

GENERAL FOR CHILLER PLANT AT BALLSTON

THE CHILLER PLANT IS DESIGNED FOR CONSTANT FLOW (GPM) FOR CHILLED WATER AND CONDENSER WATER.

DURING COOLING SEASON, THE CHILLERS ARE ABLE TO OPERATE 24 HOURS A DAY.

THE CHILLED WATER SYSTEM ENABLE POINT IS CONTROLLED EITHER MANUALLY BY THE OPERATOR OR PROGRAMMABLE. IF THE CHILLED WATER SYSTEM ENABLE POINT IS ON AND THERE IS A CALL FOR COOLING (I.E. THE CHILLED WATER RETURN TEMPERATURE EXCEEDS 55°F):

- 1) CHILLED WATER PUMPS (CHWP-1, CHWP-2, CHWP-3 OR CHWP-4) AND CONDENSER WATER PUMP (CWP-1, CWP-2, CWP-3 OR CWP-4) WHICH ARE MANUALLY SELECTED BY THE PLANT OPERATOR, SHALL START. PUMPS SHALL OPERATE FOR CONSTANT WATER FLOW. THE ASSOCIATED VARIABLE SPEED DRIVES SHALL BE UTILIZED TO ADJUST PUMP SPEED FOR DESIGN FLOW RATE AND SET.
- 2) THE CHILLER START OR STOP POINT TURNS ON.
- 3) AFTER CHILLED WATER AND CONDENSER FLOW ARE PROVEN BY THE FLOW SWITCHES, THE CHILLER OPERATES UNDER ITS OPERATING AND SAFETY CONTROLS. CHILLER'S INTEGRATED VARIABLE SPEED DRIVE SHALL ADJUST ITS CAPACITY IN ORDER TO MAINTAIN THE CHILLER'S CHILLED WATER SUPPLY TEMPERATURE SET POINT.

CONFIRM THE PUMPS DESIRED STATE (I.E. ON OR OFF) FROM THEIR VARIABLE SPEED DRIVES. GENERATE AN ALARM IF STATUS DEVIATES FROM START OR STOP CONTROL.

A KEY SWITCH LOCATED OUTSIDE THE CHILLER PLANT ROOM SHALL SHUT DOWN BOTH CHILLERS WHEN REQUIRED. ANOTHER KEY SWITCH SHALL MANUALLY START THE EXHAUST FAN IN ORDER TO VENTILATE THE CHILLER ROOM IN CASE OF REFRIGERANT GAS LEAK DETECTED. LOCATE IN A TAMPER PROOF ENCLOSURE, AT A LOCATION OUTSIDE OF THE CHILLER ROOM AND COORDINATED WITH THE OWNER.

SEND ALL EQUIPMENT STATUS AND ALARM CONDITIONS TO CHILLER PLANT CONTROL PANEL WITHIN THE CHILLER PLANT. REFER TO CHILLER SPECIFICATION 15625 FOR ALL THE CHILLER, PUMP RELATED ANALOG POINT, STATUS POINTS, CONTROL POINTS AND ALARM POINTS REQUIREMENTS. PROVIDE CAPABILITY FOR THE CONTROL POINTS TO BE CONNECTED TO THE AEMS SYSTEM. IN ADDITION TO THE ABOVE, ALSO PROVIDE THE FOLLOWING.

