 40 | 40 | GRUNDFOS MAGNA 3 40-180 F | 587 WATTS, 208 VOLT, SINGLE PHASE | CANNED-ROTOR TYPE PUMP. PERMANENT MAGNET MOTOR (PM MOTOR). FLANGED. 30% PROPYLENE GLYCOL FLUID. PROVIDE ONE COMPLETE SPARE PUMP. |

## DUCT HUMIDIFIER SCHEDULE

| EQUIPMENT | SERVICE | LOCATION | CAPACITY (LBS/HR) | CFM | DUCT SIZE | STEAM PRESSURE (PSIG) | ACTUATOR |
|---|---|---|---|---|---|---|---|
| HU-1 | OR-1 HUMIDIFICATION | PENTHOUSE Z-3 | 60 | 2100 | 24x18 | 10 PSIG | EXISTING |
| HU-2 | OR-2 HUMIDIFICATION | PENTHOUSE Z-3 | 50 | 1760 | 20x18 | 10 PSIG | EXISTING |
| HU-3 | OR-3 HUMIDIFICATION | PENTHOUSE Z-3 | 50 | 1760 | 20x18 | 10 PSIG | EXISTING |
| HU-4 | SURGERY SUPPORT HUMIDIFICATION | PENTHOUSE Z-3 | 90 | 3130 | 14x22 | 10 PSIG | EXISTING |

NOTE: VERIFY DUCT SIZES ON-SITE PRIOR TO ORDERING.

## CODE NOTES:

1. CODES AND REGULATIONS: ALL WORK HEREUNDER SHALL BE STRICTLY IN CONFORMANCE WITH APPLICABLE CODES AND REGULATIONS. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2009 INTERNATIONAL CODES, 2009 UNIFORM PLUMBING CODE, CITY AND BOROUGH OF JUNEAU TITLE 19 MODIFICATIONS, AND STATE OF ALASKA MODIFICATIONS. ALL ELECTRICAL EQUIPMENT SHALL BEAR THE UL LABEL.

STATE OF ALASKA
THOMAS H. MURRAY
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REGISTERED PROFESSIONAL ENGINEER
ELECTRICAL
ISSUE DATE: 1/4/2016


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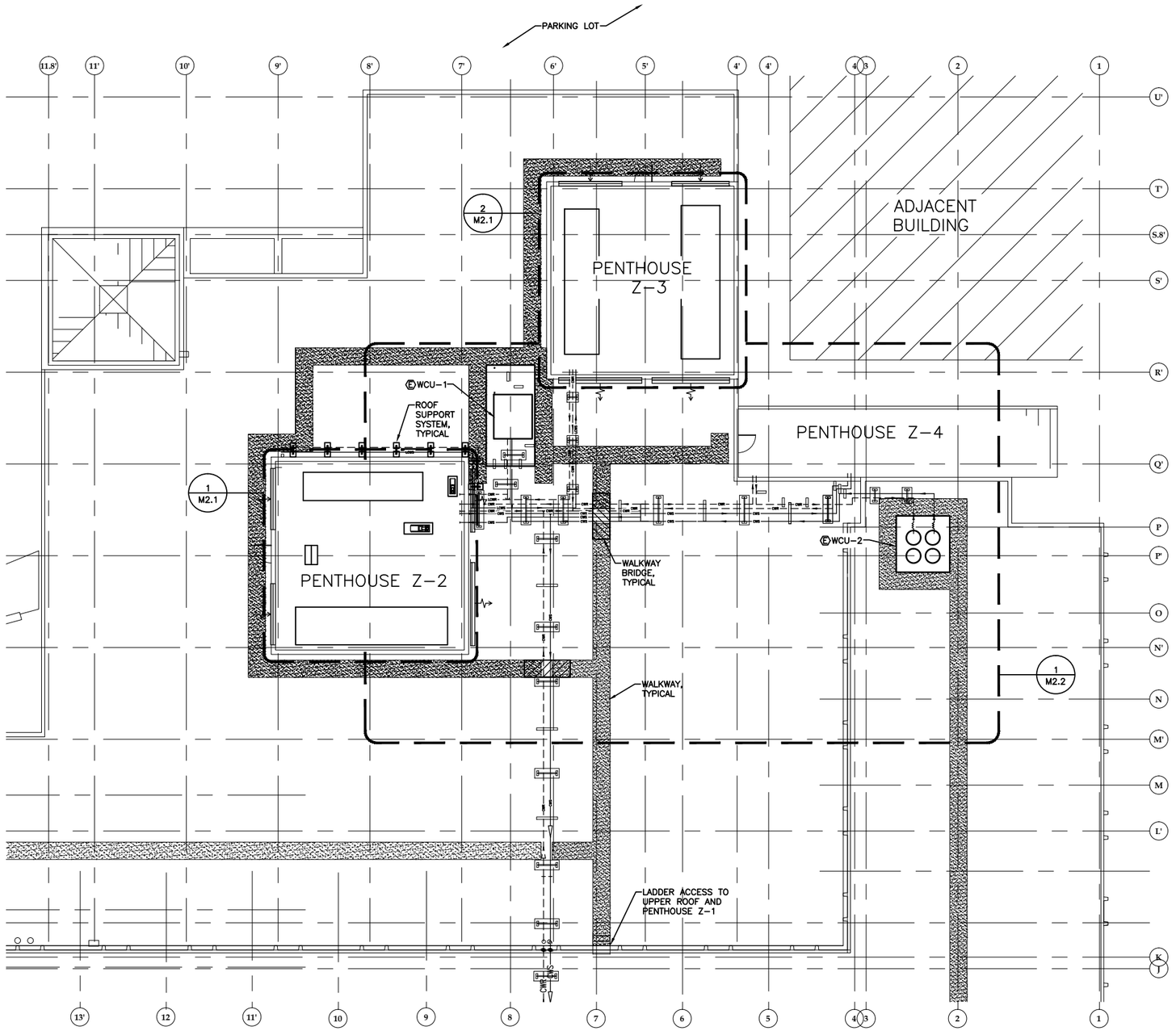
City & Borough of Juneau
Bartlett Regional Hospital
OR Surgery Ventilation System Upgrades
E16-095
JUNEAU, ALASKA

SHEET TITLE:
SYMBOLS & SCHEDULES

| | |
|---|---|
| SCALE: | AS SHOWN: |
| DATE: | 1/4/2016 |
| DRAWN: | KB |
| DESIGNED: | RS |
| CHECKED: | DM |

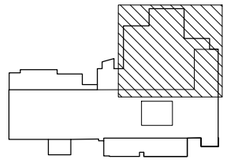
SHEET NO.
M0.1
JOB NO. 15-117




1 **PARTIAL ROOF PLAN**

SCALE: 0 5' 10' 20'

PROJECT NORTH



KEY PLAN - ROOF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PARTIAL ROOF PLAN

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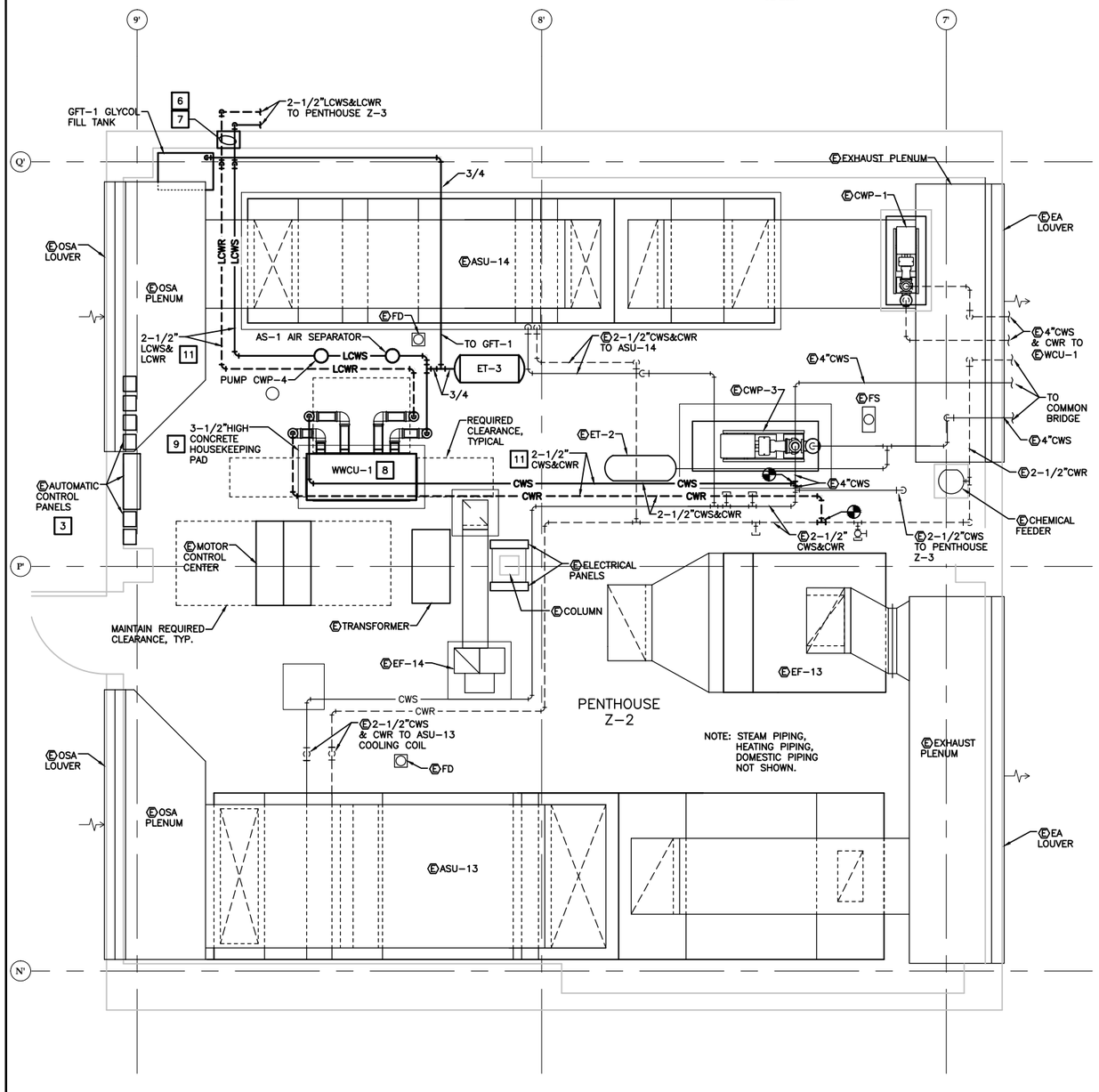
SHEET NO.
M1.1
JOB NO. 15-117

## CONSTRUCTION NOTES:

1. REPLACE EXISTING DUCT HUMIDIFIER WITH NEW. CONNECT HUMIDIFIER PIPING TO EXISTING STEAM AND CONDENSATE PIPING AS DETAILED ON M3.2. REPLACE EXISTING F&T STEAM TRAP WITH BUCKET TYPE STEAM TRAP. REINSTALL AUTOMATIC VALVE AND CONTROL FOR THE DUCT HUMIDIFIER. INSULATE STEAM PIPING. VERIFY EXISTING DUCT SIZE ON-SITE. MODIFY EXISTING DUCTWORK AS REQUIRED.
2. INSTALL MULTIBLADE DAMPER IN EXISTING SUPPLY AIR DUCTWORK. INSTALL 8X8 ACCESS DOOR ADJACENT. MODIFY DUCT AS NECESSARY. REPAIR EXISTING RIGID DUCT INSULATION.
3. REVISE EXISTING AUTOMATIC CONTROLS AS REQUIRED FOR NEW WORK. MODIFY EXISTING CONTROLS AND GRAPHICS. SEE M401 AND SEQUENCE OF OPERATIONS.
4. MODIFY EXISTING CHILLED WATER PIPING. INSTALL NEW 2-1/2 INCH LCWS AND LCWR PIPING. INSULATE PIPING.
5. REMOVE EXISTING DUCT SOUND LINER CLEAN TO SHEET METAL.
6. CLEANLY DRILL HOLES THROUGH EXISTING ABANDONED SHEETMETAL FLASHED CLOSURE FOR NEW PIPING. SEAL EXTERIOR PENETRATIONS WATER-TIGHT. INTERIOR OF WALL PENETRATION SHALL BE INSULATED AROUND PIPING AND AIR SEALED.
7. ROUTE PIPING BETWEEN PENTHOUSE Z-2 AND PENTHOUSE Z-3. HEAT TRACE LCWS AND LCWR PIPING ON ROOF AND COVER WITH ALUMINUM PIPING INSULATION COVER SYSTEM.
8. INSTALL WWCU-1 CHILLER, CWP-4 PUMP, ET-3 EXPANSION TANK, AS-1 AIR SEPARATOR, GFT-1 GLYCOL FILL TANK, AND RELATED PIPING SYSTEM. SEE PIPING DIAGRAMS FOR SIZING, VALVING, COMPLETE PIPING CONFIGURATION, AND RELATED APPURTENANCES.
9. PROVIDE 3-1/2 INCH HIGH REINFORCED CONCRETE HOUSEKEEPING PAD FOR CHILLER.
10. CLEANLY CUT ROUND HOLES THROUGH THE EIFS EXTERIOR WALL AND SEAL WITH BACKER ROD AND SEALANT WATERTIGHT. INTERIOR OF WALL PENETRATION SHALL BE INSULATED AROUND PIPING AND AIR SEALED. RUN PIPING INSULATION THROUGH WALL.
11. INSTALL PIPING AND TRIM AS HIGH AS POSSIBLE FOR SERVICE OF EQUIPMENT UNDERNEATH.

