

# DAVIS APPLIED TECHNOLOGY COLLEGE

## Medical / Health Technology Building Chiller Replacement

550 East 300 South Kaysville, Utah 84037



Original drawings remain the property of the Engineer and as such the Engineer retains total ownership and control. The design represented by these drawings are sold to the client for a one time use, unless otherwise agreed upon in writing by the Engineer.  
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**DAVIS APPLIED TECHNOLOGY COLLEGE**  
Medical / Health Technology Building  
Chiller Replacement  
550 East 300 South  
Kaysville, Utah 84037-2699

REVISIONS

| NO. | DATE | DESCRIPTION |
|-----|------|-------------|
|     |      |             |

SHEET CONTENTS  
**COVER SHEET**

**C0.0**

### CODE ANALYSIS

| APPLICABLE CODES                       |      |  |      |
|--|------|--|------|
|  | Year |  | Year |
| International Building Code            | 2008 | National Electrical Code               | 2008 |
| International Mechanical Code          | 2008 | Uniform Code for Building Conservation | N/A  |
| International Plumbing Code            | 2008 | ADA Accessibility Guidelines           |      |
| International Fire Code                | 2008 |  |      |
| International Energy Conservation Code | 2009 |  |      |

- A. Occupancy and Group: B
- Change in Use: Yes  No  Mixed Occupancy: Yes  No   
Special Use and Occupancy (e.g. High Rise, Covered Mall): N/A
- B. Seismic Design Category: N/A Design Wind Speed: N/A mph
- C. Type of Construction (circle one):  
 I/A    I/B    II/A    II/B    III/A    III/B    IV/HT    V/A    V/B
- D. Fire Resistance Rating Requirements for the Exterior Walls based on the fire separation distance (in hours):  
North: NR South: NR East: NR West: NR
- E. Mixed Occupancies: NO Nonseparated Uses: NO
- F. Sprinklers:  
Required: NO Provided: NO Type of Sprinkler System: N/A
- G. Number of Stories: 4 Building Height: 62' 0"
- H. Actual Area per Floor (square feet): 46325
- I. Tabular Area: UL
- J. Area Modifications:  
 a)  $A_a = A_1 + \left[ \frac{A_1 I_1}{100} \right] + \left[ \frac{A_1 I_2}{100} \right]$     $I_1 = 100 \left[ \frac{F}{P} - 0.25 \right] \frac{W}{30}$
- b) Sum of the Ratio Calculations for Mixed Occupancies:  
 $\frac{\text{Actual Area}}{\text{Allowable Area}} \leq 1$
- c) Total Allowable Area for:  
 1) One Story:           
 2) Two Story:  $A_a(2)$   
 3) Three Story:  $A_a(3)$
- d) Unlimited Area Building: Yes  No  Code Section:
- K. Fire Resistance Rating Requirements for Building Elements (hours)
- | Element                    | Hours | Assembly Listing | Element                    | Hours | Assembly Listing |
|----------------------------|-------|------------------|----------------------------|-------|------------------|
| Exterior Bearing Walls     | N     |                  | Floors - Ceiling Floors    | N     |                  |
| Interior Bearing Walls     | N     |                  | Roofs - Ceiling Roofs      | N     |                  |
| Exterior Non-Bearing Walls | N     |                  | Exterior Doors and Windows | NR    |                  |
| Structural Frame           | N     |                  | Shaft Enclosures           | 1 HR  |                  |
| Partitions - Permanent     | N     |                  | Fire Walls                 |       |                  |
| Fire Barriers              |       |                  | Fire Partitions            |       |                  |
|                            |       |                  | Smoke Partitions           |       |                  |
- L. Design Occupant Load:           
Exit Width Required: N/A Exit Width Provided: N/A
- M. Minimum Number of Required Plumbing Facilities:  
 a) Water Closets - Required (m)          (f)          Provided (m)          (f)           
 b) Lavatories - Required (m)          (f)          Provided (m)          (f)           
 c) Bath Tubs or Showers:           
 d) Drinking Fountains:          Service Sinks:

- FOOTNOTES:
- In case of conflict with the U.S. Department of Justice Federal Registers Parts I through V - ADA Guidelines and specific reference to the International Building Code Accessibility Chapters, the more restrictive requirement shall govern.
  - Additional Code Information shall be provided at the discretion of the Building Official for Complex Buildings. Including, but not limited to:
    - High Rise Requirements.
    - Atriums.
    - Performance Based Criteria.
    - Means or Egress Analysis.
    - Fire Assembly Locator Sheet.
    - Exterior and Interior Accessibility Route.
    - Fire Stopping, Including Tested Design Number.
  - Deferred Submittals:
    - Seismic Bracing.

### SHEET INDEX

- C0.0 COVER SHEET
- M0.0 MECHANICAL SYMBOLS AND ABBREVIATIONS
- M1.1 LARGE SCALE MECHANICAL/CHILLER ROOM PLAN
- M5.1 MECHANICAL DETAILS AND SCHEDULES
- M7.1 MECHANICAL SCHEMATIC
- E1.1 LARGE SCALE MECHANICAL/CHILLER ROOM ELECTRICAL PLAN

### CONSULTANTS

PROJECT ENGINEER: VAN BOERUM & FRANK ASSOCIATES, INC.  
330 SOUTH 300 EAST  
SALT LAKE CITY, UT 84111  
(801) 530-3148 (Steve Shepherd)