CHILLER PLANT FAN COIL UNIT/ AHU
CHILLER PLANT EXHAUST/ SUPPLY FANS
CHILLER PLANT UNIT HEATERS

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CHILLER PLANT EXHAUST/ SUPPLY FANS
CHILLER PLANT UNIT HEATERS

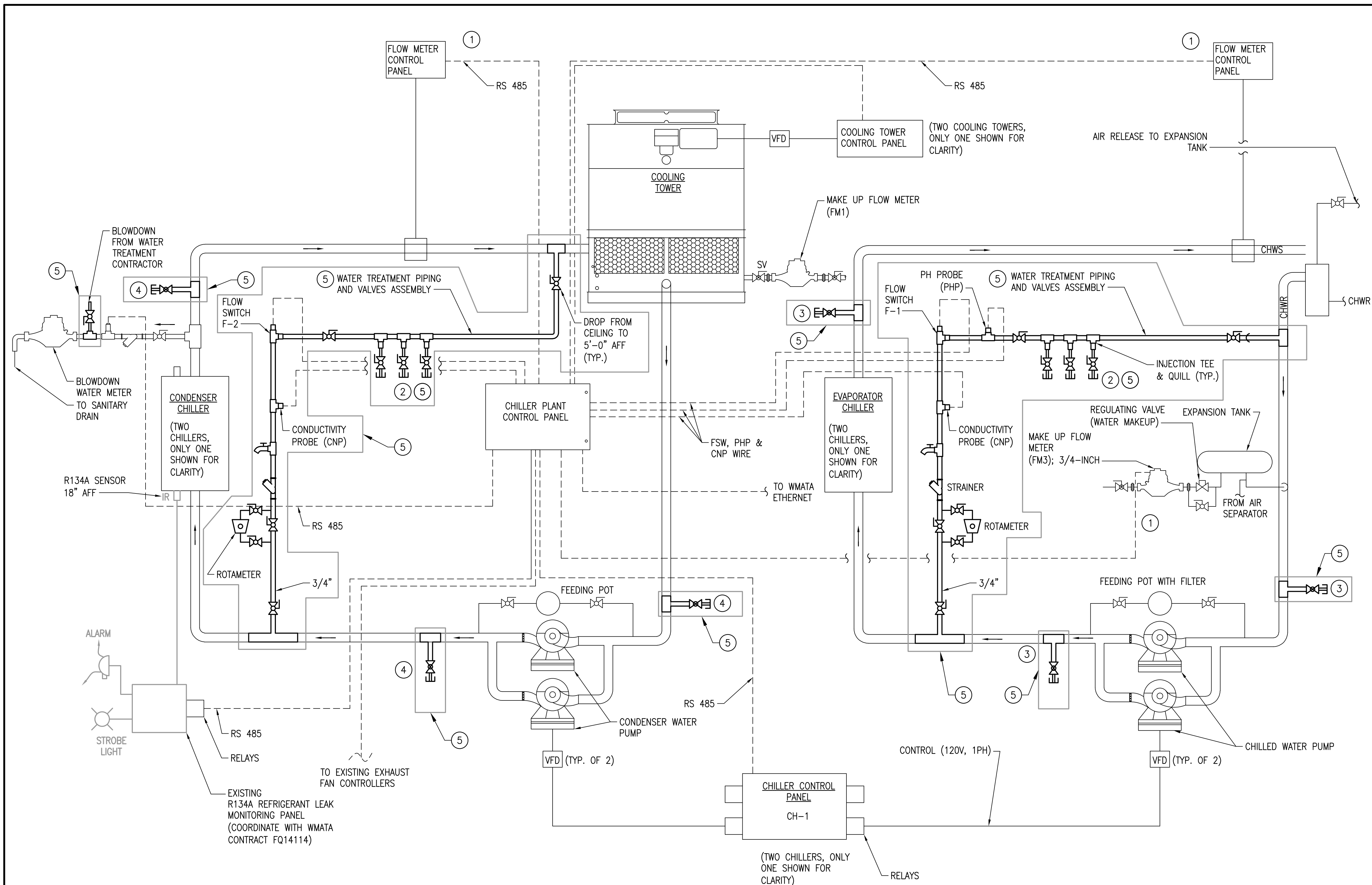
UNIT COMMON ALARM: INITIATE AN ALARM UPON RECEIVING A COMMON ALARM FROM THE UNIT FACTORY CONTROLS OF FCU/ AHU. THIS INCLUDES THE FILTER CHANGE ALARM AS WELL.



SEQUENCE OF OPERATION

THE FCU FAN AND THE CHILLED WATER FLOW CONTROL VALVE SHALL BE CONTROLLED BY THE SPACE TEMPERATURE SENSOR VIA THE PRODUCTIVITY 3000, PAC AT THE CHILLER PLANT MONITORING PANEL. WHEN THE SPACE TEMPERATURE RISES ABOVE 82F, THE FCU FAN SHALL BE STARTED. THE THREE WAY VALVE SHALL CONTROL THE CHILLED WATER FLOW TO MAINTAIN THE SPACE SET POINT TEMPERATURE OF 80F. WHEN THE SPACE TEMPERATURE FALLS BELOW 78F, THE FCU FAN SHALL TURN OFF.

[illegible]



- GENERAL NOTES:**
- CONTRACTOR SHALL FIELD VERIFY EXACT LOCATION AND QUANTITIES OF EQUIPMENT, PIPING, VALVES, DUCTWORK, ELECTRICAL AND CONTROL WIRING PRIOR TO DEMOLITION. ITEMS SHOWN ON THIS PLAN ARE APPROXIMATE.
 - REFER TO LEGEND SHEET FOR GENERAL ABBREVIATIONS AND SYMBOLS.

