

three inches = one foot

one and one half inches = one foot

one inch = one foot

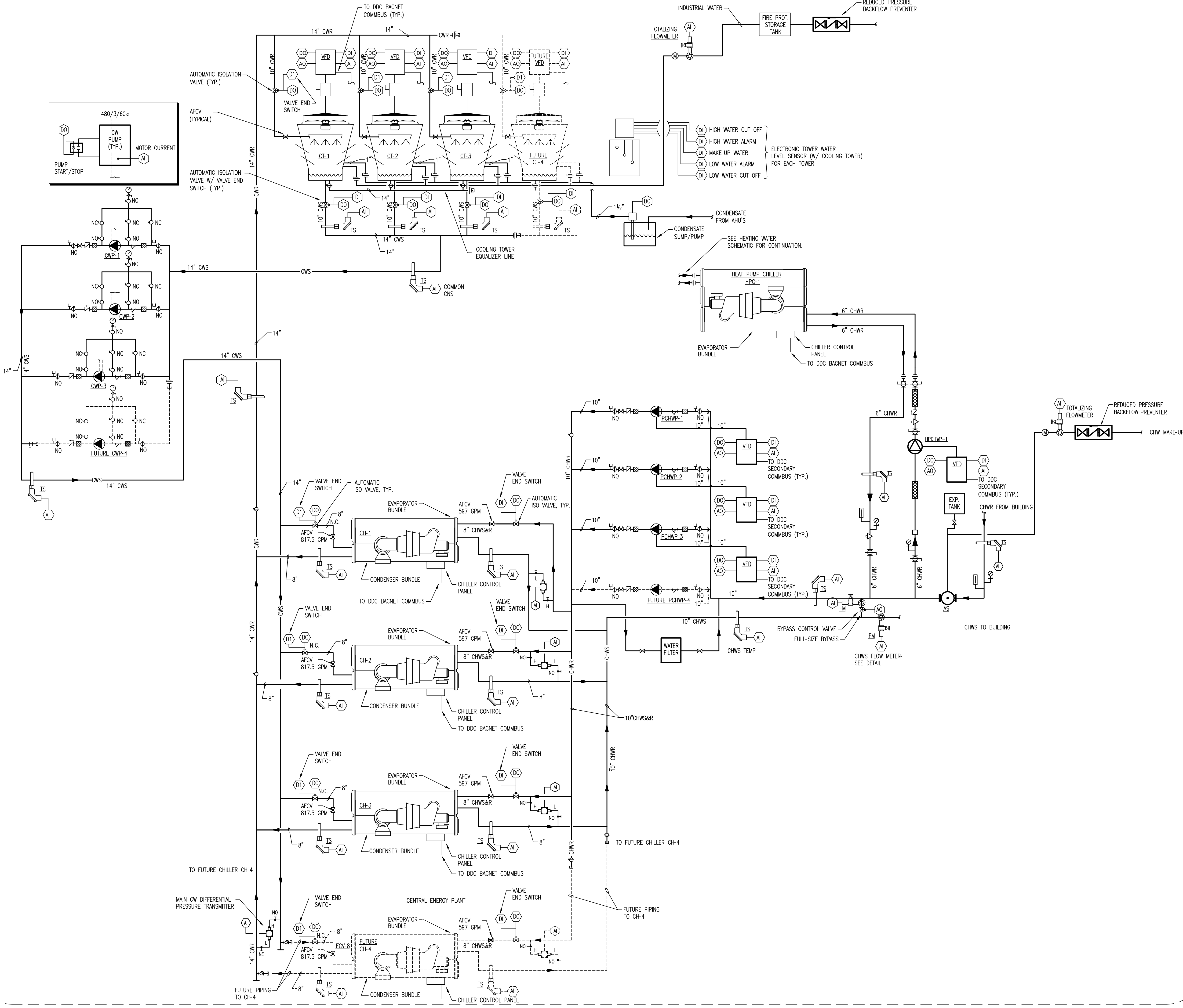
three quarters inch = one foot

one half inch = one foot

three eighths inch = one foot

one quarter inch = one foot

one eighth inch = one foot



VARIABLE PRIMARY CHILLED WATER PIPING AND CONTROL DIAGRAM
No Scale

CONDENSER WATER PUMPING

THE CONDENSER WATER PUMP SPEED SHALL BE CONTROLLED TO MAINTAIN THE DIFFERENTIAL PRESSURE ACROSS THE MAIN CONDENSER WATER LOOP AT THE BCS CONDENSER DIFFERENTIAL PRESSURE TRANSMITTER AT 15 PSI (AS DETERMINED BY THE TEST AND BALANCE CONTRACTOR BASED ON THE CONDENSER WATER FLOW REQUIREMENTS FOR EACH CHILLER). IN ACCORDANCE WITH THE CHILLER DESIGN CONDENSER WATER FLOW RATE. ON A DECREASE IN DIFFERENTIAL PRESSURE AT THE CHILLERS, OR IF NEEDED TO ENSURE THAT THE END-OF-CURVE LIMIT FLOW IS NOT EXCEEDED AT THE LEAD PUMP, THE BCS SHALL START THE LEAD CHW PUMP AND RAMP UP THE LEAD PUMP SPEED WHILE RAMPING DOWN THE LEAD CHW PUMP SPEED TO CONTROL BOTH PUMPS SIMULTANEOUSLY AT THE SAME SPEED.

THE BCS SHALL CONTROL THE SPEED OF THE LEAD (AND LAG) CHW PUMP(S) IN SEQUENCE WHILE MONITORING END-OF-CURVE FLOW LIMITS OF ANY ACTIVE PUMP(S) TO MAINTAIN THE DIFFERENTIAL PRESSURE ACROSS THE CONDENSER WATER LOOP AT ALL TIMES.