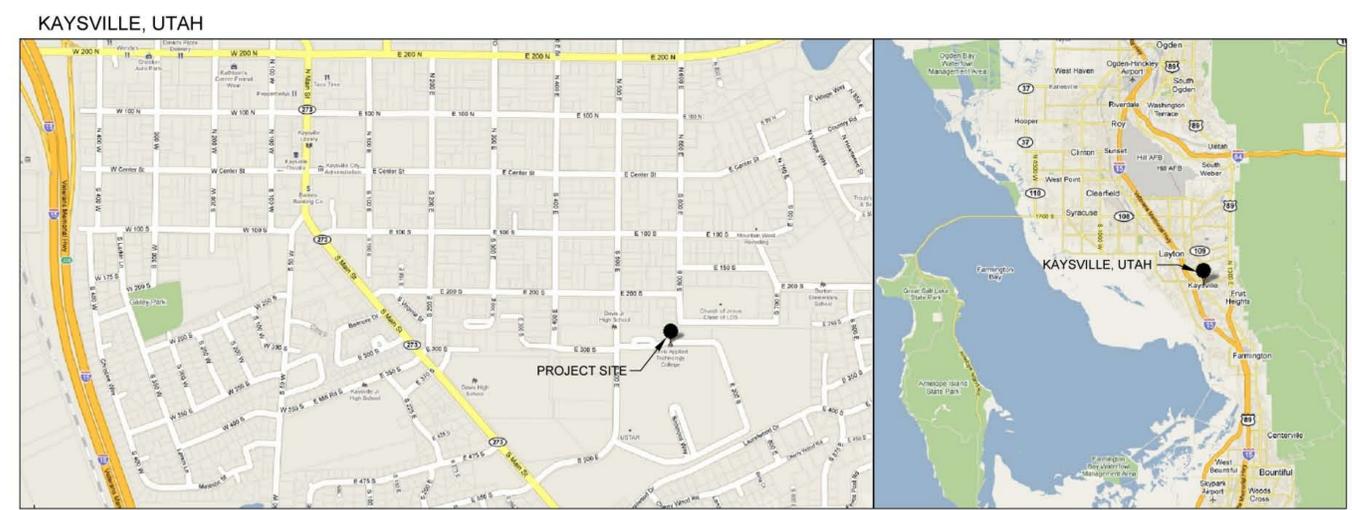
ELECTRICAL ENGINEER: VAN BOERUM & FRANK ASSOCIATES, INC.  
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## DFCM Project No. 10187220

## Property No. 02062

# CONSTRUCTION DRAWINGS



Vicinity Map

# LEGEND OF MECHANICAL SYMBOLS AND ABBREVIATIONS

## MECHANICAL

|  |   |
|--|---|
|  | POSITIVE PRESSURE DUCT - RISE   |
|  | POSITIVE PRESSURE DUCT - DROP   |
|  | NEGATIVE PRESSURE DUCT - RISE   |
|  | NEGATIVE PRESSURE DUCT - DROP   |
|  | ROUND DUCT - RISE   |
|  | ROUND DUCT - DROP   |
|  | UNDER FLOOR DUCT  |
|  | TURNING VANES   |
|  | FRESH AIR LOUVER  |
|  | RELIEF AIR OR EXHAUST AIR LOUVER  |
|  | CEILING SUPPLY DIFFUSER   |
|  | CEILING RETURN REGISTER   |
|  | CEILING EXHAUST REGISTER, (BALANCE TO MATCH SUPPLY IF RETURN CFM IS NOT SHOWN)  |
|  | SIDEWALL SUPPLY REGISTER  |
|  | SIDEWALL EXHAUST OR RETURN REGISTER   |
|  | CEILING SUPPLY DIFFUSER WITH FLEXIBLE DUCT  |
|  | CEILING AIR GRILLE WITH FLEXIBLE DUCT   |
|  | CEILING RETURN AIR GRILE W/ SOUND BOOT  |
|  | LINEAR DIFFUSER WITH PLENUM AND FLEXIBLE DUCT CONNECTION, NO. OF SLOTS & SIZE OF SLOT ON TOP, ACTIVE LENGTH AND CFM ON BOTTOM |
|  | FLEXIBLE DUCT CONNECTION  |
|  | FLEXIBLE DUCT   |
|  | FAN   |
|  | FLAT OVAL DUCT WITH NET INSIDE DIMENSIONS SHOWN IN INCHES.  |
|  | RECTANGULAR DUCT WITH NET INSIDE DIMENSIONS SHOWN IN INCHES.  |
|  | ROUND DUCT WITH NET INSIDE DIMENSIONS SHOWN IN INCHES.  |
|  | INCLINED RISE   |
|  | INCLINED DROP   |
|  | R/W=1. ROUND DUCT SIMILAR TO RECTANGULAR  |
|  | RECTANGULAR TO RECTANGULAR OR ROUND TO ROUND DUCT TRANSFORMATION MAXIMUM 15° INCLUDED ANGLE EXCEPT WHERE SHOWN OTHERWISE.     |
|  | RECTANGULAR TO ROUND DUCT TRANSFORMATION  |
|  | BRANCH DUCT SPLIT WITH 6" WIDTH AND MIN. ELBOW TURNING VANE OPTIONAL.   |
|  | TAP ENTRY AREA EQUALS 150% OF BRANCH AREA   |
|  | HIGH EFFICIENCY FITTING   |
|  | MANUAL VOLUME DAMPER  |
|  | FIRE DAMPER IN DUCT, W/ ACCESS PANEL REQD.  |
|  | COMBINATION FIRE/SMOKE DAMPER W/ ACCESS PANEL   |
|  | SMOKE DAMPER W/ ACCESS PANEL  |
|  | BACK DRAFT DAMPER   |
|  | ATC DAMPER  |
|  | ACCESS PANEL IN DUCT OR PLENUM  |
|  | HEATING OR COOLING COIL IN DUCT   |
|  | SINGLE DUCT AIR TERMINAL BOX VARIABLE OR CONSTANT VOLUME, MIN. 1-1/2" TERMINAL INLET SIZE STRAIGHT DUCT AT TERMINAL INLET.    |
|  | 4-WAY BLOW PATTERN  |
|  | 3-WAY BLOW PATTERN  |
|  | 2-WAY BLOW PATTERN  |
|  | 2-WAY BLOW PATTERN  |
|  | 1-WAY BLOW PATTERN  |
|  | DUCT SMOKE DETECTOR   |
|  | UNIT HEATER   |

TOP FIGURES INDICATE NECK SIZE. BOTTOM FIGURE INDICATES CFM.