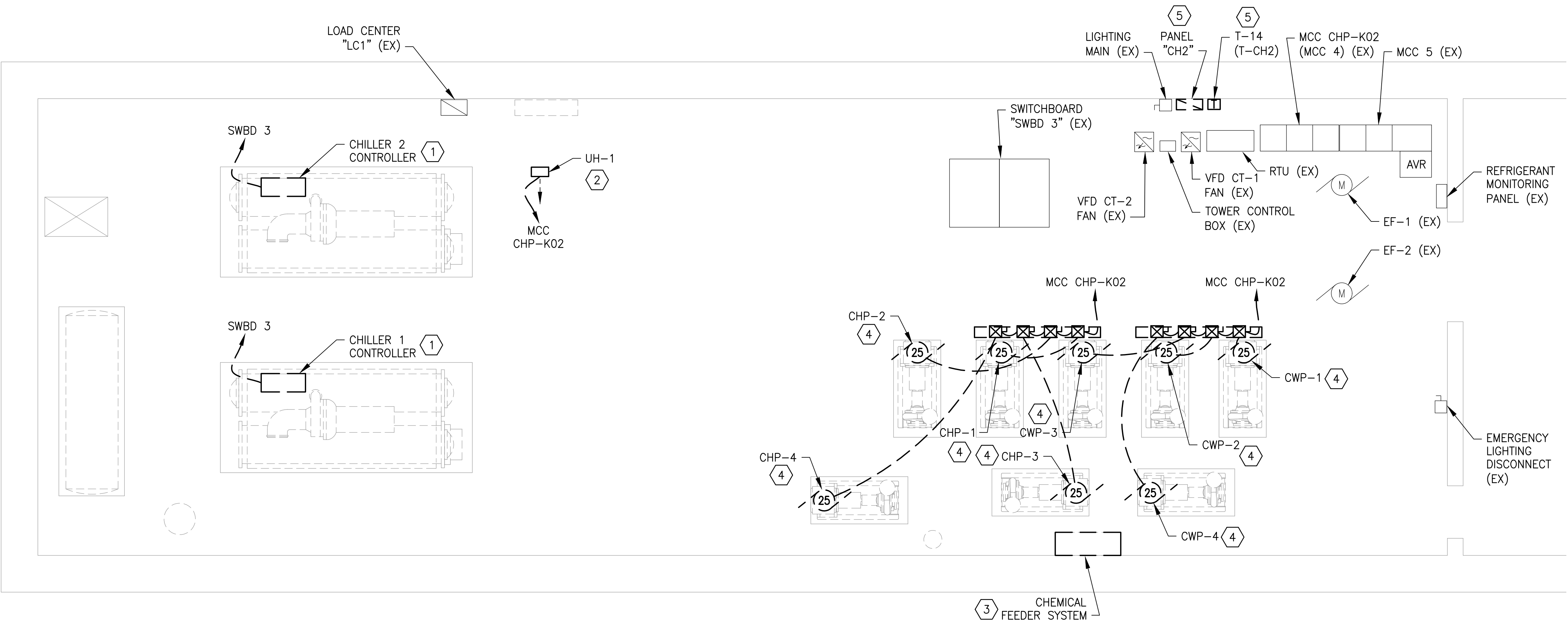
- KEYNOTES:**
- COMMUNICATIONS WIRING SHALL BE IN RIGID CONDUIT FROM FLOW METER MONITORING PANEL TO THE CHILLER PLANT CONTROL PANEL, UTILIZING BELDEN 89842 MULTI-CONDUCTOR - LOW CAPACITANCE COMPUTER AND COMPUTER POS CABLE OR EQUIVALENT.
 - TAPS FOR FUTURE CHEMICAL INJECTION PUMPS.
 - TAPS FOR CHILLED WATER SYSTEM WATER MONITORING/TREATMENT.
 - TAPS FOR CONDENSER WATER SYSTEM WATER MONITORING/TREATMENT.
 - REFER TO WMATA REFERENCE DRAWINGS DD-ME-HVAC-007, DD-ME-HVAC-008, AND DD-ME-HVAC-009.