WHEN THE CHILLER PLANT IS INITIALLY STARTED UP, THE BCS SHALL AUTOMATICALLY START THE LEAD CONDENSER WATER PUMP AND LEAD COOLING TOWER TO OPERATE IN CONJUNCTION WITH THE LEAD CHILLER, IN ACCORDANCE WITH THE COOLING TOWER STARTUP SEQUENCE.

THE BCS SHALL OPEN THE SELECTED LEAD COOLING TOWER VALVES, AND THEN START THE SELECTED LEAD CONDENSER WATER PUMP BY GRADUALLY RAMPING UP THE PUMP SPEED THROUGH THE DIFFERENTIAL PRESSURE ACROSS THE CONDENSER WATER LOOP AT ALL TIMES.

COOLING TOWER MAKEUP WATER SYSTEM

THE BCS SHALL REMOTELY MONITOR AND CONTROL THE MAKEUP WATER TO THE COOLING TOWER THROUGH DIRECT DIGITAL CONTROL INPUTS AND OUTPUTS.

THE BCS SHALL MONITOR THE PROBE ELECTRONIC WATER LEVEL SENSOR (PROVIDED WITH THE COOLING TOWER) FOR THE FOLLOWING DIGITAL INPUTS:

- TOWER MAKEUP WATER (N.O.)
- TOWER BASIN LOW ALARM (N.O.)
- TOWER BASIN LOW CUTOFF (N.O.)
- TOWER BASIN ALARM (N.O.)
- TOWER BASIN HIGH CUTOFF (N.O.)

SEQUENCE OF OPERATION FOR THE COOLING TOWER MAKEUP WATER SYSTEM SHALL BE AS FOLLOWS:

NORMAL OPERATING LEVEL FOR THE COOLING TOWER SHALL BE 9" ABOVE THE BOTTOM OF SUMP. ON A DECREASE IN THE COOLING TOWER WATER LEVEL TO THE MAKEUP LEVEL OF 8" (ADJUSTABLE), THE BCS SHALL ENABLE THE RECLAIMED WATER SUMP/CONDENSATE PUMP SYSTEM. ON AN INCREASE IN THE TOWER WATER LEVEL TO THE HIGH WATER ALARM OF 13" (ADJUSTABLE) THE BCS SHALL DISABLE THE RECLAIMED WATER SUMP/CONDENSATE PUMP SYSTEM.