## PLUMBING

|  |   |
|--|---|
|  | FLOOR SINK  |
|  | FLOOR DRAIN   |
|  | FLOOR CLEAN-OUT OR CLEAN-OUT TO GRADE   |
|  | ROOF DRAIN  |
|  | DOWNSPOUT NOZZLE  |
|  | ARROW INDICATES DIRECTION OF FLOW IN PIPE   |
|  | CHECK VALVE   |
|  | PRESSURE REDUCING, EXTERNAL PRESSURE VALVE  |
|  | PRESSURE REDUCING, SELF CONTAINED VALVE   |
|  | ATC VALVE - 2 WAY   |
|  | ATC VALVE - 3 WAY   |
|  | SOLENOID VALVE  |
|  | GATE VALVE  |
|  | GATE VALVE - NON RISING STEM  |
|  | GLOBE VALVE   |
|  | TEMPERATURE AND PRESSURE TEST PORT  |
|  | PRESSURE SWITCH   |
|  | GAS COCK  |
|  | CALIBRATED BALANCING VALVE WITH GPM INDICATED   |
|  | REDUCED PRESSURE BACKFLOW PREVENTER W/ DRAIN PAN  |
|  | BRANCH - BOTTOM CONNECTION  |
|  | BRANCH - TOP CONNECTION   |
|  | BRANCH - SIDE CONNECTION  |
|  | RISE OR DROP  |
|  | RISE - DOWN (ELBOW)   |
|  | RISE - DOWN (ELBOW)   |
|  | VENT THRU ROOF  |
|  | WATER HAMMER ARRESTOR   |
|  | INLINE PUMP   |
|  | INLINE PUMP   |
|  | CLEAN-OUT   |
|  | RELIEF VALVE  |
|  | ANGLE VALVE   |
|  | FLOW METER  |
|  | UNION   |
|  | BALANCING COCK  |
|  | SHUT-OFF COCK FOR USE WITH PRESSURE GAUGE   |
|  | FLEXIBLE EXPANSION JOINT  |
|  | THERMOMETER - TEMP RANGE AS INDICATED   |
|  | PRESSURE GAUGE WITH SHUT-OFF COCK   |
|  | PRESSURE GAUGE WITH PIGTAIL   |
|  | LATERAL STRAINER WITH BLOW-OFF VALVE, PROVIDE HOSE END WITH CAP WHERE DISCHARGE IS NOT PIPED TO DRAIN |
|  | BALL VALVE (PIPE SIZES 2" AND SMALLER)  |
|  | BUTTERFLY VALVE (PIPE SIZES 2-1/2" AND LARGER)  |
|  | MOTOR OPERATED BUTTERFLY VALVE  |
|  | VALVE IN RISE   |
|  | AIR VENT-MANUAL   |
|  | AIR VENT-AUTO   |
|  | FLOW SWITCH   |
|  | REDUCER   |
|  | CONCENTRIC REDUCER  |
|  | ECCENTRIC REDUCER   |

## PLUMBING CONT.

|  |                                      |
|--|--------------------------------------|
|  | THERMOSTATIC MIXING VALVE            |
|  | HOSE BIBB                            |
|  | PIPE CAP                             |
|  | SWITCH                               |
|  | SENSOR                               |
|  | THERMOSTAT                           |
|  | NIGHT THERMOSTAT                     |
|  | FILL PORT                            |
|  | DRAIN PAN AND P-TRAP                 |
|  | FIXTURE FROM LEVEL ABOVE             |
|  | FLOW METER ORIFICE                   |
|  | FLANGE                               |
|  | 90° ELBOW                            |
|  | 45° ELBOW                            |
|  | STEAM TRAP, F&T=FLOAT & THERMOSTATIC |
|  | LEADER INDICATES DOWNWARD SLOPE      |
|  | DEMOLITION                           |
|  | ALIGNMENT GUIDE                      |
|  | ANCHOR                               |
|  | LUBRICATED PLUG COCK                 |

## SYMBOLS

|  |   |
|--|---|
|  | PLUMBING FIXTURES   |
|  | POINT OF CONNECTION   |
|  | SECTION TAG - TOP FIGURE IS SECTION NO., BOTTOM FIGURE IS SHEET NO. |
|  | DETAIL TAG - TOP FIGURE IS DETAIL NO., BOTTOM FIGURE IS SHEET NO.   |
|  | EQUIPMENT IDENTIFICATION  |
|  | KEYED NOTE IDENTIFICATION   |

## FIRE

|  |                                 |
|--|---------------------------------|
|  | HOSE VALVE                      |
|  | NRS GATE VALVE WITH SUPERVISION |
|  | FLOW SWITCH                     |
|  | FIRE RISER                      |
|  | SPRINKLER HEAD                  |
|  | FIRE SPRINKLER WATER            |

## LINETYPES

|  |                                      |
|--|--------------------------------------|
|  | ACID VENT                            |
|  | ACID WASTE                           |
|  | BOILER BLOW DOWN                     |
|  | BOILER FEED WATER                    |
|  | BRINE                                |
|  | CARBON DIOXIDE                       |
|  | COMPRESSED AIR                       |
|  | CHEMICAL FEED                        |
|  | CHILLED WATER SUPPLY                 |
|  | CHILLED WATER RETURN                 |
|  | CONDENSER WATER SUPPLY               |
|  | CONDENSER WATER RETURN               |
|  | DOMESTIC COLD WATER (DCW)            |
|  | DOMESTIC HOT WATER (DHW)             |
|  | DOMESTIC HOT WATER RETURN (DHW-R)    |
|  | DEIONIZED WATER SUPPLY               |
|  | DEIONIZED WATER RETURN               |
|  | EXISTING PIPING                      |
|  | EXISTING PIPING TO BE REMOVED        |
|  | GLYCOL HEAT RECOVERY PIPING          |
|  | GLYCOL PIPING SOLUTION               |
|  | FUEL OIL RETURN                      |
|  | FUEL OIL SUPPLY                      |
|  | FUEL OIL VENT                        |
|  | NATURAL GAS                          |
|  | HOT GAS                              |
|  | HELICOPTER FUEL RETURN               |
|  | HELICOPTER FUEL SUPPLY               |
|  | HIGH PRESSURE DOMESTIC WATER         |
|  | HIGH PRESSURE CONDENSATE             |
|  | HIGH PRESSURE STEAM                  |
|  | HEATING HOT WATER RETURN             |
|  | HEATING HOT WATER SUPPLY             |
|  | INSTRUMENT AIR                       |
|  | INSTRUMENT AIR AT PRESSURE INDICATED |
|  | LAB AIR                              |
|  | LAB VACUUM                           |
|  | LOW PRESSURE CONDENSATE              |
|  | LIQUIFIED PETROLEUM GAS              |
|  | LOW PRESSURE STEAM                   |
|  | MEDICAL AIR                          |
|  | MEDICAL AIR AT PRESSURE INDICATED    |
|  | MEDIUM PRESSURE CONDENSATE           |
|  | MEDIUM PRESSURE STEAM                |
|  | MAKE UP WATER                        |
|  | MEDICAL VACUUM                       |
|  | NITROGEN                             |
|  | NITROUS OXIDE                        |
|  | MEDICAL OXYGEN                       |
|  | MEDICAL OXYGEN AT PRESSURE INDICATED |
|  | PUMPED CONDENSATE                    |

