



NOTE:
 THE EXISTING CHILLER WILL BE RETROFITTED AND A NEW CHILLER WILL BE PROVIDED TO PROVIDE A BACNET INTERFACE TO THE BMS CONTROLS CONTRACTOR. A MINIMUM OF THE FOLLOWING INFORMATION WILL BE PROVIDED BY THIS INTERFACE.

- OUTPUTS FROM THE CHILLER CONTROLS INCLUDE:
- 1) CHILLER READY TO START
 - 2) CHILLER IS OPERATING
 - 3) CHILLER SHUT DOWN ON SAFETY REQUIRING RESET
 - 4) CHILLED WATER TEMPERATURES ENTERING AND LEAVING CHILLER
 - 5) CONDENSER WATER TEMPERATURES ENTERING AND LEAVING CHILLER
 - 6) REFRIGERANT PRESSURE
 - 7) OIL PRESSURE AND TEMPERATURE
 - 8) RUNNING LOAD AMPS AND KILOWATTS
 - 9) HOURS OF OPERATION

- INPUTS TO THE CHILLER CONTROLS FROM BMS BACNET INCLUDE:
- 1) START/STOP SIGNAL
 - 2) LEAVING CHILLED WATER SET POINT
 - 3) RESET CHILLED WATER SET POINT
 - 4) DEMAND LIMIT SET POINT.

EMS CONTROLS CONTRACTOR TO PROVIDE WIRING FROM CHILLER COMMUNICATION PORTS (INCLUDED WITH UNITS) TO EMS NETWORK AND CHILLER CONTROL INPUTS.

EMS CONTROLS CONTRACTOR SHALL PROVIDE TEMPERATURE SENSOR WELLS TO DIVISION 15 CONTRACTOR FOR INSTALLATION IN PIPING.

NOTE:
 LOCATE DPT AT NEW AHU COIL CONTROLLED BY 2-WAY VALVE. FIELD VERIFY FINAL LOCATION. LOCATION TBD

SEQUENCE OF OPERATION:

CHILLED WATER SYSTEM

- 1) CHILLERS, PUMPS, AND COOLING TOWER ARE CONTROLLED BY DDC SYSTEM.
- 2) WINTER SCHEDULE: THE PRIMARY CHILLED WATER PUMP #2 ASSOCIATED WITH CHILLER #2 WILL START WHEN CHILLER RECEIVES A START SIGNAL. THE START SIGNAL IS BASED ON TIME SCHEDULE, OUTSIDE AIR TEMPERATURE OF 65° F AND MORE, AND 20% (ADJUSTABLE) OF CHILLED WATER VALVES CALLING FOR COOLING.
- 3) THE SECONDARY CHILLED WATER PUMPS WILL START THROUGH THE TIME SCHEDULE. WHEN THE OUTSIDE TEMPERATURE IS ABOVE 65° F AND 20% (ADJUSTABLE) OF CHILLED WATER VALVES ARE CALLING FOR COOLING.
- 4) CHILLER'S INTERNAL CONTROLS WILL MAINTAIN THE CHILLED WATER TEMPERATURE BASED ON RESET SIGNAL FROM THE DDC SYSTEM. DDC CONTROL SHALL MONITOR CHILLED WATER SUPPLY AND RETURN TEMPERATURES AND STAGE ON THE CHILLERS.
- 5) THE CHILLER #1 SHALL START WHEN THE SUPPLY AND RETURN TEMPERATURE DIFFERENTIAL (ΔT) EXCEEDS 14 DEGREES F (ADJUSTABLE) FOR MORE THAN 30 MINUTES (ADJUSTABLE) SEQUENCE FOR CH-2.
- 6) THE VDF ON THE SECONDARY PUMPS WILL MODULATE TO MAINTAIN A CONSTANT PRESSURE DIFFERENTIAL ACROSS THE SUPPLY AND RETURN AT BUILDING 16 AHU# TBD.
- 7) SUMMER SCHEDULE: BASE LOAD CH-1 FIRST, THEN OPERATE CH-2 FOR PARTIAL LOAD.

CONDENSER WATER SYSTEM

- 1) THE COOLING TOWER AND THE PUMPS ARE CONTROLLED BY THE DDC SYSTEM.
- 2) CONDENSER PUMPS AND COOLING TOWER FAN SHALL START/STOP BASED ON CHILLER'S DEMAND.
- 3) CONDENSER WATER SUPPLY SETPOINT IS SET AT THE OPERATOR TERMINAL. DDC CONTROL SHALL MONITOR THE CONDENSER SUPPLY AND RETURN TEMPERATURE AND START / STOP THE COOLING TOWER FANS
- 4) RESET THE CONDENSER WATER TEMPERATURE SETPOINT BASED ON OUTSIDE AIR DRY AND WET BULB TEMPERATURE.
- 5) VDF ON CONDENSER WATER PUMPS SHALL MAINTAIN CONDENSER RETURN TEMPERATURE AT MINIMUM 75°F (ADJUSTABLE) DURING WINTER MONTHS TO MEET CHILLER MANUFACTURER'S REQUIREMENTS.
- 6) INSTALL AUTOMATIC ISOLATION VALVES AT EACH COOLING TOWER CELL'S INLET AND OUTLET CONNECTIONS. TOTAL OF 3 VALVES AT OUTLETS AND 3 VALVES AT INLETS.
- 7) THE OPERATION OF CH-1 SHALL ACTIVATE ONE COOLING TOWER CELL AND THE OPERATION OF CH-2 SHALL ACTIVATE TWO COOLING TOWER CELL CONDENSERS.

REFRIGERANT MONITORING SYSTEM

EMS CONTROLS CONTRACTOR SHALL MAKE PROVISIONS TO MONITOR REFRIGERANT MONITORING SYSTEM FOR ALARM STATUS. EF-1 SHALL OPERATE AT FULL CAPACITY UPON REFRIGERANT DETECTION.

CHILLER CONTROL DIAGRAM

SCALE: NTS

REV	DATE	DESCRIPTION
1	1/27/06	ISSUE
2	2/19/06	ISSUE
3	3/7/06	ISSUE
4	5/27/06	REVISION TO USA COMMENTS
5	6/22/06	REVISION TO USA COMMENTS
6	5/1/06	AS BUILTS

CMT
 CENTRAL PLANT RENOVATION
 CMT JOB # 22524-008
 THESE DRAWINGS AND SPECIFICATIONS HAVE BEEN PREPARED BY CMT FOR THEIR CLIENTS USE IN ACCORDANCE WITH SECTION 01211-1 OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF THE STATE OF CALIFORNIA.

Canada College Modernization
 CENTRAL PLANT RENOVATION
 San Mateo County Community College District



CHILLER CONTROL DIAGRAM

SCALE	NTS
PROJECT NO.	22524-008
DESIGNED BY	
CHECKED BY	
DATE	
APPROVED BY	
DATE	
PROJECT NAME	
PLT NAME	

M-07