## SHEET NOTES:

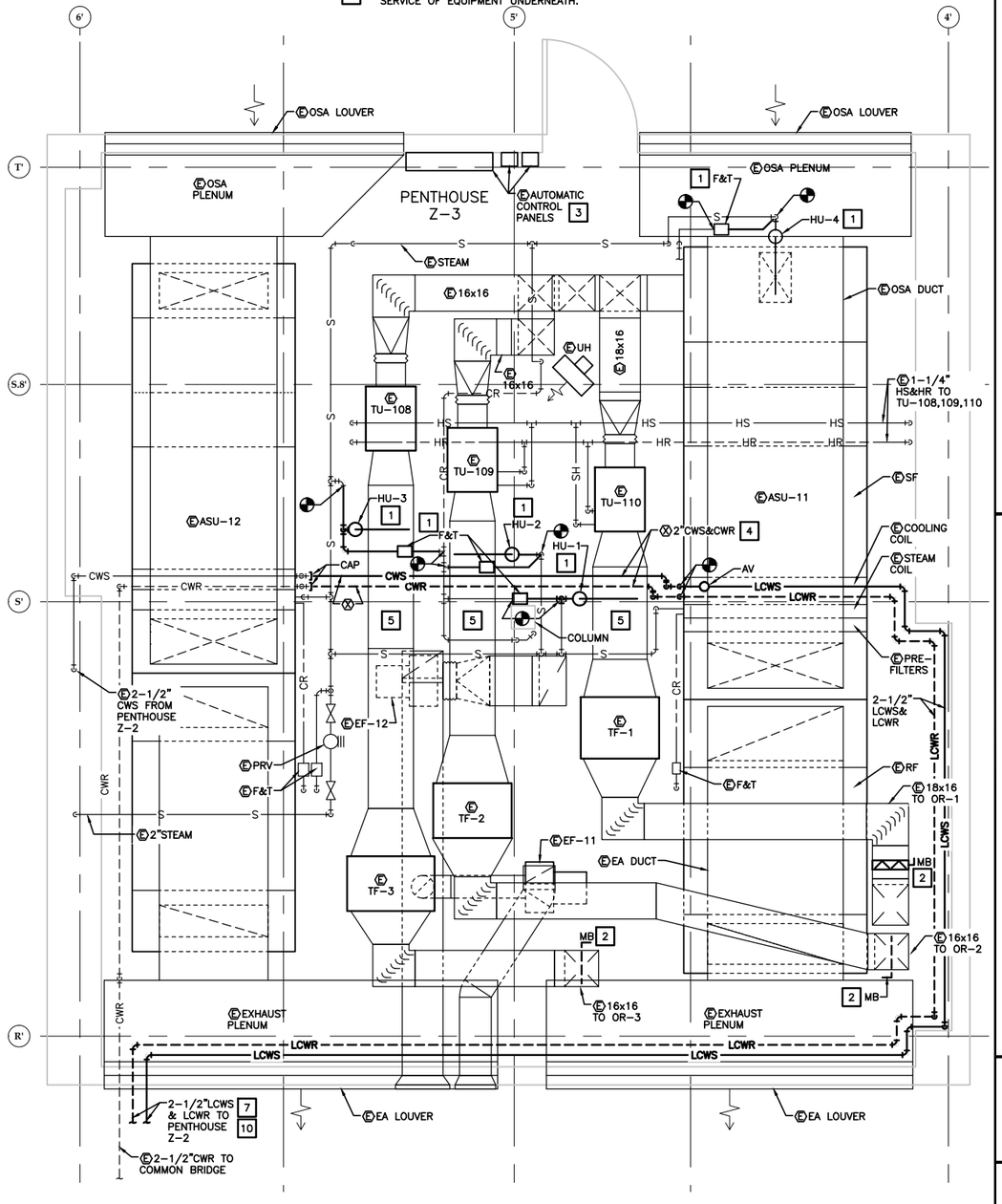
1. INSTALL CHANNEL FRAMING BETWEEN EXISTING ROOF BEAMS FOR SUPPORT OF INTERIOR EQUIPMENT AND PIPING. INSTALL CHANNEL FRAMING SUPPORTS TO BEAMS WITH MINIMAL DISTURBANCE TO EXISTING BEAM FIREPROOFING.




### 1 PENTHOUSE Z-2 MECH ROOM PLAN

SCALE: 0 2' 4' 8'

PROJECT NORTH




### 2 PENTHOUSE Z-3 MECH ROOM PLAN

SCALE: 0 2' 4' 8'

PROJECT NORTH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49th
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REGISTERED PROFESSIONAL ENGINEER
ISSUE DATE: 1/4/2016

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SHEET TITLE:
PENTHOUSE PLANS

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SHEET NO.
M2.1
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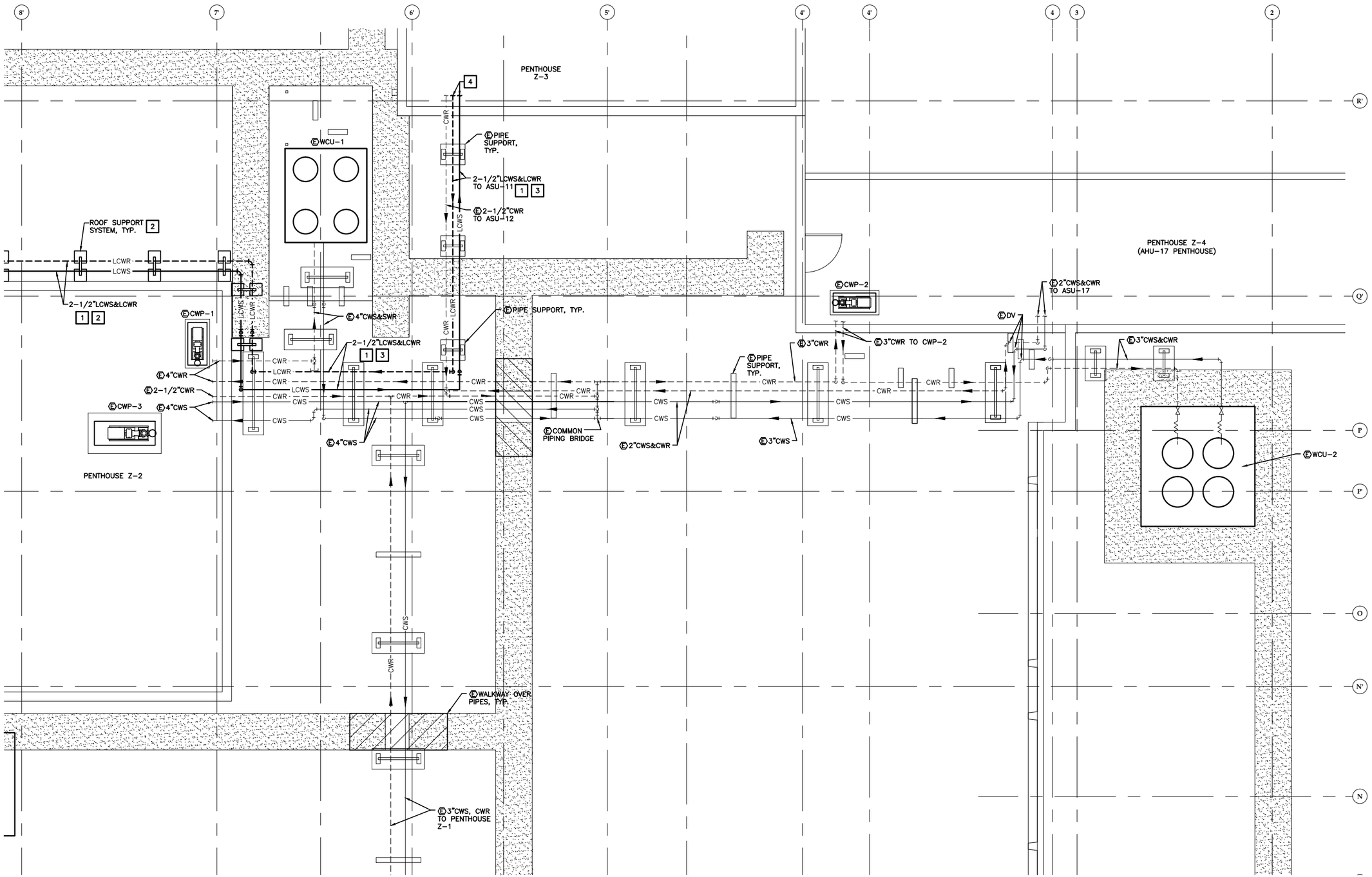

**1** **PARTIAL ROOF PLAN**

SCALE: 0 2' 4' 8'

PROJECT NORTH

## SHEET NOTES:

1. COORDINATE WITH HOSPITAL MAINTENANCE STAFF FOR SCHEDULING OF ALL WORK ON ROOF AND SHUT DOWN TIMES OF EXISTING CHILLER SYSTEM. SHUT DOWN TIMES ARE TO BE KEPT TO A MINIMUM SO THAT THE MAJORITY OF THE SYSTEM IS TO BE INSTALLED PRIOR TO DISCONNECTING THE EXISTING CHILLED WATER SYSTEM AND PIPING.
2. ALL NEW LOW TEMPERATURE CHILLED WATER PIPING (LCWS, LCWR) IS TO BE HEAT TRACED, INSULATED AND COVERED WITH METAL OUTER COVERING. HEAT TRACING PROVIDED AND INSTALLED UNDER ELECTRICAL DIVISION.
3. ALL NEW EXTERIOR METAL SUPPORTS PAINTED TWO COATS OF RUST PREVENTIVE PAINT. ALL METAL CLEANED AND PRIMED PRIOR TO PAINTING.
4. PIPING PITCHED TO DRAIN IN PENTHOUSE Z-2 OR PENTHOUSE Z-3. COORDINATE HEIGHTS OF PIPE SUPPORTS FOR PROPER PITCH.

## CONSTRUCTION NOTES:

1 INSTALL LCWS AND LCWR PIPING BETWEEN PENTHOUSE Z-2 AND Z-3. HEAT TRACE LCWS AND LCWR PIPING AND COVER WITH ALUMINUM PIPING INSULATION COVER SYSTEM.

2 SECURE NEW PIPING TO NEW ROOF SUPPORT SYSTEM. ROOF SUPPORT SYSTEM SHALL BE SUITABLE FOR INSTALLATION ON ROOF WITHOUT PENETRATION THROUGH EXISTING ROOF MEMBRANE ON ROOFING SYSTEM. ROOF PIPING SUPPORT SYSTEM SHALL BE SIMILAR TO CADDY PYRAMID ST SERIES OR THE RTS (EBERL) ROOF SUPPORT SYSTEM. INSTALL PER MANUFACTURER'S INSTRUCTIONS. DO NOT DISTURB EXISTING ROOF.

3 SECURE NEW PIPING TO EXISTING ROOF PIPING SUPPORTS. ATTACH ADDITIONAL GALVANIZED STEEL CHANNEL FRAMING TO EXISTING ROOF SUPPORT SYSTEM AS NEEDED FOR ATTACHMENT OF PIPING. NEW PIPING IS GENERALLY INSTALLED HIGHER THAN EXISTING PIPING. MODIFY EXISTING SUPPORTS AS NEEDED. TOUCH UP SUPPORTS WITH SPRAY APPLIED COLD GALVANIZING.

4 CLEANLY CUT ROUND HOLES THROUGH THE EIFS EXTERIOR WALL AND SEAL WITH BACKER ROD AND SEALANT WATERTIGHT. INTERIOR OF WALL PENETRATION SHALL BE INSULATED AROUND PIPING AND AIR SEALED. RUN PIPING INSULATION THROUGH WALL.