## LINETYPES CONT.

|  |                              |
|--|------------------------------|
|  | REVERSE OSMOSIS WATER SUPPLY |
|  | REVERSE OSMOSIS WATER RETURN |
|  | ROOF DRAIN                   |
|  | ROOF DRAIN OVERFLOW          |
|  | REFRIGERANT LIQUID           |
|  | REFRIGERANT SUCTION          |
|  | SEWER (BELOW GRADE)          |
|  | SEWER (ABOVE GRADE)          |
|  | SOFT DOMESTIC WATER (SW)     |
|  | VACUUM                       |
|  | VENT (SEWER)                 |

## MECH. GENERAL NOTES

- DO NOT ROUTE DUCTS AND PIPES ABOVE ELECTRICAL PANELS. ALL ELECTRICAL PANELS MUST HAVE CLEAR ACCESS SPACE IN FRONT OF PANEL 4'-0" DEEP AND 6'-6" HIGH. DO NOT ROUTE DUCTS AND PIPES IN ELECTRICAL ROOMS, EXCEPT DUCTS AND PIPES SERVING THE ROOM.
- IF CONTRACTOR ENCOUNTERS MATERIAL WHICH MAY CONTAIN ASBESTOS IMMEDIATELY STOP WORK IN THIS AREA AND NOTIFY THE OWNER.
- PROVIDE CEILING ACCESS PANELS AS REQUIRED WHERE MECHANICAL EQUIPMENT, VALVES, VAV BOXES, FIRE DAMPERS, ETC. ARE LOCATED ABOVE INACCESSIBLE CEILING.
- STEEL ROOF DECK SHALL NOT BE USED TO SUPPORT LOADS FROM PIPING, DUCTWORK OR EQUIPMENT, UNLESS NOTED OTHERWISE. HANGER LOADS LESS THAN 50 LBS. MAY BE HUNG FROM THE STEEL ROOF DECK IN CASES WHEN HANGING FROM THE STEEL ROOF DECK CANNOT BE AVOIDED; THE ATTACHMENT METHOD MUST DISTRIBUTE THE LOAD ACROSS THE DECK AS APPROVED BY THE STRUCTURAL ENGINEER.



VAN BOERUM & FRANK ASSOCIATES INC. CONSULTING ENGINEERS

330 SOUTH 300 EAST SALT LAKE CITY, UT 84111 801.530.3148 etc 801.530.3150 fax http://www.vbfa.com



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## REVISIONS

|                   |                         |
|-------------------|-------------------------|
| VBFA PROJECT #:   | 10253                   |
| CHECKED BY:       | Sshepherd, Jbeck/Sjohns |
| DRAWN BY:         | Ejarez/Kmcgee           |
| CURRENT/BID DATE: | 07/22/10                |