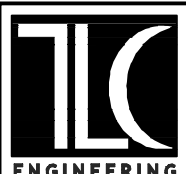
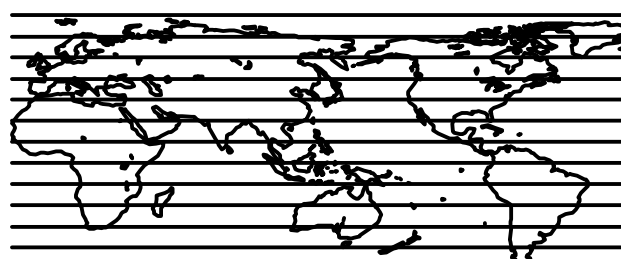
IF CONDENSATE IS AVAILABLE IN THE RECLAIMED WATER SUMP, THE FLOAT SWITCH (PROVIDED WITH THE RECLAIMED WATER SUMP) SHALL START THE LEAD CONDENSATE SUMP PUMP TO PROVIDE MAKEUP WATER TO THE COOLING TOWER. THE ALTERNATOR CONTROL PANEL (PROVIDED WITH THE RECLAIMED WATER SUMP) SHALL ALTERNATE THE PUMPS.

IF THE COOLING TOWER WATER LEVEL IS ABOVE 8", AND THE CONDENSATE LEVEL IS ABOVE THE FLOAT SWITCH, CONDENSATE SHALL FLOW THROUGH THE OVERFLOW DRAIN PROVIDED IN THE RECLAIMED WATER SUMP TO THE STORM DRAIN.

EACH TOWER CELL FLOAT VALVE (PROVIDED WITH EACH TOWER CELL) SHALL OPEN WHEN THE WATER LEVEL IS BELOW THE FLOAT AND SHALL CLOSE WHEN THE WATER LEVEL IS ABOVE THE FLOAT.

ON AN INCREASE IN THE TOWER WATER LEVEL ABOVE THE HIGH WATER CUTOFF LEVEL OF 10" (ADJUSTABLE) THE BCS SHALL PROVIDE A HIGH WATER LEVEL ALARM TO THE BCS OPERATOR WORKSTATION. ON A DECREASE IN THE TOWER WATER LEVEL BELOW THE LOW WATER CUTOFF LEVEL OF 4" (ADJUSTABLE) THE BCS SHALL IMMEDIATELY ALARM THE BCS CWS AND AFTER A ONE-MINUTE (ADJUSTABLE) TIME DELAY AUTOMATICALLY STOP THE CONDENSER WATER PUMPS AND CHILLERS.

RECORD DRAWINGS

Revisions	Date	CONSULTANTS	 255 S. Orange Avenue Suite 1800 Orlando, Florida 32801 Phone: 407-841-9050 Fax: 407-843-5445 www.tlc-engineers.com © Copyright 2008 TLC Engineering for Architecture, Inc. EB #0000015 TLC NO:108302	Eric S. Cepull, P.E. Florida License #64750	ARCHITECT/ ENGINEERS:  HELLMUTH, OBATA & KASSABAUM, INC. ARCHITECTURE, ENGINEERING, PLANNING, INTERIORS, GRAPHICS, CONSULTING One Tampa City Center, Suite 1900, Tampa, FL 33602 Voice: (813) 229-0300 Fax: (813) 223-7116 Internet: http://www.hok.com FL Reg. AAC001139 All trademarks & intellectual property rights reserved © 2008 Contract No.: 6CA2400	Drawing Title: HVAC RISER DIAGRAMS CHILLED WATER	Approved: Checker	Project Title Lee County Outpatient Clinic	Project Number 516CA2400	Building Number	Client Location Cape Coral, Florida	Date 12/07/12	Checked: DCB	Drawn EMF	Drawing Number: H702	Office of Construction and Facilities Management 