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SHEET TITLE:
ENLARGED
ROOF PLAN

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SHEET NO.
M2.2
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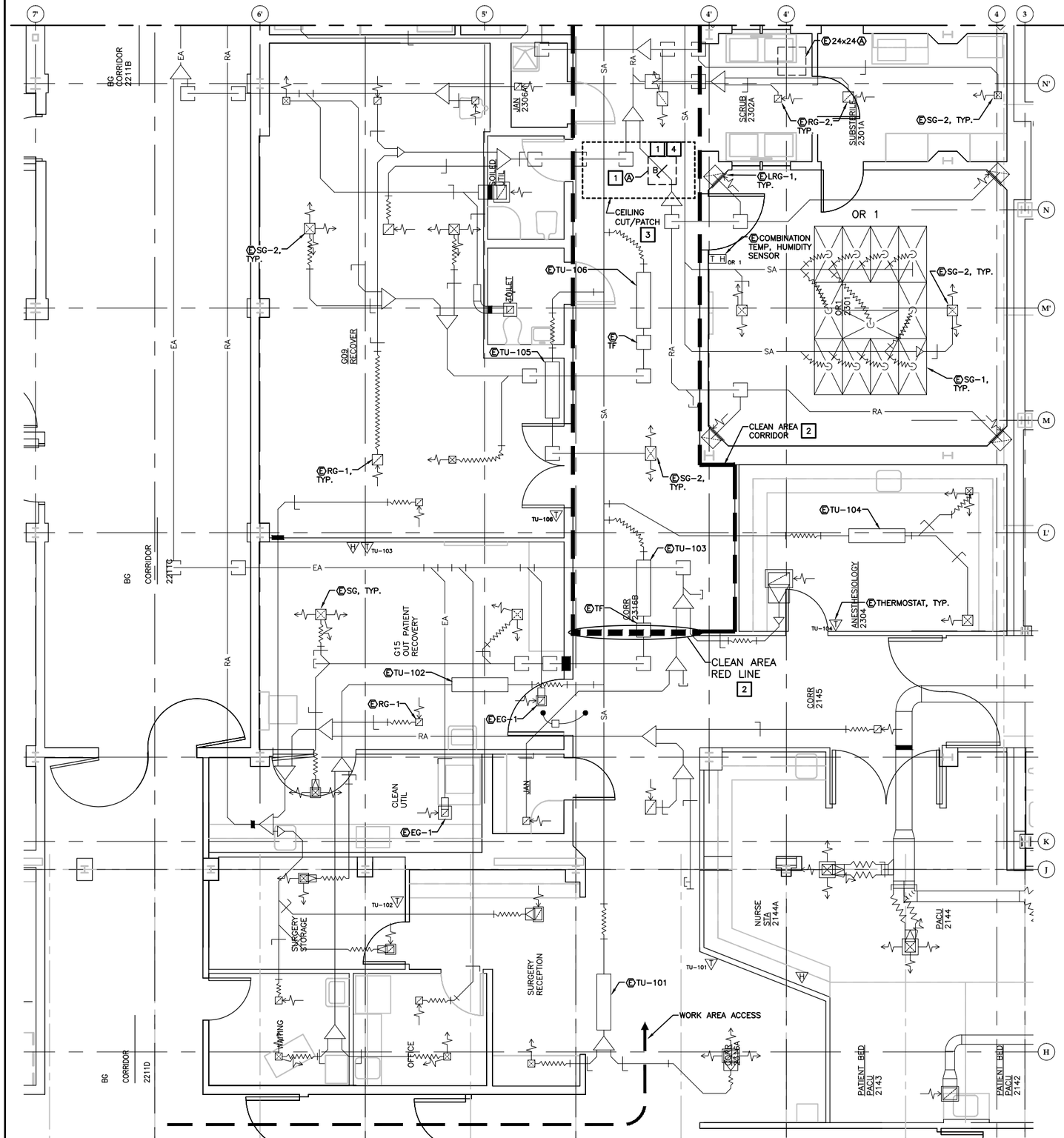


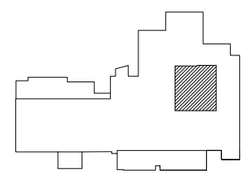

## CONSTRUCTION NOTES:

1. INSTALL BALANCING DAMPER IN EXISTING DUCT. MODIFY DUCT AS REQUIRED. VERIFY EXISTING DUCT LOCATION AND SIZE ON-SITE. INSTALL 24x24 OR 30x30 CEILING ACCESS DOOR FOR ACCESS TO ALL ADJUSTMENT DAMPERS INSTALLED IN THIS WORK. PROVIDE FRAMING AS REQUIRED FOR NEW CEILING ACCESS DOORS.
2. OR SURGERY CLEAN AREA CORRIDOR. ALL WORK IN THIS AREA MUST BE COORDINATED WITH AND APPROVED BY OWNER. ALL WORK MUST COMPLY WITH ALL OF THE SAFETY AND ENVIRONMENTAL REQUIREMENTS THAT ARE OUTLINED WITHIN SPECIFICATION SECTION 015221 SPECIAL SAFETY REQUIREMENTS/ICRA.
3. FIELD VERIFY THE LOCATIONS OF EXISTING RECESSED LIGHT FIXTURES, SURFACE MOUNTED SMOKE DETECTORS, SPRINKLER HEADS, RECESSED SPEAKERS, AND SURFACE MOUNTED CALL/NOTIFICATION FIXTURES AND CONDUIT PRIOR TO THE START OF WORK. EXISTING CEILING IS HARD GYPSUM BOARD.
4. ADJUST RETURN AIR DAMPER AS NEEDED TO PROVIDE POSITIVE PRESSURE REQUIRED FOR OPERATING ROOM IAQ.

## 1 ENLARGED FLOOR PLAN - OR SOUTH

SCALE: 0 2' 4' 8'

PROJECT NORTH



KEY PLAN


STATE OF ALASKA
THOMAS H. MURRAY
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REGISTERED PROFESSIONAL ENGINEER
ISSUE DATE: 1/4/2016

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SHEET TITLE:
ENLARGED FLOOR PLAN - OR SOUTH

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M2.3
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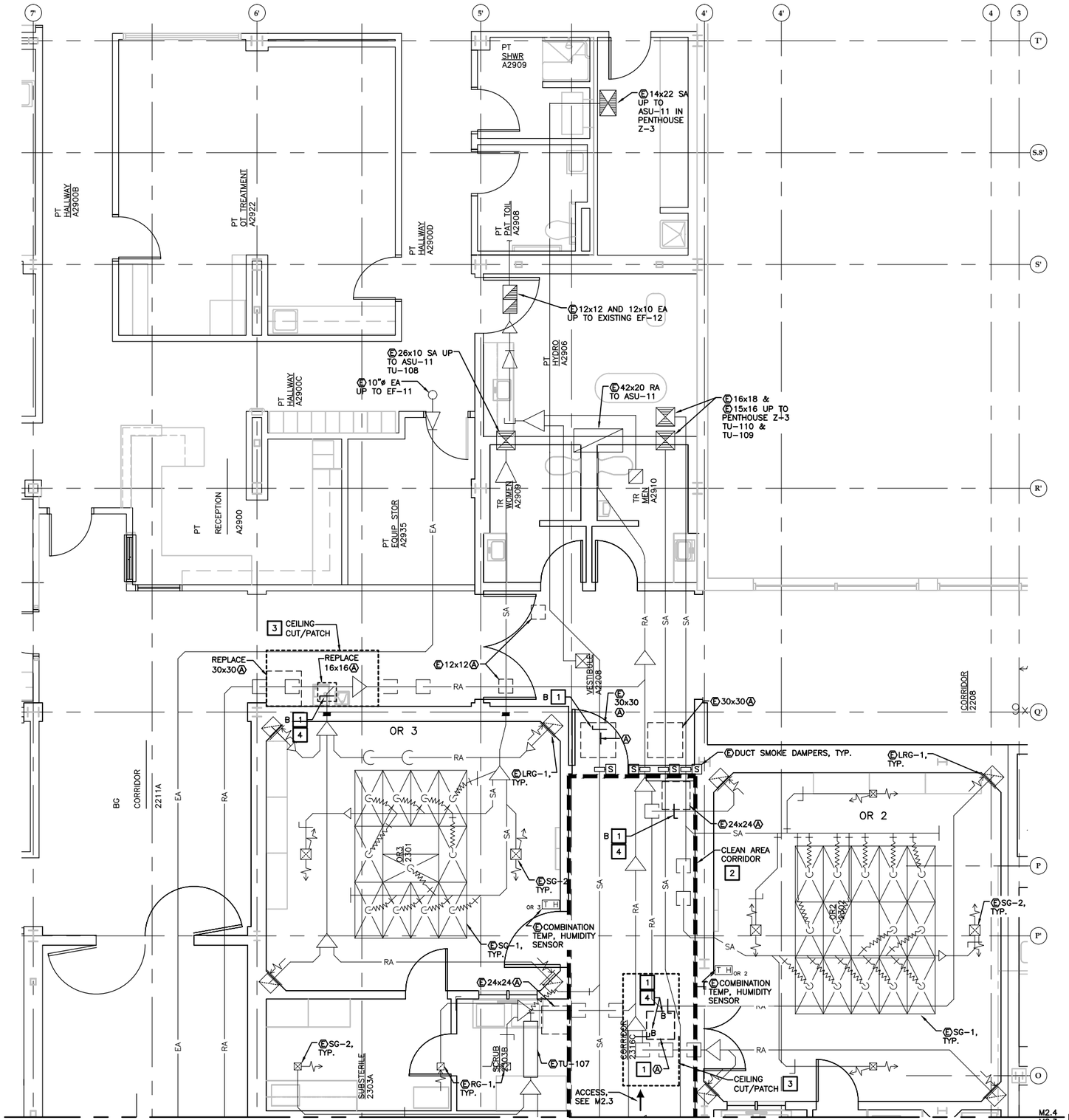


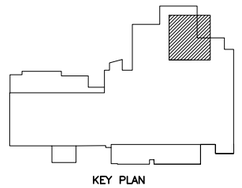

## CONSTRUCTION NOTES:

1. INSTALL BALANCING DAMPER IN EXISTING DUCT. MODIFY DUCT AS REQUIRED. VERIFY EXISTING DUCT LOCATION AND SIZE ON-SITE. INSTALL 24x24 OR 30x30 CEILING ACCESS DOOR FOR ACCESS TO ALL ADJUSTMENT DAMPERS INSTALLED IN THIS WORK. PROVIDE FRAMING AS REQUIRED FOR NEW CEILING ACCESS DOORS.
2. OR SURGERY CLEAN AREA CORRIDOR. ALL WORK IN THIS AREA MUST BE COORDINATED WITH AND APPROVED BY OWNER. ALL WORK MUST COMPLY WITH ALL OF THE SAFETY AND ENVIRONMENTAL REQUIREMENTS THAT ARE OUTLINED WITHIN SPECIFICATION SECTION 015221 SPECIAL SAFETY REQUIREMENTS/ICRA.
3. FIELD VERIFY THE LOCATIONS OF EXISTING RECESSED LIGHT FIXTURES, SURFACE MOUNTED SMOKE DETECTORS, SPRINKLER HEADS, RECESSED SPEAKERS, AND SURFACE MOUNTED CALL/NOTIFICATION FIXTURES AND CONDUIT PRIOR TO THE START OF WORK. EXISTING CEILING IS HARD GYPSUM BOARD.
4. ADJUST RETURN AIR DAMPER AS NEEDED TO PROVIDE POSITIVE PRESSURE REQUIRED FOR OPERATING ROOM IAQ.

## 1 ENLARGED FLOOR PLAN - OR NORTH

SCALE: 0 2' 4' 8'

PROJECT NORTH



KEY PLAN


STATE OF ALASKA
THOMAS H. MURRAY
ME 7870
REGISTERED PROFESSIONAL ENGINEER
ISSUE DATE: 1/4/2016

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City & Borough of Juneau
Bartlett Regional Hospital
OR Surgery Ventilation System Upgrades
E16-095
JUNEAU, ALASKA

SHEET TITLE:
ENLARGED FLOOR PLAN - OR NORTH

| | |
|---|---|
| SCALE: | AS SHOWN: |
| DATE: | 1/4/2016 |
| DRAWN: | KB |
| DESIGNED: | RS |
| CHECKED: | DM |

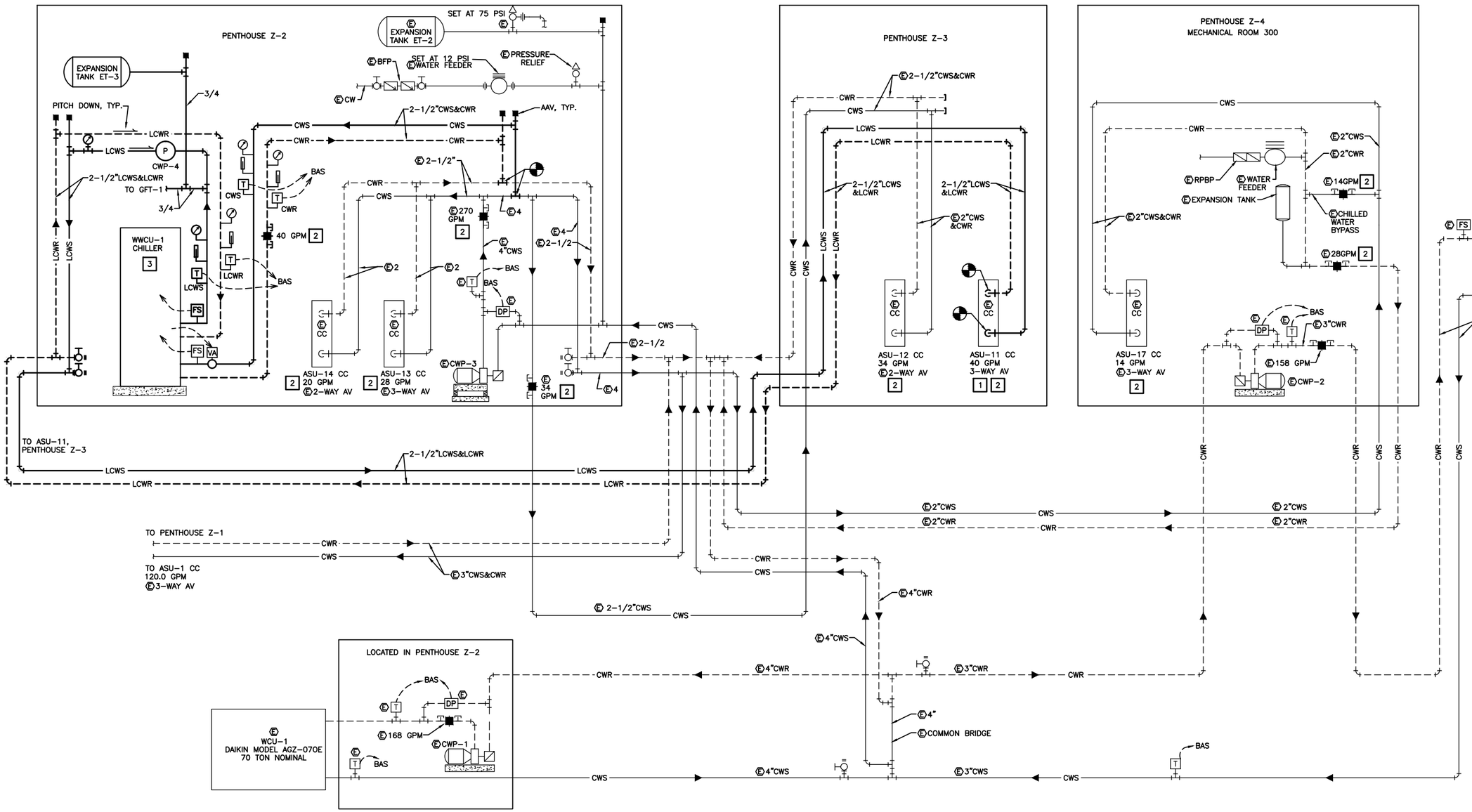
SHEET NO.
M2.4
JOB NO. 15-117

## SHEET NOTES:

1. SEE PIPING DIAGRAM 1/M3.2 FOR COMPLETE PIPING CONFIGURATION, SIZING, VALVES, AND RELATED APPURTENANCES.

## CONSTRUCTION NOTES:

1. SEE DETAILS 4/M3.2 AND 5/M3.2.
2. ADJUST FLOWSETTER TO FLOW RATE SHOWN.
3. SEE PIPING DIAGRAM 1/M3.2.




1 **CHILLED WATER DIAGRAM - OVERALL**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ISSUE DATE: 1/4/2016