## SHEET CONTENTS MECHANICAL SYMBOLS AND ABBREVIATIONS

1

2

3

4

5

6

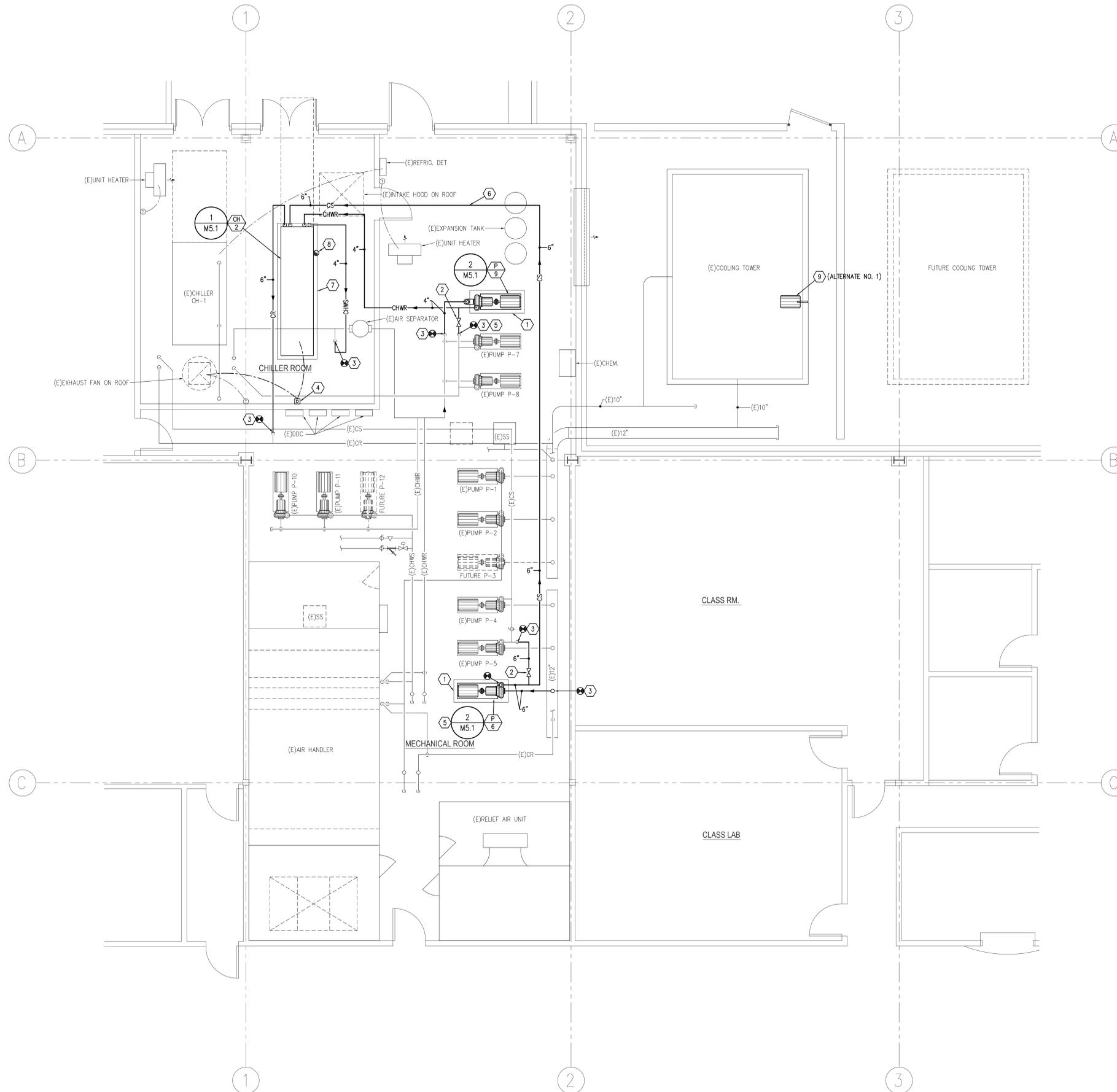
E

D

C

B

A



# KEYED NOTES

1. PROVIDE NEW 4" CONCRETE HOUSEKEEPING PAD.
2. PROVIDE ISOLATION VALVE AND FULL SIZE BYPASS LINE.
3. EXTEND AND CONNECT NEW PIPING TO EXISTING.
4. PROVIDE AND INSTALL NEW REFRIGERANT DETECTION SYSTEM. SEE ATC SPECIFICATIONS.
5. TEST & BALANCE NEW PUMPS TO FLOWS AS SCHEDULED.
6. CHILLED WATER SYSTEM IS FILLED WITH 15% PROPYLENE GLYCOL. DURING CONSTRUCTION CAPTURE ALL GLYCOL. STORE AND RE-FILL SYSTEM. CLEAN AND TREAT NEW PIPING AND FILL SYSTEM TO CAPACITY.
7. PROVIDE NEW 6" CONCRETE HOUSEKEEPING PAD.
8. EXTEND REFRIGERANT VENT LINES THRU ROOF. FLASH AND SEAL PENETRATIONS. SIZE AND INSTALL VENT LINES PER MANUFACTURERS RECOMMENDATIONS.
9. ALTERNATE NO. 1: REPLACE EXISTING TWO-SPEED 25 HP COOLING TOWER FAN MOTOR WITH NEW NEMA PREMIUM, COOLING TOWER RATED, TEFC ENCLOSURE, INVERTER DUTY MOTOR. PROVIDE NEW MOTOR MOUNTS AND ACCESSORIES TO ACCOMMODATE NEW MOTOR. PROVIDE AND INSTALL NEW MOTOR PER MANUFACTURERS (MARLEY) RECOMMENDATIONS. THE MOTOR SUPPORTS SHOULD BE G-235 STEEL OF AN APPROPRIATE THICKNESS THAT IS HOT DIPPED GALVANIZED AFTER FABRICATION FOR CORROSION RESISTANCE. THE HEIGHT SHALL BE DESIGNED SO THE MOTOR AND GEAREDCR SHAFTS ALIGN AND THAT NO MODIFICATION TO THE GEAREDCR IS NEEDED. THE CLOSE COUPLING SHOULD BE DESIGNED SPECIFICALLY FOR COOLING TOWER APPLICATIONS AND HAVE A FLEXIBLE ELEMENT, TIRE TYPE COUPLING AND CAST DUCTILE-IRON. ELECTRO-GALVANIZED HUBS AND CLAMP RINGS. THE HARDWARE IS TO BE STAINLESS STEEL. THIS COUPLING TYPE HAS A SHOCK LOAD CUSHIONING THAT IS IDEAL FOR VFD USE. CONTACT LOCAL REPRESENTATION HOLBROOK & ASSOCIATES INC. (801-308-0128). SEE ELECTRICAL DRAWINGS FOR VFD SPECIFICATIONS.



**VAN BOERUM  
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| REVISIONS |  |
|-----------|--|
|           |  |
|           |  |
|           |  |

VBFA PROJECT #: 10253  
CHECKED BY: SshepherdJbeck/Sjohns  
DRAWN BY: Ejuarez/Kmcgee  
CURRENT/BID DATE: 07/22/10

SHEET CONTENTS  
**LARGE SCALE  
MECH. / CHILLER  
ROOM PLAN**

**M1.1**



A4

**LARGE SCALE MECHANICAL / CHILLER ROOM PLAN**

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





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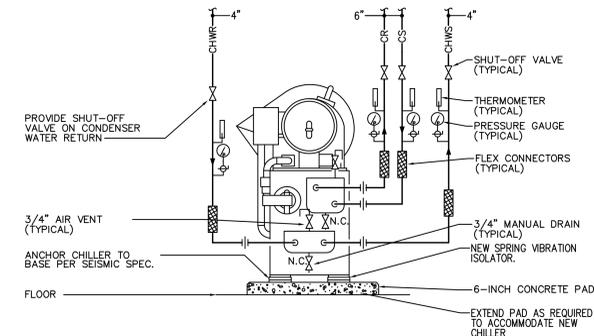
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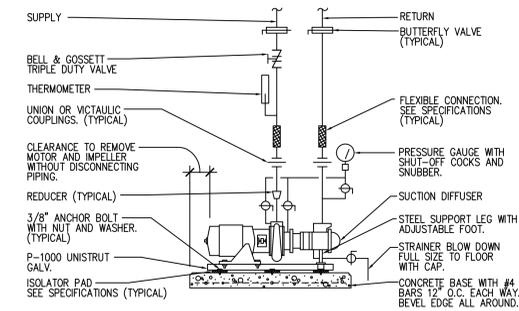
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- NOTE: 1. ARRANGE PIPING TO FACILITATE TUBE SERVICE SPACE. 2. PIPE REFRIGERANT RELIEF TO OUTSIDE, FULL SIZE. 3. PIPE OIL COOLER AS REQUIRED BY MANUFACTURER, TO CHILLED WATER SUPPLY AND RETURN.



1 CHILLER PIPING DETAIL NO SCALE



2 PUMP CONNECTION DETAIL NO SCALE

WATER-COOLED CHILLER SCHEDULE table with columns for ID, Manufacturer, Location, Type, Refrig., Load, Description, Flow Rate, Entering/Leaving Temp., Working Fluid, Head Loss, Electrical (Max, Total), Maximum Input, Chiller and Control, Length/Width/Height, and Notes.

- 1. WATER COOLED CHILLER - TWIN SCREW COMPRESSORS WITH DUAL INDEPENDENT REFRIGERANT CIRCUITS 2. SINGLE PINT POWER CONNECTION 3. UNIT SHALL COME WITH WYE DELTA STARTER AND FACTORY MOUNTED DISCONNECT

PUMP SCHEDULE table with columns for ID, Manufacturer, Model Number, Serves, Type, Flow Rate, Working Fluid, Head Loss, Efficiency, Construction, Motor Size, Motor BHP, Motor Speed, Voltage/Freq, and Notes.

- 1. BASE MOUNTED END SUCTION CENTRIFUGAL PUMP

REVISIONS table with columns for revision number, description, and date.