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JUNEAU, ALASKA

SHEET TITLE:
CHILLED WATER DIAGRAM - OVERALL

| | |
|---|---|
| SCALE: | AS SHOWN: |
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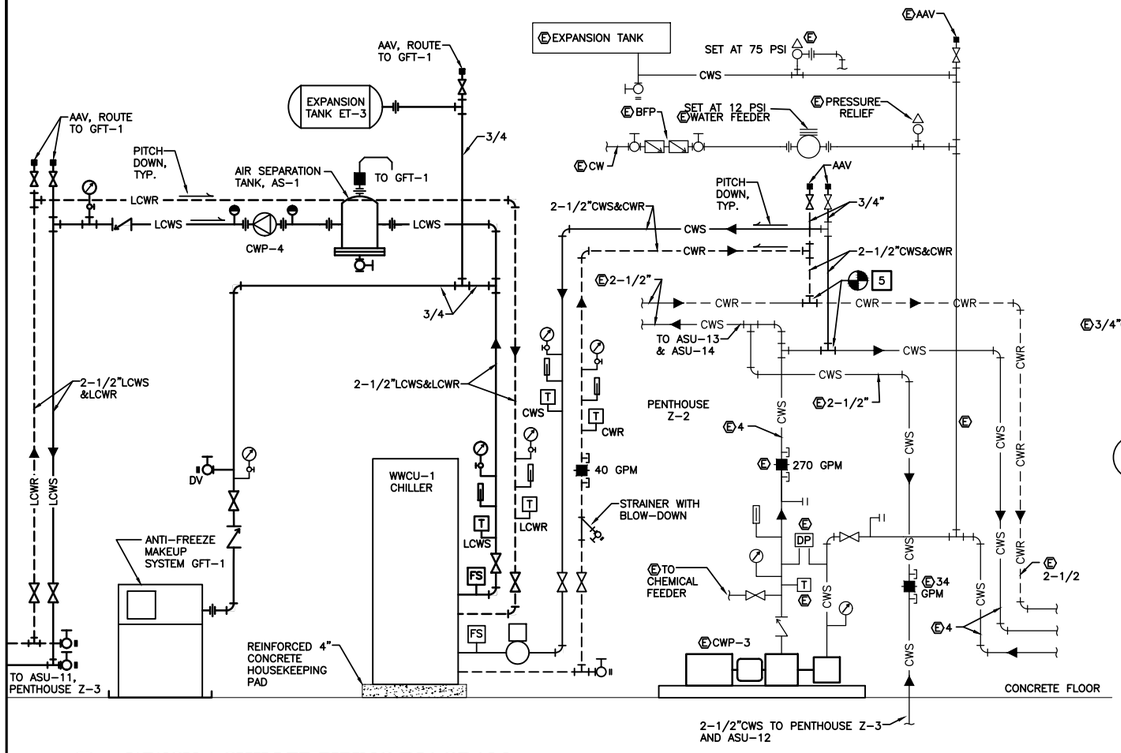
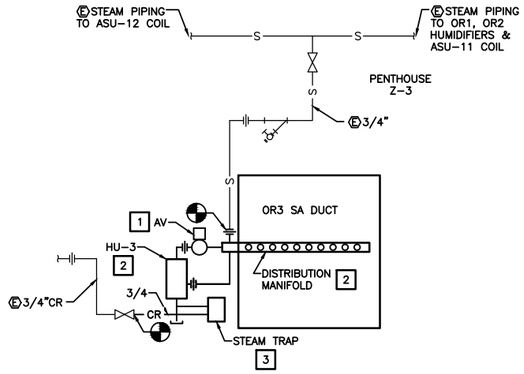
SHEET NO.
M3.1
JOB NO. 15-117



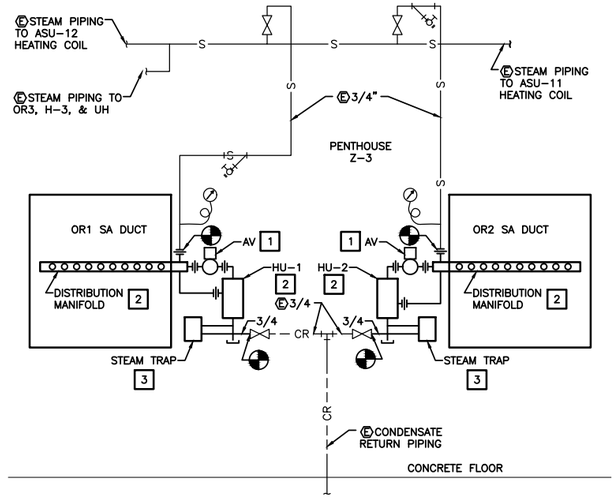

## 1 WWCU-1 CHILLER PIPING DIAGRAM

NO SCALE




## 2 DUCT HUMIDIFIER PIPING DIAGRAM - OR3 HU-3

NO SCALE

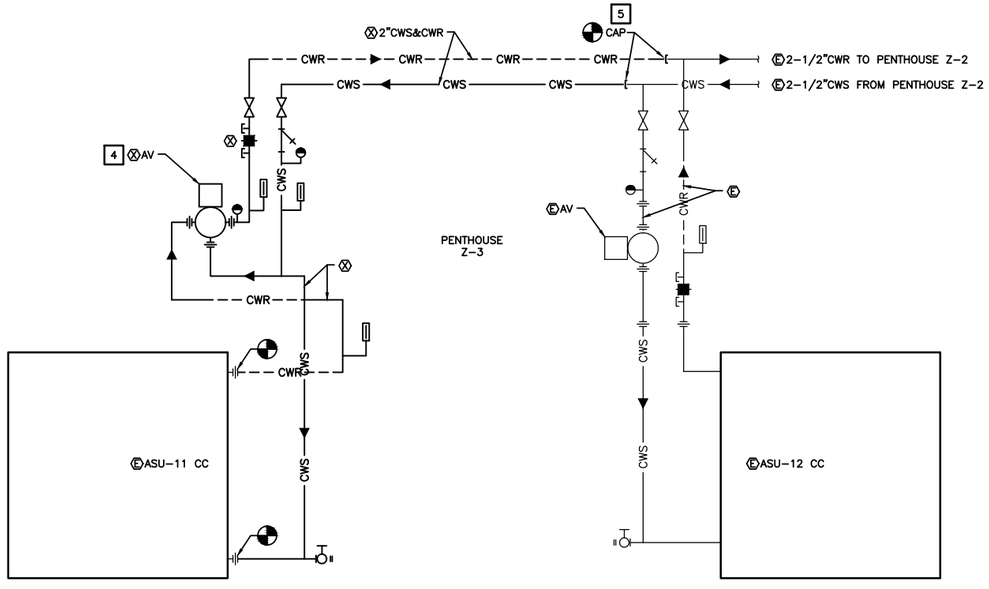



## 3 DUCT HUMIDIFIER PIPING DIAGRAM - OR1 HU-1 AND OR2 HU-2

NO SCALE

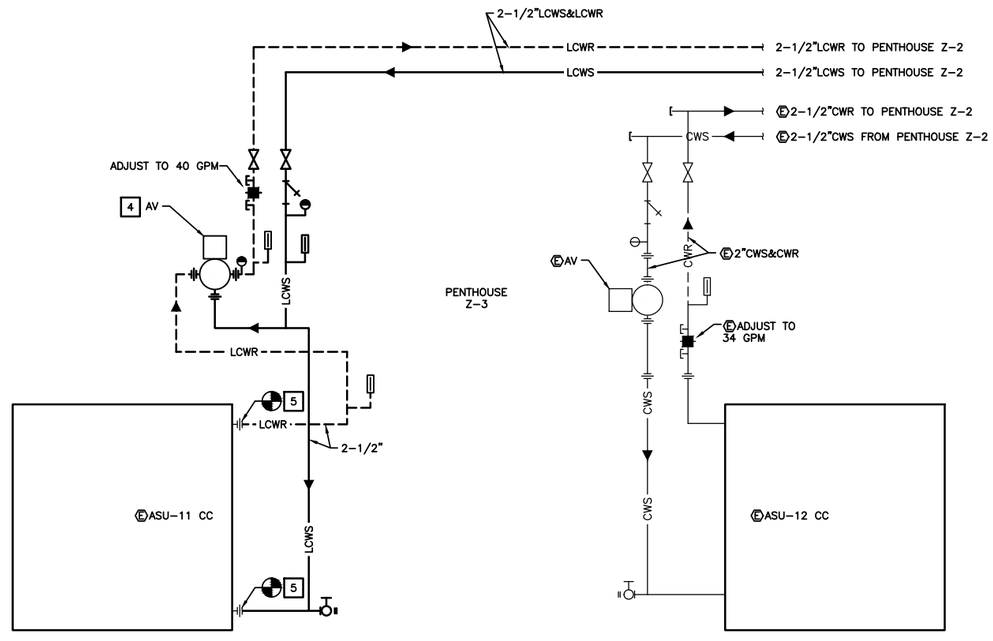
## CONSTRUCTION NOTES:

1. REMOVE AND REINSTALL EXISTING HUMIDIFIER AUTOMATIC VALVE AS REQUIRED FOR REPLACEMENT OF DUCT HUMIDIFIER.
2. REMOVE AND REPLACE DUCT HUMIDIFIER. MODIFY PIPING AS REQUIRED.
3. REMOVE EXISTING F&T TYPE STEAM TRAP AND REPLACE WITH BUCKET TYPE STEAM TRAP. MODIFY CONDENSATE PIPING AS REQUIRED FOR REPLACEMENT OF STEAM TRAP WITH DIFFERENT TYPE.
4. REMOVE AND REPLACE CHILLED WATER PIPING, AUTOMATIC VALVE, AND RELATED SPECIALTIES.
5. REPAIR/REPLACE INSULATION AT CONNECTION POINT.




## 4 CHILLED WATER PIPING DIAGRAM - ASU-11 & ASU-12 - DEMOLITION

NO SCALE




## 5 CHILLED WATER PIPING DIAGRAM - ASU-11 & ASU-12

NO SCALE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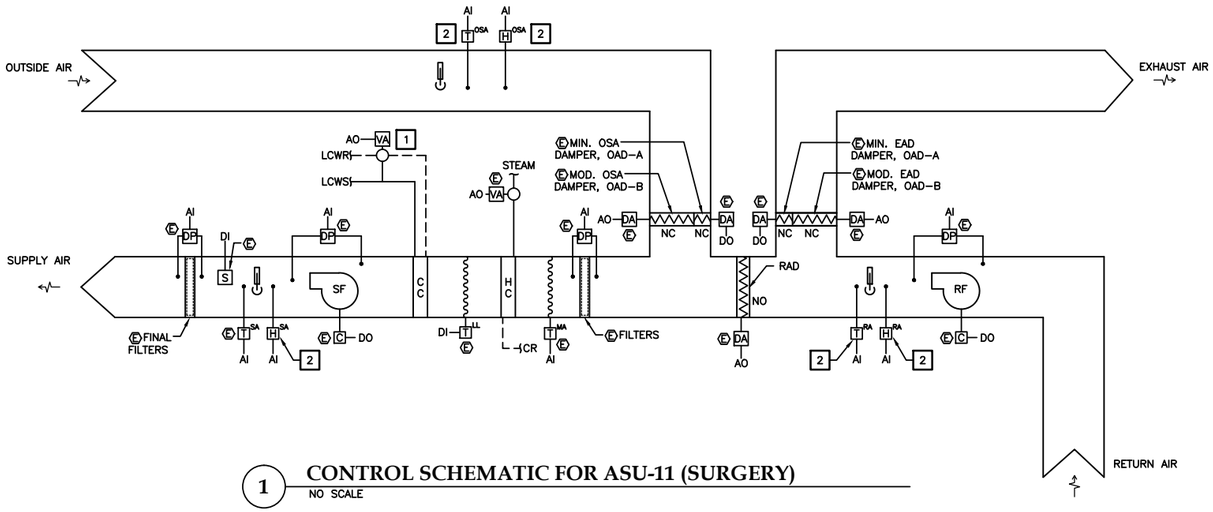
SHEET TITLE:
PIPING DIAGRAMS

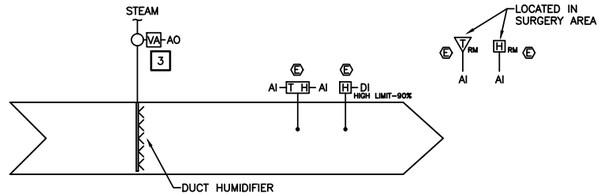
| | |
|---|---|
| SCALE: | AS SHOWN: |
| DATE: | 1/4/2016 |
| DRAWN: | KB |
| DESIGNED: | RS |
| CHECKED: | DM |

SHEET NO.
M3.2
JOB NO. 15-117



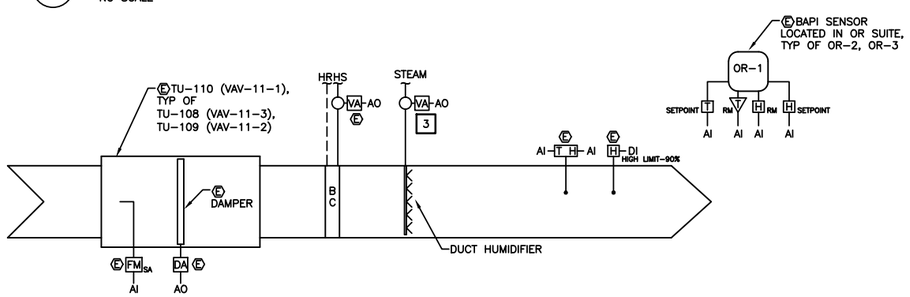

## 1 CONTROL SCHEMATIC FOR ASU-11 (SURGERY)

NO SCALE




## 2 CONTROL SCHEMATIC FOR HUMIDIFIER HU-4 (SURGERY COMMON AREA)

NO SCALE




## 3 CONTROL SCHEMATIC FOR SURGERY SUITE OR-1

NO SCALE

**TYPICAL OF OR-2, OR-3**

## CONTROLS LEGEND

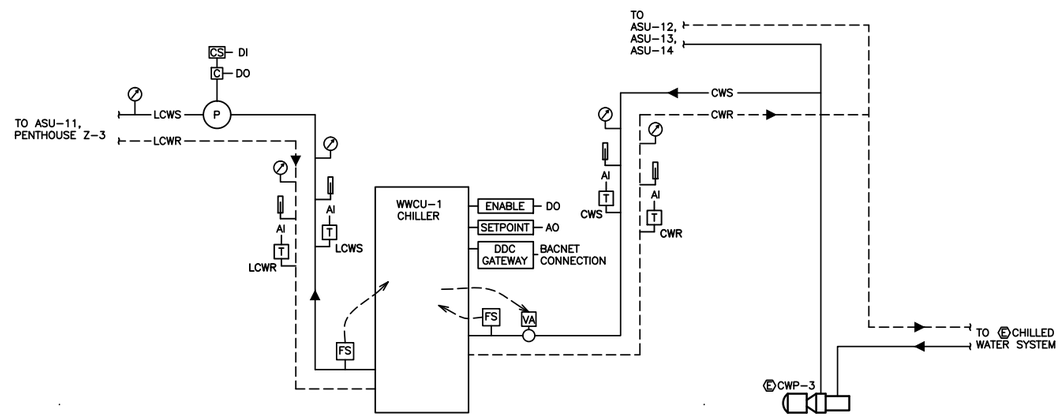
| | | | |
|---|---|---|---|
| C | CONTROLLER | AI | ANALOG INPUT |
| S | SMOKE SENSOR | AO | ANALOG OUTPUT |
| T | IMMERSION THERMOSTAT OR THERMOSTATIC SENSOR | ASU | AIR SUPPLY UNIT |
| | | BC | BOOSTER COIL |
| H | HUMIDITY SENSOR | CC | COOLING COIL |
| T H | COMBINATION TEMPERATURE/HUMIDITY SENSOR | COM | COMMON |
| | | CWS | CHILLED WATER SUPPLY |
| P | PRESSURE SENSOR | CWR | CHILLED WATER RETURN |
| VA | VALVE ACTUATOR | DI | DIGITAL INPUT |
| DA | DAMPER ACTUATOR | DO | DIGITAL OUTPUT |
| FS | FLOW SWITCH | EAD | EXHAUST AIR DAMPER |
| DP | DIFFERENTIAL PRESSURE GAGE | EF | EXHAUST FAN |
| CS | CURRENT SENSOR | HR | HEATING RETURN |
| FM | FLOW SENSOR | HS | HEATING SUPPLY |
| P | PUMP | HU | DUCT HUMIDIFIER |
| | ROOM THERMOSTAT | LCWS | LOW TEMPERATURE CHILLED WATER SUPPLY |
| | AIR DIRECTION | LCWR | LOW TEMPERATURE CHILLED WATER RETURN |
| | THERMOMETER | LL | LOW LIMIT CONTROL |
| (E) | EXISTING | MA | MIXED AIR |
| | | NO | NORMALLY OPEN |
| | | NC | NORMALLY CLOSED |
| | | OAD | OUTSIDE AIR DAMPER |
| | | OSA | OUTSIDE AIR |
| | | CWP-1 | PUMP |
| | | RA | RETURN AIR |
| | | RAD | RETURN AIR DAMPER |
| | | RF | RETURN FAN |
| | | SA | SUPPLY AIR |
| | | SF | SUPPLY FAN |
| | | TU | TERMINAL UNIT |
| | | VAV | VARIABLE AIR VOLUME |
| | | WWCU-1 | WATER-WATER CHILLER UNIT |

## GENERAL NOTES:

1. THE DIAGRAMS AND POINTS SHOWN HERE ARE SCHEMATIC ONLY. REFER TO SEQUENCE OF OPERATIONS AND SPECIFICATIONS FOR COMPLETE CONFIGURATION OF THE SYSTEMS. COORDINATE WITH ALL OTHER DISCIPLINES TO ACHIEVE RESULTS AS SHOWN AND INTENDED IN THE DOCUMENTS. GENERAL NOTES APPLY TO ALL CONTROLS DRAWINGS.
2. INSTALL SENSING DEVICES ADJACENT TO MECHANICAL THERMOMETERS AND GAGES. THERMOMETERS SHOWN ON CONTROL DRAWINGS ARE TO BE PROVIDED AND INSTALLED BY MECHANICAL CONTRACTOR.
3. MODIFY EXISTING CONTROL SYSTEM AND GRAPHICS FOR NEW CONTROL WORK AND MODIFICATIONS TO EXISTING CONTROLS.

## CONSTRUCTION NOTES:

1. REMOVE AND REINSTALL EXISTING CHILLED WATER AUTOMATIC VALVE AND CONTROL.
2. INSTALL SENSOR.
3. REMOVE AND REINSTALL EXISTING DUCT HUMIDIFIER VALVE ACTUATOR.




## 4 CONTROL SCHEMATIC - WWCU-1 (LOW TEMP CHILLER)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SHEET TITLE:
CONTROLS

| | |
|---|---|
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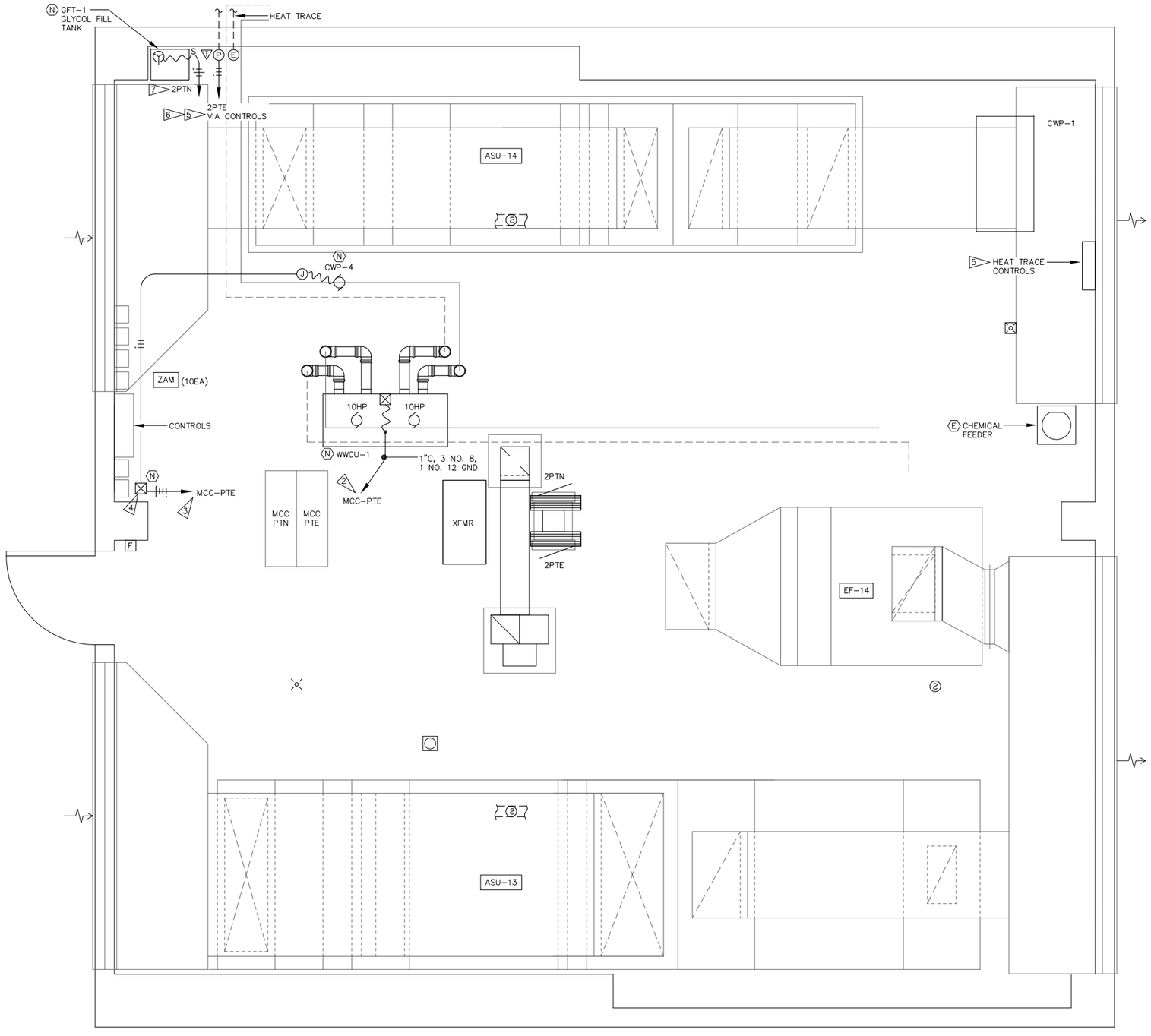
| DRAWN: | KB |
| DESIGNED: | RS |
| CHECKED: | DM |

SHEET NO.
M4.1
JOB NO. 15-117




1 **PENTHOUSE Z2 PLAN**

SCALE: 0 1' 2' 4'

PROJECT NORTH

NOTES:

1. THESE DRAWINGS ILLUSTRATE THE EXISTING CONDITIONS WITH ADDITIONS AND MODIFICATIONS IDENTIFIED.
2. PROVIDE NEW BUCKET WITH 60A DISCONNECT AND 40A TIME DELAY FUSES. MCC-PTE IS A GE 8000 SERIES MOTOR CONTROL CENTER WITH TWO ADJACENT 1/2 BUCKET SPACES AVAILABLE.
3. PROVIDE 15/2 CIRCUIT BREAKER. SPACES AVAILABLE.
4. FULL VOLTAGE, NON-REVERSING MAGNETIC STARTER (NEMA 0) WITH H-O-A SWITCH AND RED LED PILOT LIGHT.
5. REFER TO DRAWINGS E2.2, E2.3, AND E2.4 FOR HEAT TRACE INSTALLATION.
6. PROVIDE NEW 30/2 CLASS B (30Ma) GFI CIRCUIT BREAKER.
7. PROVIDE 15/1 CIRCUIT BREAKER.