VBFA PROJECT #: 10253 CHECKED BY: SshepherdJ.beck/Sjohns DRAWN BY: Ejuarez/Kmcgee CURRENT/BID DATE: 07/22/10

SHEET CONTENTS MECHANICAL DETAILS & SCHEDULES



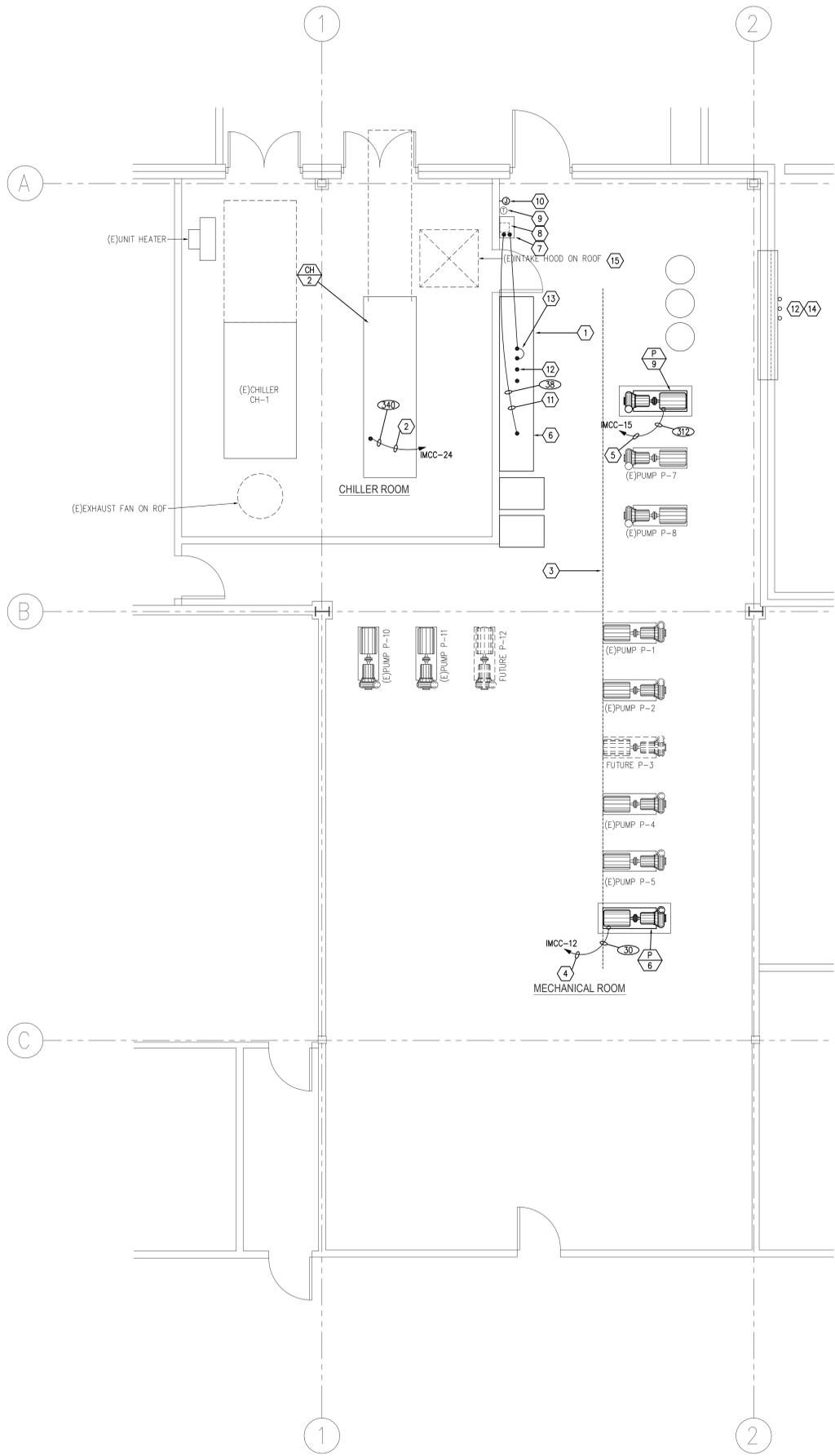
E

D

C

B

A



| MECHANICAL EQUIPMENT SCHEDULE |                 |            |           |    |     |                      |           |       |  |
|-------------------------------|-----------------|------------|-----------|----|-----|----------------------|-----------|-------|--|
| MARK                          | DESCRIPTION     | ELECTRICAL |           |    |     | DISCONNECT SIZE/POLE | FUSE SIZE | NOTES |  |
|                               |                 | VPH        | LOAD (KW) | HP | FLA |                      |           |       |  |
| CH-2                          | CHILLER         | 4603       |           |    |     |                      | 250       | 1     |  |
| P-6                           | COND WATER PUMP | 4603       |           | 15 |     |                      |           |       |  |
| P-9                           | PRIM CHILL PUMP | 4603       |           | 5  |     |                      |           |       |  |

VPH=VOLTAGE / PHASE / HERTZ  
MCA = MINIMUM CIRCUIT AMPACITY  
MOCP = MAXIMUM OVER CURRENT PROTECTION LISTED BY THE MANUFACTURER  
NOTES:  
(1) PROVIDE FUSE SIZED TO THE MAXIMUM LISTED BY THE MANUFACTURER.

| ELECTRICAL SYMBOL SCHEDULE |  |
|----------------------------|--|
| SYMBOL                     | DEVICE/FIXTURE DESCRIPTION   |
| (E)                        | MECHANICAL EQUIPMENT   |
| ---                        | WIRING IN CND IN CEILING OR WALL   |
| ○                          | CONDUIT TURNED UP  |
| →                          | CIRCUIT HOME RUN TO PANEL. 3 CONDUCTORS INCLUDING THE EQUIPMENT GROUND CONDUCTOR.  |
| →                          | CIRCUIT HOME RUN TO PANEL. NUMBER OF ARROW HEADS INDICATE NUMBER OF CIRCUITS. SLASH MARKS INDICATE NUMBER OF CONDUCTORS. EX. TWO CIRCUITS, FOUR CONDUCTORS, COMMON NEUTRAL AND THREE CIRCUITS WITH 7 CONDUCTORS (SEPARATE NEUTRAL PER CIRCUIT). BOTH EX. INCLUDE AN EQUIP. GROUND. |
| ---                        | WIRING IN CND IN GROUND OR FLOOR   |
| ●                          | CONDUIT TURNED DOWN  |

INSTALL CONDUIT AS DRAWN ON THE PLANS. THE ONLY EXCEPTIONS ARE THOSE AUTHORIZED IN WRITING BY THE ENGINEER. ALL CONDUITS SHALL INCLUDE AN EQUIPMENT GROUND CONDUCTOR SIZED PER NEC.