## LEGEND

### ABBREVIATIONS:

| | |
|---|---|
| GFI | GROUND FAULT INTERRUPTED |
| UON | UNLESS OTHERWISE NOTED |
| XFMR | TRANSFORMER |

### SHEET NOTE SYMBOLS:

- (E) EXISTING
- (N) NEW
- X FLAG NOTE, X=NUMBER

### POWER:

- EQUIPMENT CONNECTION
- (J) JUNCTION BOX
- (C) CONTACTOR
- (E) END TERMINATION
- (P) POWER TERMINATION
- (T) TERMINAL/TAP
- MOTOR CONNECTION
- MOTOR STARTER
- THERMOSTAT, 46" AFF

### SERVICE EQUIPMENT:

- PANELBOARD

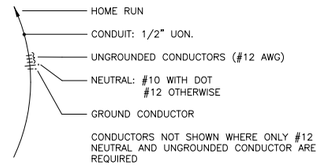
### CONTROLS:

| | |
|---|---|
| S | SINGLE POLE SWITCH |

### FIRE ALARM:

- (2) SMOKE DETECTOR
- (2) DUCT DETECTOR
- FIRE ALARM HORN/STROBE
- FIRE ALARM STROBE ONLY

### CONDUIT & CONDUCTORS:




CONDUCTORS NOT SHOWN WHERE ONLY #12 NEUTRAL AND UNGROUNDED CONDUCTOR ARE REQUIRED

102.72
4 JAN 2016

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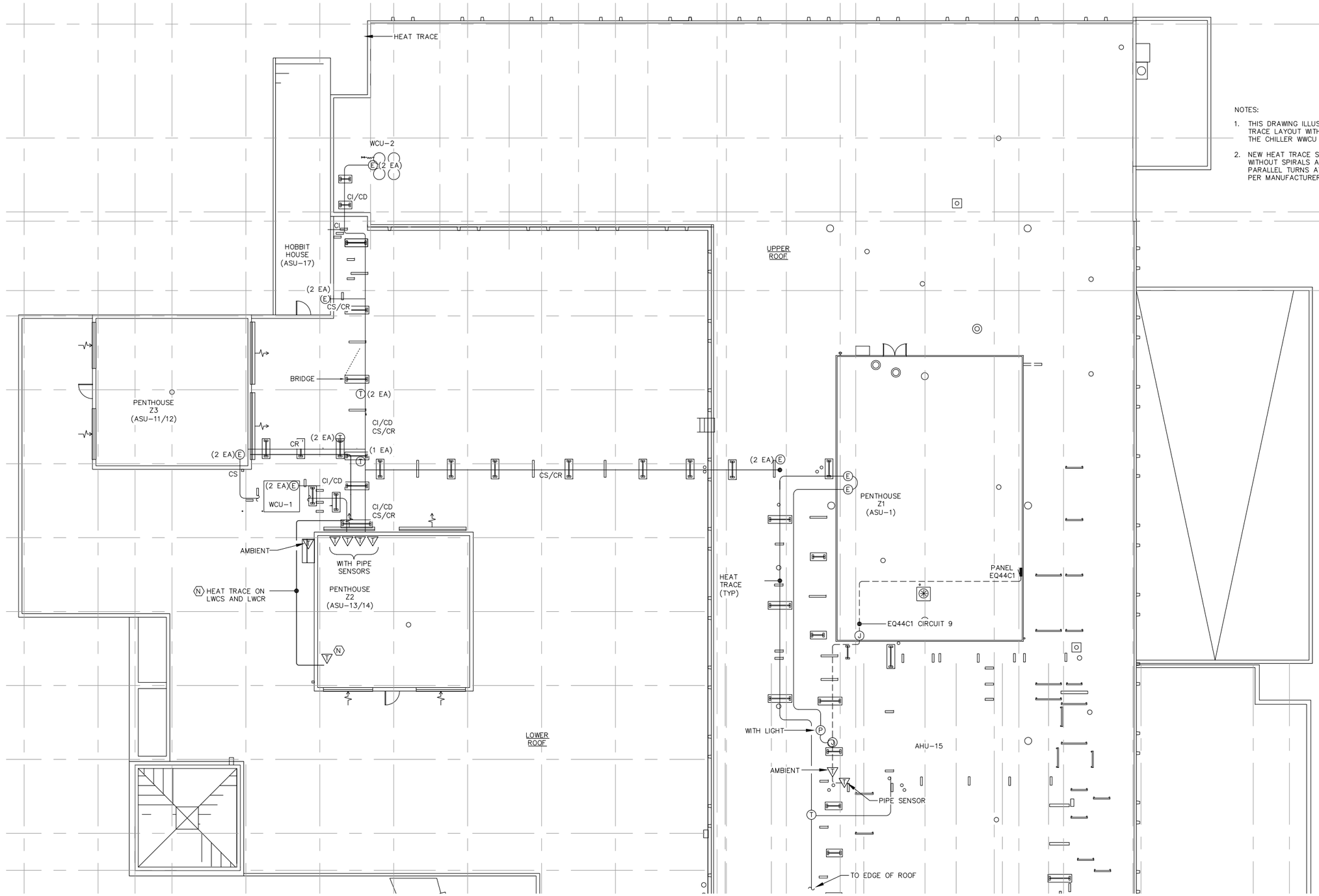
JUNEAU, ALASKA

SHEET TITLE:
PENTHOUSE PLAN

| | |
|---|---|
| SCALE: | AS SHOWN: |
| DATE: | 1/4/2016 |
| DRAWN: | REJ |
| DESIGNED: | BCH |
| CHECKED: | BCH |

SHEET NO.
E2.1
JOB NO. 15-117




NOTES:

1. THIS DRAWING ILLUSTRATES THE EXISTING HEAT TRACE LAYOUT WITH ADDITIONAL HEAT TRACE FOR THE CHILLER WWCU IDENTIFIED.
2. NEW HEAT TRACE SHALL BE STRAPPED TO PIPES WITHOUT SPIRALS AROUND PIPES. PROVIDE EXTRA PARALLEL TURNS AT VALVES AND OTHER APPARATUS PER MANUFACTURER.

**1 PARTIAL ROOF PLAN**

SCALE: 0 5' 10' 20'

PROJECT NORTH

102.72
STATE OF ALASKA
REGISTERED PROFESSIONAL ENGINEER
4 JAN 2016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SHEET TITLE:
PARTIAL ROOF PLAN

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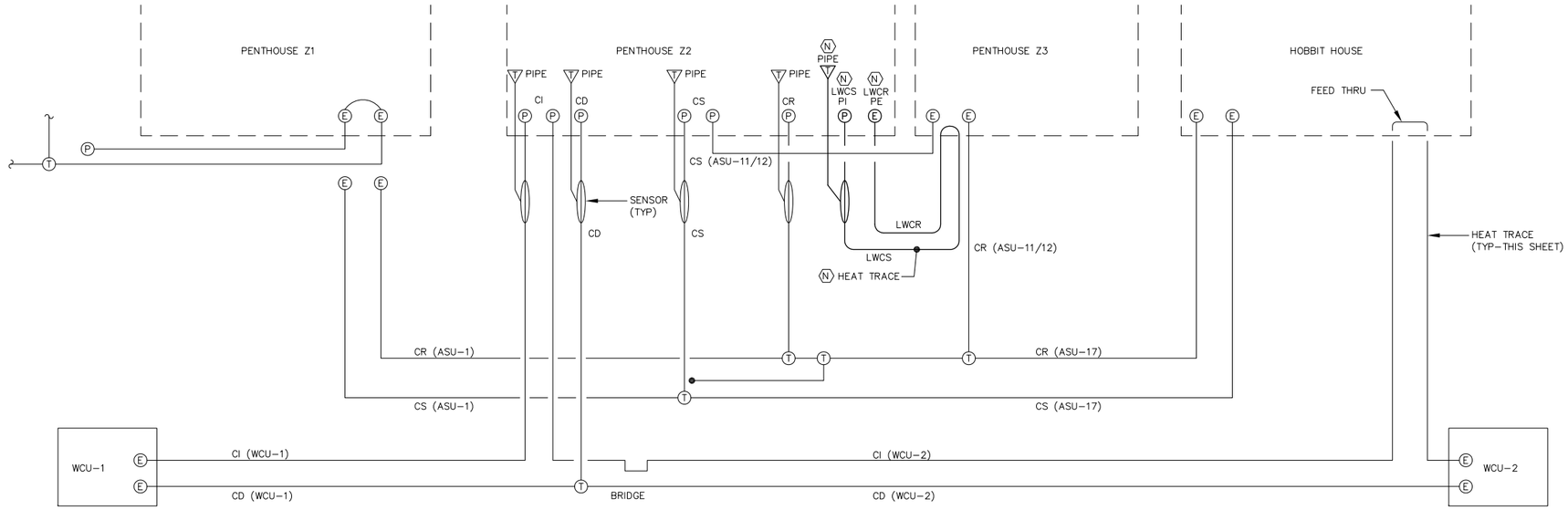
|---|---|
| SCALE: | AS SHOWN: |
| DATE: | 1/4/2016 |
| DRAWN: | REJ |
| DESIGNED: | BCH |
| CHECKED: | BCH |

SHEET NO.
E2.2
JOB NO. 15-117

Jan 04, 2016 - 4:19pm
F:\Projects\102 Murray & Assoc\72 BRH OR Surgery Ventilation\Drawings\Working\E2.2.dwg (PARTIAL ROOF PLAN tab)




NOTES:

1. THIS DRAWING ILLUSTRATES THE EXISTING HEAT TRACE CONFIGURATION ON THE HOSPITAL ROOF WITH THE ADDITIONAL COMPONENTS FOR THE NEW OR CHILLER HEAT TRACE IDENTIFIED.

2. THE NEW HEAT TRACE SYSTEM SHALL INCLUDE THE FOLLOWING COMPONENTS:
   - HEAT TRACE: THERMON BSX-8-2
   - POWER TERMINATION: THERMON DP
   - END TERMINATION: THERMON DL
   - ADJUSTABLE LINE VOLTAGE, MECHANICAL THERMOSTAT WITH PIPE WALL SENSOR: THERMON E4X-35235

## 1 SCHEMATIC DIAGRAM - ROOF HEAT TRACE


102.72
4 JAN 2016

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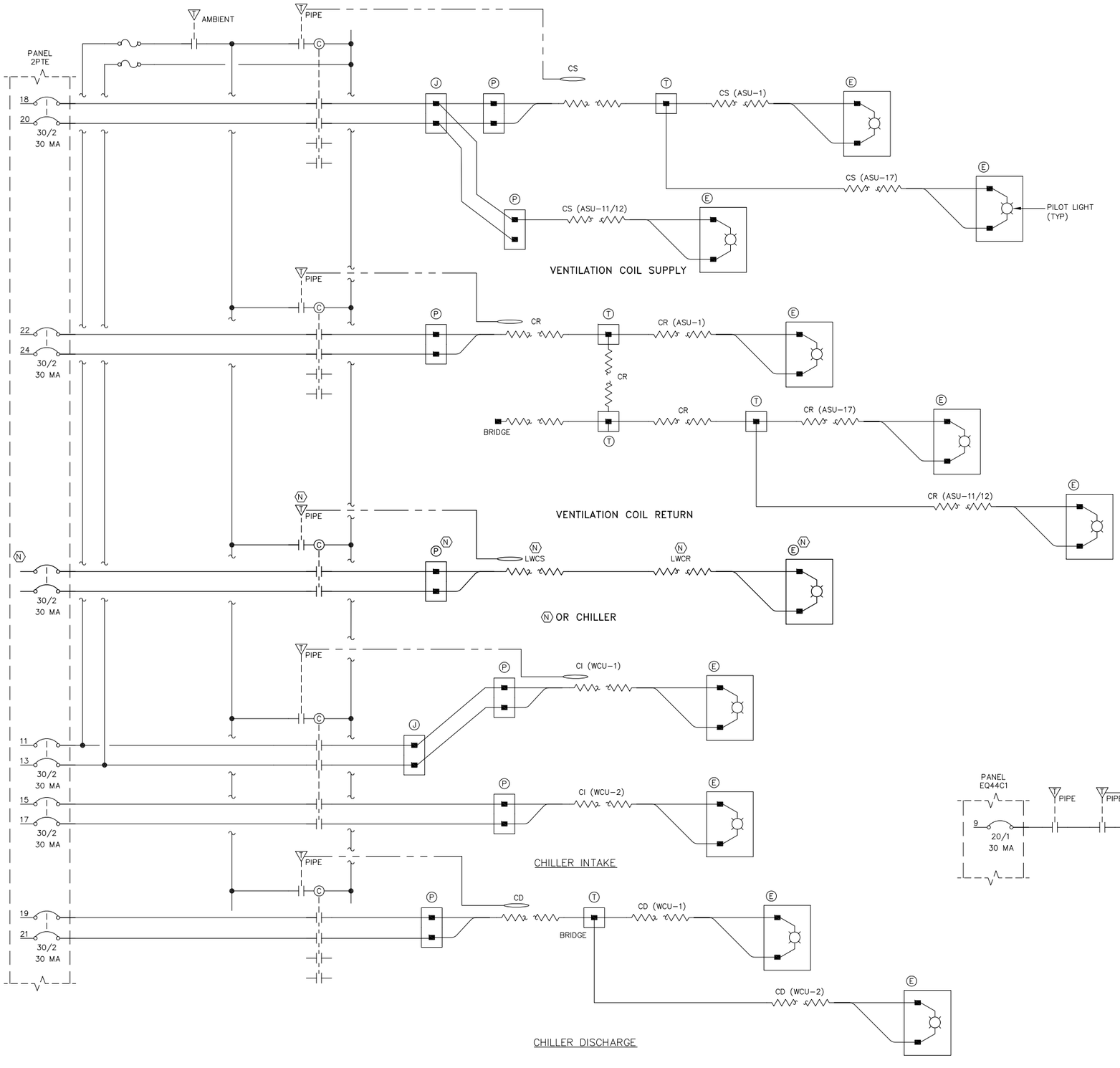
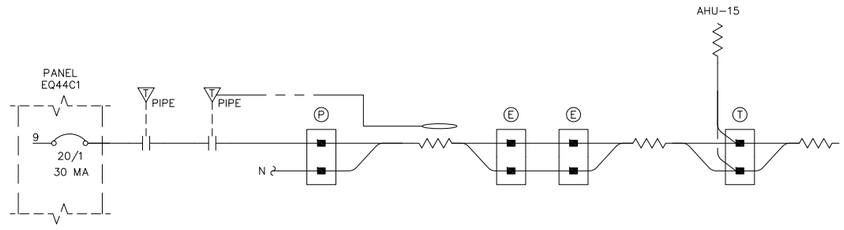
JUNEAU, ALASKA

SHEET TITLE:
SCHEMATIC DIAGRAM

| | |
|---|---|
| SCALE: | AS SHOWN: |
| DATE: | 1/4/2016 |
| DRAWN: | REJ |
| DESIGNED: | BCH |
| CHECKED: | BCH |

SHEET NO.
E2.3
JOB NO. 15-117




NOTES:

1. THIS DRAWING ILLUSTRATES THE CONFIGURATION OF THE EXISTING HEAT TRACE CONTROLS WITH THE NEW EQUIPMENT FOR THE CHILLER WWCU-1 IDENTIFIED.

**1 SCHEMATIC DIAGRAM - HEAT TRACE CONTROLS**

102.72
4 JAN 2016

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SHEET TITLE:
SCHEMATIC DIAGRAM
HEAT TRACE
CONTROLS

| | |
|---|---|
| SCALE: | AS SHOWN: |
| DATE: | 1/4/2016 |
| DRAWN: | REJ |
| DESIGNED: | BCH |
| CHECKED: | BCH |

SHEET NO.
E2.4
JOB NO. 15-117

# SPECIFICATION

## GENERAL

1.1 DEFINITIONS

A. EMT: ELECTRICAL METALLIC TUBING.

B. FMC: FLEXIBLE METAL CONDUIT.

C. GFCI: GROUND–FAULT CIRCUIT INTERRUPTER.

D. IMC: INTERMEDIATE METAL CONDUIT.

E. LFMC: LIQUIDTIGHT FLEXIBLE METAL CONDUIT.

F. LFNC: LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT.

G. PVC: POLYVINYL CHLORIDE.

H. RSC: RIGID STEEL CONDUIT.

1.2 SUBMITTALS

A. PRODUCT DATA:

1. HEAT TRACE AND ACCESSORIES.

1.3 QUALITY ASSURANCE

A. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, ARTICLE 100, BY A TESTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, AND MARKED FOR INTENDED USE.

B. COMPLY WITH NFPA 70.

1.4 COORDINATION

A. SEQUENCE, COORDINATE, AND INTEGRATE INSTALLING ELECTRICAL MATERIALS AND EQUIPMENT FOR EFFICIENT FLOW OF THE WORK. COORDINATE INSTALLING LARGE EQUIPMENT REQUIRING POSITIONING BEFORE CLOSING IN THE BUILDING.

B. WHERE ELECTRICAL IDENTIFICATION DEVICES ARE APPLIED TO FIELD–FINISHED SURFACES, COORDINATE INSTALLATION OF IDENTIFICATION DEVICES WITH COMPLETION OF FINISHED SURFACE.

1.5 FIELD QUALITY CONTROL

A. INSPECT INSTALLED COMPONENTS FOR DAMAGE AND FAULTY WORK, INCLUDING THE FOLLOWING:

1. SUPPORTING DEVICES FOR ELECTRICAL COMPONENTS.

2. ELECTRICAL IDENTIFICATION.

3. ELECTRICAL DEMOLITION.

4. CUTTING AND PATCHING FOR ELECTRICAL CONSTRUCTION.

5. TOUCHUP PAINTING.

1.6 REFINISHING AND TOUCHUP PAINTING

A. REFINISH AND TOUCHUP PAINT.

1. CLEAN DAMAGED AND DISTURBED AREAS AND APPLY PRIMER, INTERMEDIATE, AND FINISH COATS TO SUIT THE DEGREE OF DAMAGE AT EACH LOCATION.

2. FOLLOW PAINT MANUFACTURER'S WRITTEN INSTRUCTIONS FOR SURFACE PREPARATION AND FOR TIMING AND APPLICATION OF SUCCESSIVE COATS.

3. REPAIR DAMAGE TO GALVANIZED FINISHES WITH ZINC–RICH PAINT RECOMMENDED BY MANUFACTURER.

4. REPAIR DAMAGE TO PAINT FINISHES WITH MATCHING TOUCHUP COATING RECOMMENDED BY MANUFACTURER.

1.7 CLEANING AND PROTECTION

A. ON COMPLETION OF INSTALLATION, INCLUDING OUTLETS, FITTINGS, AND DEVICES, INSPECT EXPOSED FINISH. REMOVE BURRS, DIRT, PAINT SPOTS, AND CONSTRUCTION DEBRIS.

B. PROTECT EQUIPMENT AND INSTALLATIONS AND MAINTAIN CONDITIONS TO ENSURE THAT COATINGS, FINISHES, AND CABINETS ARE WITHOUT DAMAGE OR DETERIORATION AT TIME OF SUBSTANTIAL COMPLETION.

## BASIC MATERIALS AND METHODS

1.1 SUPPORTING DEVICES

A. MATERIAL: COLD–FORMED STEEL, WITH CORROSION–RESISTANT COATING ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.

B. METAL ITEMS FOR USE OUTDOORS, IN DAMP LOCATIONS, OR IN CORROSIVE ENVIRONMENTS: HOT–DIP GALVANIZED STEEL, OR STAINLESS STEEL.

C. SLOTTED–STEEL CHANNEL SUPPORTS: FLANGE EDGES TURNED TOWARD WEB, AND 9/16–INCH–DIAMETER SLOTTED HOLES AT A MAXIMUM OF 2 INCHES O.C., IN WEBS.

1. CHANNEL THICKNESS: SELECTED TO SUIT STRUCTURAL LOADING.

2. FITTINGS AND ACCESSORIES: PRODUCTS OF THE SAME MANUFACTURER AS CHANNEL SUPPORTS.

D. RACEWAY AND CABLE SUPPORTS: MANUFACTURED CLEVIS HANGERS, RISER CLAMPS, STRAPS, THREADED C–CLAMPS WITH RETAINERS, CEILING TRAPEZE HANGERS, WALL BRACKETS, AND SPRING–STEEL OR CLICK–TYPE HANGERS.

E. EXPANSION ANCHORS: CARBON–STEEL WEDGE OR SLEEVE TYPE.

F. TOGGLE BOLTS: ALL–STEEL SPRINGHEAD TYPE.

G. POWDER–DRIVEN THREADED STUDS: HEAT–TREATED STEEL.

H. ELECTRICAL EQUIPMENT INSTALLATION:

1. HEADROOM MAINTENANCE: IF MOUNTING HEIGHTS OR OTHER LOCATION CRITERIA ARE NOT INDICATED, ARRANGE AND INSTALL COMPONENTS AND EQUIPMENT TO PROVIDE THE MAXIMUM POSSIBLE HEADROOM.

2. MATERIALS AND COMPONENTS: INSTALL LEVEL, PLUMB, AND PARALLEL AND PERPENDICULAR TO OTHER BUILDING SYSTEMS AND COMPONENTS, UNLESS OTHERWISE INDICATED.

3. EQUIPMENT: INSTALL TO FACILITATE SERVICE, MAINTENANCE, AND REPAIR OR REPLACEMENT OF COMPONENTS. CONNECT FOR EASE OF DISCONNECTING, WITH MINIMUM INTERFERENCE WITH OTHER INSTALLATIONS.

4. RIGHT OF WAY: GIVE TO RACEWAYS AND PIPING SYSTEMS INSTALLED AT A REQUIRED SLOPE.

I. ELECTRICAL SUPPORTING DEVICE APPLICATION:

1. DAMP LOCATIONS AND OUTDOORS: HOT–DIP GALVANIZED MATERIALS, STAINLESS STEEL MATERIALS, OR NONMETALLIC, U–CHANNEL SYSTEM COMPONENTS.

2. DRY LOCATIONS: STEEL MATERIALS.

3. SELECTION OF SUPPORTS: COMPLY WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.

4. STRENGTH OF SUPPORTS: ADEQUATE TO CARRY PRESENT AND FUTURE LOADS, TIME A SAFETY FACTOR OF AT LEAST FOUR; MINIMUM OF 200–LB DESIGN LOAD.

J. SUPPORT INSTALLATION:

1. INSTALL SUPPORT DEVICES TO SECURELY AND PERMANENTLY FASTEN AND SUPPORT ELECTRICAL COMPONENTS.

2. INSTALL INDIVIDUAL AND MULTIPLE RACEWAY HANGERS AND RISER CLAMPS TO SUPPORT RACEWAYS. PROVIDE U–BOLTS, CLAMPS, ATTACHMENTS, AND OTHER HARDWARE NECESSARY FOR HANGER ASSEMBLIES AND FOR SECURING HANGER RODS AND CONDUITS.

3. SUPPORT PARALLEL RUNS OF HORIZONTAL RACEWAYS TOGETHER ON TRAPEZE– OR BRACKET–TYPE HANGERS.

4. SIZE SUPPORTS FOR MULTIPLE RACEWAY INSTALLATIONS SO CAPACITY CAN BE INCREASED BY A 25 PERCENT MINIMUM IN THE FUTURE.

5. SUPPORT INDIVIDUAL HORIZONTAL RACEWAYS SEPARATE, MALLEABLE–IRON PIPE HANGERS OR CLAMPS.

6. INSTALL ¼–INCH DIAMETER OR LARGER THREADED STEEL HANGER RODS, UNLESS OTHERWISE INDICATED.

7. SEPARATELY SUPPORT CAST BOXES THAT ARE THREADED TO RACEWAYS AND USED FOR FIXTURE SUPPORT. SUPPORT SHEET–METAL BOXES DIRECTLY FROM THE BUILDING STRUCTURE OR BY BAR HANGERS.

8. INSTALL METAL CHANNEL RACKS FOR MOUNTING CABINETS, PANELBOARDS, DISCONNECT SWITCHES, CONTROL ENCLOSURES, PULL AND JUNCTION BOXES, TRANSFORMERS, AND OTHER DEVICES, UNLESS COMPONENTS ARE MOUNTED DIRECTLY TO STRUCTURAL ELEMENTS OF ADEQUATE STRENGTH.

9. SECURELY FASTEN ELECTRICAL ITEMS AND THEIR SUPPORTS TO THE BUILDING STRUCTURE, UNLESS OTHERWISE INDICATED. PERFORM FASTENING ACCORDING TO THE FOLLOWING UNLESS OTHER FASTENING METHODS ARE INDICATED:

a. WOOD: FASTEN WITH WOOD SCREWS OR SCREW–TYPE NAILS.

b. MASONRY: TOGGLE BOLTS ON HOLLOW MASONRY UNITS AND EXPANSION BOLTS ON SOLID MASONRY UNITS.

c. EXISTING CONCRETE: EXPANSION BOLTS.

d. INSTEAD OF EXPANSION BOLTS, THREADED STUDS DRIVEN BY A POWDER CHARGE AND PROVIDED WITH LOCK WASHERS MAY BE USED IN EXISTING CONCRETE.

e. STEEL: WELDED THREADED STUDS OR SPRING–TENSION CLAMPS ON STEEL. FIELD WELDING: COMPLY WITH AWS D1.1. WELDING TO STEEL STRUCTURE MAY BE USED ONLY FOR THREADED STUDS, NOT FOR CONDUITS, PIPE STRAPS, OR OTHER ITEMS. LIGHT STEEL: SHEET–METAL SCREWS. FASTENERS: SELECT SO THE LOAD APPLIED TO EACH FASTENER DOES NOT EXCEED 25 PERCENT OF ITS PROOF–TEST LOAD.

1.2 IDENTIFICATION

A. IDENTIFICATION DEVICES: A SINGLE TYPE OF IDENTIFICATION PRODUCT FOR EACH APPLICATION CATEGORY. USE COLORS PRESCRIBED BY ANSI A13.1, NFPA 70, AND THESE SPECIFICATIONS.

B. TAPE MARKERS FOR WIRE: VINYL OR VINYL–CLOTH, SELF–ADHESIVE, WRAPAROUND TYPE WITH PREPRINTED NUMBERS AND LETTERS.

C. COLOR–CODING CABLE TIES: TYPE 6/6 NYLON, SELF–LOCKING TYPE. COLORS TO SUIT CODING SCHEME.

D. ENGRAVED–PLASTIC LABELS, SIGNS, AND INSTRUCTION PLATES: ENGRAVING STOCK, MELAMINE PLASTIC LAMINATE PUNCHED OR DRILLED FOR MECHANICAL FASTENERS 1/16–INCH MINIMUM THICKNESS FOR SIGNS UP TO 20 SQ.IN. AND 1/8–INCH MINIMUM THICKNESS FOR LARGER SIZES. ENGRAVED LEGEND IN WHITE LETTERS ON BLACK BACKGROUND.

E. FASTENERS FOR NAMEPLATES AND SIGNS: SELF–TAPPING, STAINLESS–STEEL SCREWS OR NO. 10/32 STAINLESS–STEEL MACHINE SCREWS WITH NUTS AND FLAT AND LOCK WASHERS.

F. INSTALLATION:

1. INSTALL AT LOCATIONS FOR MOST CONVENIENT VIEWING WITHOUT INTERFERENCE WITH OPERATION AND MAINTENANCE OF EQUIPMENT.

2. COORDINATE NAMES, ABBREVIATIONS, COLORS, AND OTHER DESIGNATIONS USED FOR ELECTRICAL IDENTIFICATION WITH CORRESPONDING DESIGNATIONS INDICATED IN THE CONTRACT DOCUMENTS OR REQUIRED BY CODES AND STANDARDS. USE CONSISTENT DESIGNATIONS THROUGHOUT PROJECT.

3. SELF–ADHESIVE IDENTIFICATION PRODUCTS: CLEAN SURFACES BEFORE APPLYING.

4. COLOR–CODE 208/120–V SYSTEM SECONDARY SERVICE, FEEDER, AND BRANCH–CIRCUIT CONDUCTORS THROUGHOUT THE SECONDARY ELECTRICAL SYSTEM AS FOLLOWS:

a. PHASE A: BLACK

b. PHASE B: RED

c. PHASE C: BLUE

5. COLOR–CODE 480/277–V SYSTEM SECONDARY SERVICE, FEEDER, AND BRANCH–CIRCUIT CONDUCTORS THROUGHOUT THE SECONDARY ELECTRICAL SYSTEM AS FOLLOWS:

a. PHASE A: BROWN

b. PHASE B: ORANGE

c. PHASE C: YELLOW

1.3 DEMOLITION

A. PROTECT EXISTING ELECTRICAL EQUIPMENT AND INSTALLATIONS INDICATED TO REMAIN. IF DAMAGED OR DISTURBED IN THE COURSE OF THE WORK, REMOVE DAMAGED PORTIONS AND INSTALL NEW PRODUCTS OF EQUAL CAPACITY, QUALITY, AND FUNCTIONALITY.