NOTES/ABBREVIATIONS  
AFF - ABOVE FINISHED FLOOR, AFG - ABOVE FINISHED GRADE,  
AIC - AMPS INTERRUPTING CAPACITY, BC - BARE COPPER, BFC - BELOW FINISHED CEILING,  
BFG - BELOW FINISHED GRADE, CND. OR C. - CONDUIT, CLG - INSTALLED IN CEILING,  
CT - CURRENT TRANSFORMER, DPA - DROP FROM ABOVE, (E) - EXISTING,  
EC - ELECTRICAL CONTRACTOR, EV - ELECTRO VOICE, GC - GENERAL CONTRACTOR,  
GND - GROUND, MC - MECHANICAL CONTRACTOR, MCA - MINIMUM CIRCUIT AMPS,  
P.C. - PLUMBING CONTRACTOR, POC - POINT OF CONNECTION, POS - POINT OF SALES,  
RMC - RIGID METAL CONDUIT, SCA - SHORT CIRCUIT AMPERES,  
TC - TEMP. CONTROL CONTRACTOR, UNO - UNLESS NOTED OTHERWISE, VA - VOLT/AMPS,  
VF - VERIFY IN FIELD, WP - WEATHER PROOF/NEMA 3R

| CONDUIT/CONDUCTOR SCHEDULE |      |               |     |      |        |         |
|----------------------------|------|---------------|-----|------|--------|---------|
| MARK                       | AMPS | CONDUIT CABLE | QTY | SIZE | INSUL. | REMARKS |
| (312)                      | 20   | 3/4"          | 3   | 12   | (1)    | (2)     |
| (30)                       | 30   | 3/4"          | 3   | 10   | (1)    | (2)     |
| (35)                       | 50   | 1"            | 3   | 8    | (1)    | (2)     |
| (340)                      | 230  | 2 1/2"        | 3   | 4/0  | (1)    | (2)     |

NOTE:  
(1) THHN/THWN-2.  
(2) ALL CONDUIT SHALL CONTAIN A SEPARATE EQUIPMENT GROUNDING CONDUCTOR SIZED IN ACCORDANCE WITH THE NEC. ACCOUNT FOR PARALLEL RUNS.

SUFFIX:  
"AL" INDICATES ALUMINUM CONDUCTORS  
"Y" INDICATES YELLOW ISOLATED GROUND CONDUCTOR IN ADDITION TO THE GROUND CONDUCTOR IN NOTE ABOVE.

GENERAL NOTES

- THE ELECTRICAL SYSTEMS DEFINED BY THESE PLANS AND SPECIFICATIONS ARE TO BE CONSTRUCTED AS COMPLETE AND OPERABLE SYSTEMS AND SHALL BE BID WITH THIS INTENT. THE CONTRACTOR SHALL VISIT THE SITE, READ ALL THE RELEVANT DOCUMENTS AND BECOME FAMILIAR WITH THE TYPE OF CONSTRUCTION AND WORK TO BE ACCOMPLISHED. SHOULD ANY ERROR, OMISSION OR CONFLICT EXIST IN EITHER THE PLANS OR SPECIFICATIONS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IN WRITING BEFORE SUBMITTING HIS BID PRICE SO A CHANGE CAN BE ISSUED IN A PRE-BID ADDENDUM. OTHERWISE, THE CONTRACTOR AND/OR EQUIPMENT SUPPLIER SHALL SUPPLY THE PROPER MATERIALS AND LABOR TO INSTALL COMPLETE AND OPERABLE SYSTEMS AT THEIR OWN EXPENSE. WHEN EACH ELECTRICAL SYSTEM IS COMPLETE, THE CONTRACTOR SHALL TEST AND CONFIRM IT'S PROPER OPERATION. ANY INCOMPLETE SYSTEM SHALL BE MADE COMPLETE AND OPERABLE.
- THE ARCHITECTURAL AND MECHANICAL PLANS ARE CONSIDERED A PART OF THE ELECTRICAL DOCUMENTS SO FAR AS ANY ELECTRICAL ITEMS THEY MAY CONTAIN. THE ELECTRICAL CONTRACTOR SHALL REFER TO AND COORDINATE WITH THEM. NO EXTRA COST SHALL BE ALLOWED FOR FAILURE TO COORDINATE THE CONTRACT DOCUMENTS WITH OTHER TRADES AND/OR IF EQUIPMENT DIMENSIONS ARE GREATER THAN SPECIFIED AND/OR DIMENSIONED ON THE PLANS.
- NO ADDITIONS TO THE CONTRACTOR BID WILL BE ALLOWED FOR CHANGES MADE NECESSARY BY INTERFERENCE WITH OTHER WORK.
- THE ELECTRICAL CONTRACTOR SHALL PROVIDE EQUIPMENT, MATERIALS AND LABOR FOR THE CONNECTIONS OF ALL EQUIPMENT SHOWN ON THE PLANS - ARCHITECTURAL, MECHANICAL, ETC.
- THIS PROJECT IS TO BE INSTALLED IN STRICT ACCORDANCE WITH LOCAL AND STATE CODES AND THE NEC. IF AT ANY TIME DURING CONSTRUCTION OR AFTER, SOMETHING IS FOUND TO BE INSTALLED IN VIOLATION OF THE CODES LISTED ABOVE, IT SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE.
- THE ELECTRICAL CONTRACTOR SHALL SECURE ALL CONDUIT TO THE STRUCTURE AS IT IS SET IN PLACE USING INDUSTRY STANDARD METHODS AND PRACTICES.
- LENGTHS OF FLEXIBLE CONDUIT GREATER THAN 48 INCHES SHALL NOT BE INSTALLED ON THIS PROJECT. FLEXIBLE CONDUIT SHALL NOT BE CONCEALED.
- DURING CONSTRUCTION, THE ELECTRICAL CONTRACTOR SHALL REMOVE, REROUTE, AND/OR RELOCATE ANY EXISTING ELECTRICAL EQUIPMENT THAT CONFLICTS WITH THE REMODEL OR ADDITION. ALL SYSTEMS SHALL BE OPERABLE AT THE COMPLETION OF THE PROJECT. EQUIPMENT THAT IS NOT REUSED, AND NOT WANTED BY THE OWNER IN WRITING, BECOMES THE PROPERTY OF THE ELECTRICAL CONTRACTOR AND SHALL BE REMOVED FROM THE PREMISES.
- THE ELECTRICAL CONTRACTOR SHALL MAINTAIN ELECTRICAL CONTINUITY TO REMAINING EQUIPMENT WHEN ANY EXISTING ELECTRICAL EQUIPMENT IS REMOVED.
- ALL COSTS FROM THE USE OF THE EXISTING PANEL SHALL BE INCLUDED IN THE CONTRACTOR'S BASE BID, I.E. CHANGE IN BREAKER SIZE, ETC.
- ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE EQUIPMENT SUPPLIER ON THE EXACT LOCATIONS OF ALL EQUIPMENT AND ELECTRICAL CONNECTIONS PRIOR TO ROUGH-IN. THE EC SHALL MAKE THE FINAL CONNECTION TO ALL EQUIPMENT.