B. ACCESSIBLE WORK: REMOVE EXPOSED ELECTRICAL EQUIPMENT AND INSTALLATIONS, INDICATED TO BE DEMOLISHED, IN THEIR ENTIRETY.

C. ABANDONED WORK: CUT AND REMOVE BURIED RACEWAY AND WIRING, INDICATED TO BE ABANDONED IN PLACE, 2 INCHES BELOW THE SURFACE OF ADJACENT CONSTRUCTION. CAP RACEWAYS AND PATCH SURFACE TO MATCH EXITING FINISH.

D. REMOVE DEMOLISHED MATERIAL FROM PROJECT SITE.

E. REMOVE, STORE, CLEAN, REINSTALL, RECONNECT, AND MAKE OPERATIONAL COMPONENTS INDICTED FOR RELOCATION.

1.4 CUTTING AND PATCHING

A. CUT, CHANNEL, CHASE, AND DRILL FLOORS, WALLS, PARTITIONS, CEILINGS, AND OTHER SURFACES REQUIRED TO PERMIT ELECTRICAL INSTALLATIONS. PERFORM CUTTING BY SKILLED MECHANICS OF TRADES INVOLVED.

B. REPAIR AND REFINISH DISTURBED FINISH MATERIALS AND OTHER SURFACES TO MATCH ADJACENT UNDISTURBED SURFACES. INSTALL NEW FIREPROOFING WHERE EXISTING FIRESTOPPING HAS BEEN DISTURBED. REPAIR AND REFINISH MATERIALS AND OTHER SURFACES BY SKILLED MECHANICS OF TRADES INVOLVED.

1.5 TOUCHUP PAINT

A. FOR EQUIPMENT: EQUIPMENT MANUFACTURER'S PAINT SELECTED TO MATCH INSTALLED EQUIPMENT FINISH.

B. GALVANIZED SURFACES: ZINC–RICH PAINT RECOMMENDED BY ITEM MANUFACTURER.

## GROUNDING

1.1 GROUNDING CONDUCTORS

A. MATERIAL: COPPER, ONLY.

B. EQUIPMENT GROUNDING CONDUCTORS: INSULATED WITH GREEN–COLORED INSULATION.

C. BARE COPPER CONDUCTORS: COMPLY WITH THE FOLLOWING:

1. SOLID CONDUCTORS: ASTM B 3.

2. ASSEMBLY OF STRANDED CONDUCTORS: ASTM B 8.

3. TINNED CONDUCTORS: ASTM B 33.

D. COPPER BONDING CONDUCTORS: AS FOLLOWS:

1. BONDING CABLE: 28 KCMIL, 14 STRANDS OF NO. 17 AWG COPPER CONDUCTOR, ¼ INCH IN DIAMETER.

2. BONDING CONTUCTOR: NO.4 OR NO.6 AWG, STRANDED COPPER CONDUCTOR.

3. BONDING JUMPER: BARE COPPER TAPE, BRAIDED BARE COPPER CONDUCTORS, TERMINATED WITH COPPER FERRULES; 1–5/8 INCHES WIDE AND 1/6 INCH THICK.

4. TINNED BONDING JUMPER: TINNED–COPPER TAPE, BRAIDED COPPER CONDUCTORS, TERMINATED WITH COPPER FERRULES; 1–5/8 INCH WIDE AND 1/16 INCH THICK.



102.72
STATE OF ALASKA
REGISTERED PROFESSIONAL ENGINEER
4 JAN 2016

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City & Borough of Juneau
Bartlett Regional Hospital
OR Surgery Ventilation System Upgrades
JUNEAU, ALASKA

SHEET TITLE:
SPECIFICATIONS

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|---|---|
| SCALE: | AS SHOWN: |
| DATE: | 1/4/2016 |
| DRAWN: | REJ |
| DESIGNED: | BCH |
| CHECKED: | BCH |

SHEET NO.
E9.1
JOB NO. 15–117

1.2 CONNECTOR PRODUCTS

A. COMPLY WITH IEEE 837 AND UL 467; LISTED FOR USE FOR SPECIFIC TYPES, SIZES, AND COMBINATIONS OF CONDUCTORS AND CONNECTED ITEMS.

B. BOLTED CONNECTORS: BOLTED–PRESSURE–TYPE CONNECTORS, OR COMPRESSION TYPE.

C. CRIMPED CONNECTORS: HIGH COMPRESSION TYPE, IN KIT FORM, AND SELECTED PER MANUFACTURER'S WRITTEN INSTRUCTIONS.

1.3 INSTALLATION

A. IN RACEWAYS, USE INSULATED EQUIPMENT GROUNDING CONDUCTORS.

B. EQUIPMENT GROUNDING CONDUCTOR TERMINATIONS: USE BOLTED PRESSURE CLAMPS.

C. BOND INTERIOR METAL PIPING SYSTEMS AND METAL AIR DUCTS TO EQUIPMENT GROUNDING CONDUCTORS OF ASSOCIATED PUMPS, FANS, BLOWERS, ELECTRIC HEATERS, AND AIR CLEANERS. USE BRAIDED–TYPE BONDING STRAPS.

## CONDUCTORS AND CABLES

1.1 CONDUCTOR AND CABLE MATERIAL

A. COPPER COMPLYING WITH NEMA WC 5 OR 7; STRANDED FOR NO. 8 AWG AND LARGER.

B. INSULATION TYPES: TYPE THW, THHN–THWN, XHHW, USE, AND SO COMPLYING WITH NEMA WC 5 OR 7.

1.2 CONDUCTOR AND INSULATION APPLICATIONS

A. EXPOSED BRANCH CIRCUITS: TYPE THW, THHN–THWN, OR XHHW, SINGLE CONDUCTORS IN RACEWAY.

B. CLASS 1 CONTROL CIRCUITS: TYPE THW, THHE–THWN, OR XHHW, SINGLE CONDUCTORS IN RACEWAY.

C. CLASS 2 CONTROL CIRCUITS: TYPE THW, THHN–THWN, OR XHHW, SINGLE CONDUCTORS IN RACEWAY.

D. COORDINATE CONDUCTOR INSULATION TEMPERATURE RATING AND AMPACITY RATING WITH THE TEMPERATURE AND AMPACITY RATING OF THEIR CIRCUIT PROTECTION DEVICES.

E. TIGHTEN ELECTRICAL CONNECTORS AND TERMINALS ACCORDING TO MANUFACTURER'S PUBLISHED TORQUE–TIGHTENING VALUES. IF MANUFACTURER'S TORQUE VALUES ARE NOT INDICATED, USE THOSE SPECIFIED IN UL 486A AND UL 486B.

F. MAKE SPLICES AND TAPS THAT ARE COMPATIBLE WITH CONDUCTOR MATERIAL AND THAT POSSESS EQUIVALENT OR BETTER MECHANICAL STRENGTH AND INSULATION RATINGS THAN UNSPLICED CONDUCTORS.

1. USE OXIDE INHIBITOR IN EACH SPLICE AND TAP CONDUCTOR FOR ALL CONDUCTORS LOCATED IN MOIST OR CORROSIVE ENVIRONMENTS.

## RACEWAYS

1.1 CONDUIT AND TUBING

A. RIGID STEEL CONDUIT: ANSI C80.1

B. IMC: ANSI C80.6

C. EMT AND FITTINGS: ANSI C80.3

1. FITTINGS: SET–SCREW OR COMPRESSION TYPE.

D. FMC: ZINC–COATED STEEL.

E. LFMC: FLEXIBLE STEEL CONDUIT WITH PVC JACKET, FEDERAL SPECIFICATION W–C–566C.

F. FITTINGS: NEMA FB 1; COMPATIBLE WITH CONDUIT AND TUBING MATERIALS.

G. LFNC: UL 1660, FEDERAL SPECIFICATION WW–C–566C, AND ANSI/NFPA 79. THE CONDUIT, INCLUDING FITTINGS SHALL REMAIN FLEXIBLE TO 0 DEGREES FAHRENHEIT, OR LOWER.

1. TYPE B: PROVIDE LFNC WITH A POLYVINYL CHLORIDE (PVC) SPIRAL COMPLETELY SURROUNDED BY FLEXIBLE PVC, SUITABLE FOR A WET OR DRY ENVIRONMENT. THIS CONDUIT SHALL BE LISTED FOR 600 VOLT USE, OUTDOOR USE, AND CLASS I, DIV. 2, CLASS 11, DIV. 1, & CLASS 111, DIV. 1 LOCATIONS. THE OUTER COVERING SHALL BE RESISTANT TO OIL PRODUCTS, MILD ACIDS, AND SUNLIGHT.

1.2 WIREWAYS:

A. SHEET METAL SIZED AND SHAPED AS INDICATED, NEMA 1; SCREW–COVER TYPE. INCLUDE COUPLINGS, OFFSETS, ELBOWS, EXPANSION JOINTS, ADAPTERS, HOLD–DOWN STRAPS, END CAPS, AND OTHER FITTINGS TO MATCH AND MATE WITH WIREWAYS AS REQUIRED FOR COMPLETE SYSTEM.

1.3 INSTALLATION

A. OUTDOORS:

1. EXPOSED: RIGID STEEL OR IMC.

2. CONNECTION TO VIBRATING EQUIPMENT (INCLUDING TRANSFORMERS AND HYDRAULIC, PNEUMATIC, ELECTRIC SOLENOID, OR MOTOR–DRIVEN EQUIPMENT): LFNC.

3. BOXES AND ENCLOSURES: NEMA 250, TYPE 3R OR 4.

B. INDOORS:

1. EXPOSED: EMT.

2. CONNECTION TO VIBRATING EQUIPMENT (INCLUDING TRANSFORMERS AND HYDRAULIC, PNEUMATIC, ELECTRIC SOLENOID, OR MOTOR–DRIVEN EQUIPMENT): FMC.

3. BOXES AND ENCLOSURES: NEMA 250, TYPE 1.

C. MINIMUM RACEWAY SIZE: ½–INCH TRADE SIZE.

D. RACEWAY FITTINGS: COMPATIBLE WITH RACEWAYS AND SUITABLE FOR USE AND LOCATION.

1. RIGID AND INTERMEDIATE STEEL CONDUIT: USE THREADED RIGID STEEL CONDUIT FITTINGS, UNLESS OTHERWISE INDICATED.

E. INSTALL EXPOSED RACEWAYS, AND RACEWAYS WITHIN ACCESSIBLE SPACES, PARALLEL OR AT RIGHT ANGLES TO NEARBY SURFACES OR STRUCTURAL MEMBERS AND FOLLOW SURFACE CONTOURS AS MUCH AS POSSIBLE.

1. RUN PARALLEL OR BANKED RACEWAYS TOGETHER ON COMMON SUPPORTS.

2. MAKE PARALLEL BENDS IN PARALLEL OR BANKED RUNS. USE FACTORY ELBOWS ONLY WHERE ELBOWS CAN BE INSTALLED PARALLEL; OTHERWISE, PROVIDE FIELD BENDS FOR PARALLEL RACEWAYS.

F. JOIN RACEWAYS WITH FITTINGS DESIGNED AND APPROVED FOR THAT PURPOSE AND MAKE JOINTS TIGHT.

1. USE INSULATING BUSHINGS TO PROTECT CONDUCTORS.

G. TIGHTEN SET SCREWS OF THREADLESS FITTINGS WITH SUITABLE TOOLS.

H. TERMINATIONS:

1. WHERE RACEWAYS ARE TERMINATED WITH LOCKNUTS AND BUSHINGS, ALIGN RACEWAYS TO ENTER SQUARELY AND INSTALL LOCKNUTS WITH DISHED PART AGAINST BOX. USE TWO LOCKNUTS, ONE INSIDE AND ONE OUTSIDE BOX.

2. WHERE RACEWAYS ARE TERMINATED WITH THREADED HUBS, SCREW RACEWAYS OR FITTINGS TIGHTLY INTO HUB SO END BEARS AGAINST WIRE PROTECTION SHOULDER. WHERE CHASE NIPPLES ARE USED, ALIGN RACEWAYS SO COUPLING IS SQUARE TO BOX; TIGHTEN CHASE NIPPLE SO NO THREADS ARE EXPOSED.

I. FLEXIBLE CONNECTIONS: USE MAXIMUM OF 36 INCHES OF FLEXIBLE CONDUIT FOR EQUIPMENT SUBJECT TO VIBRATION, NOISE TRANSMISSION, OR MOVEMENT; AND FOR ALL MOTORS. INSTALL SEPARATE GROUND CONDUCTOR ACROSS FLEXIBLE CONNECTIONS.

## BOXES, ENCLOSURES, AND CABINETS

1.1 SHEET METAL OUTLET AND DEVICE BOXES: NEMA OS 1.
1.2 CAST–METAL OUTLET AND DEVICE BOXES: NEMA FB 1, TYPE FD, WITH GASKETED COVER.
1.3 SMALL SHEET METAL PULL AND JUNCTION BOXES: NEMA OS 1.
1.4 HINGED–COVER ENCLOSURES: NEMA 250, TYPE 1, WITH CONTINUOUS HINGE COVER AND FLUSH LATCH.

A. METAL ENCLOSURES: STEEL, FINISHED INSIDE AND OUT WITH MANUFACTURER'S STANDARD ENAMEL.



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City & Borough of Juneau
Bartlett Regional Hospital
OR Surgery Ventilation System Upgrades
JUNEAU, ALASKA

SHEET TITLE:
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| SCALE: | AS SHOWN: |
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