KEYED NOTES

- EXISTING IMCC (CUTLER HAMMER FREEDOM 2100 MOTOR CONTROL CENTER, 480V, 3PH, 3W, 800A) TO REMAIN AND ADDED TO. FIELD CONFIRM EXISTING CONDITIONS.
- PROVIDE A 400A, 3 POLE, FUSED DISCONNECT UNIT WITH 250A FUSES IN IMCC TO POWER CH-2. PROVIDE THE FEEDER FROM CH-2 TO IMCC OVERHEAD WITH THE CONDUIT PARALLEL WITH THE EXISTING CONDUIT FROM CH-1 TO IMCC. SUPPORT THE FEEDER FROM THE STRUCTURE ABOVE. FIELD CONFIRM EXISTING CONDITIONS PRIOR TO BID.
- APPROXIMATE LOCATION OF GEST EDGE OF LARGE OVERHEAD HVAC DUCT. COORDINATE WITH IT'S LOCATION WHEN INSTALLING THE FEEDERS TO P-6 AND P-9 FROM IMCC.
- PROVIDE A FVNR NEMA SIZE 2 COMBINATION STARTER DISCONNECT UNIT WITH 40A HCMP AND OVERLOADS SIZED FOR THE MOTOR IN IMCC TO POWER P-6. PROVIDE THE FEEDER FROM P-6 TO IMCC OVERHEAD WITH THE CONDUIT SUPPORTED CLOSE TO THE MOTOR AND AS REQUIRED BY THE SPECIFICATIONS AND THE NEC FROM THE MOTOR TO IMCC. FIELD CONFIRM EXISTING CONDITIONS PRIOR TO BID.
- PROVIDE A FVNR NEMA SIZE 0 COMBINATION STARTER DISCONNECT UNIT WITH 15A HCMP AND OVERLOADS SIZED FOR THE MOTOR IN IMCC TO POWER P-9. PROVIDE THE FEEDER FROM P-9 TO IMCC OVERHEAD WITH THE CONDUIT SUPPORTED CLOSE TO THE MOTOR AND AS REQUIRED BY THE SPECIFICATIONS AND THE NEC FROM THE MOTOR TO IMCC. FIELD CONFIRM EXISTING CONDITIONS PRIOR TO BID.
- EXISTING DISCONNECT FOR THE COOLING TOWER FAN TO REMAIN. DISCONNECT THE CONDUCTORS FEEDING THE COOLING TOWER AND FEED THE NEW CT VFD FROM THIS DISCONNECT. FIELD CONFIRM EXISTING CONDITIONS.
- CT VFD. PROVIDE A VFD (TOSHIBA Q94025C OR APPROVED EQUAL) TO CONTROL THE COOLING TOWER FAN. INSTALL THE VFD AT THE MAXIMUM HEIGHT AFF ALLOWED BY CODE.
- EXISTING REFRIGERATION ALARM PANEL. MOVE THE PANEL TO THE RIGHT APPROXIMATELY 16 INCHES OR ENOUGH TO ALLOW THE VFD TO BE INSTALLED AS INDICATED IN KEYED NOTE 7. PROVIDE NEW CABLES/CONDUCTORS TO THE ALARM PANEL AS REQUIRED FOR THE NEW INSTALLATION LOCATION.
- EXISTING THERMOSTAT TO REMAIN. INSTALL THE VFD CENTERED BETWEEN THE THERMOSTAT AND THE DOOR FRAME.
- EXISTING JUNCTION BOX WITH COVER TO REMAIN. FIELD CONFIRM EXISTING CONDITIONS.
- INSTALL THE CONDUIT TO FEED THE CT VFD OVERHEAD FROM IMCC.
- EXISTING CONDUITS FROM IMCC TO THE COOLING TOWER. THE TWO ON THE OUTSIDE ARE 1" AND THE CENTER CONDUIT IS 3/4" FOR CONTROLS. THE CONDUITS ARE TO REMAIN AND BE REUSED. THE CONDUITS COME OUT OF THE WALL THROUGH LF FITTINGS AND UNDER THE GROUND TO THE COOLING TOWER.
- PROVIDE 3#8+2#12+10GND CONDUCTORS FROM CT VFD TO THE COOLING TOWER FAN USING ONE OF THE EXISTING 1" CONDUITS TO THE COOLING TOWER.
- EC SHALL REMOVE ONE OF THE EXISTING DISCONNECTS ON THE COOLING TOWER FEEDING THE FAN AND REPLACE IT WITH A NEMA3R NON-FUSED DISCONNECT WITH AUXILIARY CONTACTS TO SHUT-DOWN THE VFD WHEN THE DISCONNECT IS TURNED OFF. REMOVE THE CONDUCTORS AND THE OTHER DISCONNECT FEEDING THE TOWER FAN MOTOR AT LOW SPEED. REMOVE THE CONDUIT FROM THE REMOVED DISCONNECT TO A LOCATION UNDER THE TOWER AND CAP IT WITH A BLANK NEMA3R BOX AND COVER.
- ALL WORK SHOWN AND SPECIFIED FOR ADDING THE VFD TO CONTROL THE COOLING TOWER FAN SHALL BE BID ALTERNATE #1.



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REVISIONS

| NO. | DESCRIPTION | DATE |
|-----|-------------|------|
|     |             |      |
|     |             |      |

SHEET CONTENTS  
**LARGE SCALE  
ELEC. / CHILLER  
ROOM PLAN**

E1.1



A4 LARGE SCALE ELECTRICAL / CHILLER ROOM PLAN

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