- LEGEND:**
- GATE VALVE (GV)
 - GLOBE VALVE (GB)
 - BALL VALVE (1/4 TURN) SHUT OFF TYPE (SV), NORMALLY OPEN, UNLESS OTHERWISE NOTED
 - STRAINER (STN)
 - SAMPLE PET COCK (SPC)
 - SOLENOID VALVE (SOL)
 - IR REFRIGERANT GAS LEAK SENSOR
 - MOTOR STARTER (FOR FANS)
 - VARIABLE FREQUENCY DRIVE CONTROLLER
 - FLOW SWITCH
 - FLOW METER (FM 1 TO 3) PULSE OUTPUT
 - FLOW METER (FM 4 & 5) ULTRASONIC FLOW METER
 - CENTRIFUGAL PUMP

GFP A Gannett Fleming/Parsons JOINT VENTURE

03/29/2018
DEBDAS GHOSAL
016382
PROFESSIONAL ENGINEER

			REFERENCE DRAWINGS		REVISIONS			<div><div>M</div><div>metro</div></div> <div>WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY</div> <div>DEPARTMENT OF DESIGN AND CONSTRUCTION SERVICES</div> <div>OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM GROUP</div> <div><div>APPROVED <i>Mark H. Magnusson</i> 03/2018</div><div>MARK MAGNUSSEN MANAGER, ENV. PLANNING AND COMP</div><div>DATE</div></div> <div><div>APPROVED <i>Graham Spiller</i> 03/2018</div><div>GRAHAM SPILLER GFP DEPUTY PROGRAM MANAGER</div><div>DATE</div></div> <td colspan="5">REPLACEMENT OF CHILLERS AND COOLING TOWER ACCESSORIES AT EIGHT METRO-RAIL STATIONS CWPK2 - BALLSTON (K04) CHILLER PLANT MONITORING DIAGRAM</td>		REPLACEMENT OF CHILLERS AND COOLING TOWER ACCESSORIES AT EIGHT METRO-RAIL STATIONS CWPK2 - BALLSTON (K04) CHILLER PLANT MONITORING DIAGRAM				
DESIGNED	M. MCDONNELL	01/26/18	NUMBER	TITLE	DATE	NUM	DESCRIPTION			M NO.	CONTRACT NO.	SCALE	DRAWING NO.	SHEET NO.
		DATE			03/30/2018	0	FINAL CONTRACT DRAWINGS	M1304	FQ-18102	NONE	CWPK2-M-611	161 of 173		
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		DATE												
CHECKED	D. GHOSAL	03/23/18												
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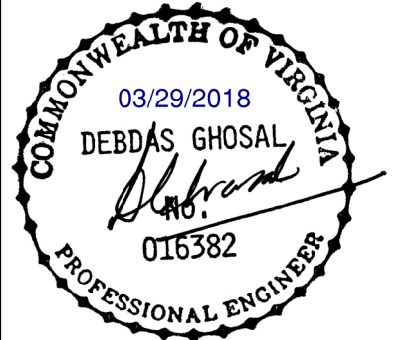
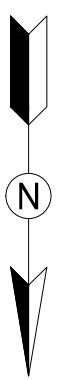


- GENERAL NOTES:
- A. ALL SHOWN EQUIPMENT IS EXISTING TO REMAIN UNLESS SHOWN OTHERWISE.
 - B. FOR EQUIPMENT TO BE DEMOLISHED: ALL EXISTING CONDUIT AND WIRING SHALL BE REMOVED BACK TO SOURCE OR AS INDICATED.

- KEYNOTES:
- 1 EXISTING CHILLER CONTROLLER EQUIPMENT TO BE DEMOLISHED BY MECHANICAL CONTRACTOR. DISCONNECT AND REMOVE WIRING AND CONDUIT BACK TO EXISTING SWITCHBOARD "SWBD 3".
 - 2 EXISTING UNIT HEATER TO BE DEMOLISHED BY MECHANICAL CONTRACTOR. DISCONNECT AND REMOVE CONDUIT AND WIRING BACK TO MCC CHP-K02.
 - 3 CHEMICAL FEEDER EQUIPMENT TO BE REMOVED BY MECHANICAL CONTRACTOR. DISCONNECT AND REMOVE ASSOCIATED POWER CONDUIT AND WIRING BACK TO SOURCE.
 - 4 EXISTING PUMP MOTOR TO BE DEMOLISHED BY MECHANICAL CONTRACTOR. DISCONNECT AND REMOVE ASSOCIATED STARTER, WIRING AND CONDUIT BACK TO MCC CHP-K02.
 - 5 DISCONNECT AND REMOVE EXISTING PANELBOARD "CH2" AND ASSOCIATED TRANSFORMER. REMOVE WIRING AND CONDUIT BACK TO MCC CHP-K02. PRESERVE EXISTING BRANCH CIRCUITS FOR RECONNECTION TO NEW PANELBOARD.

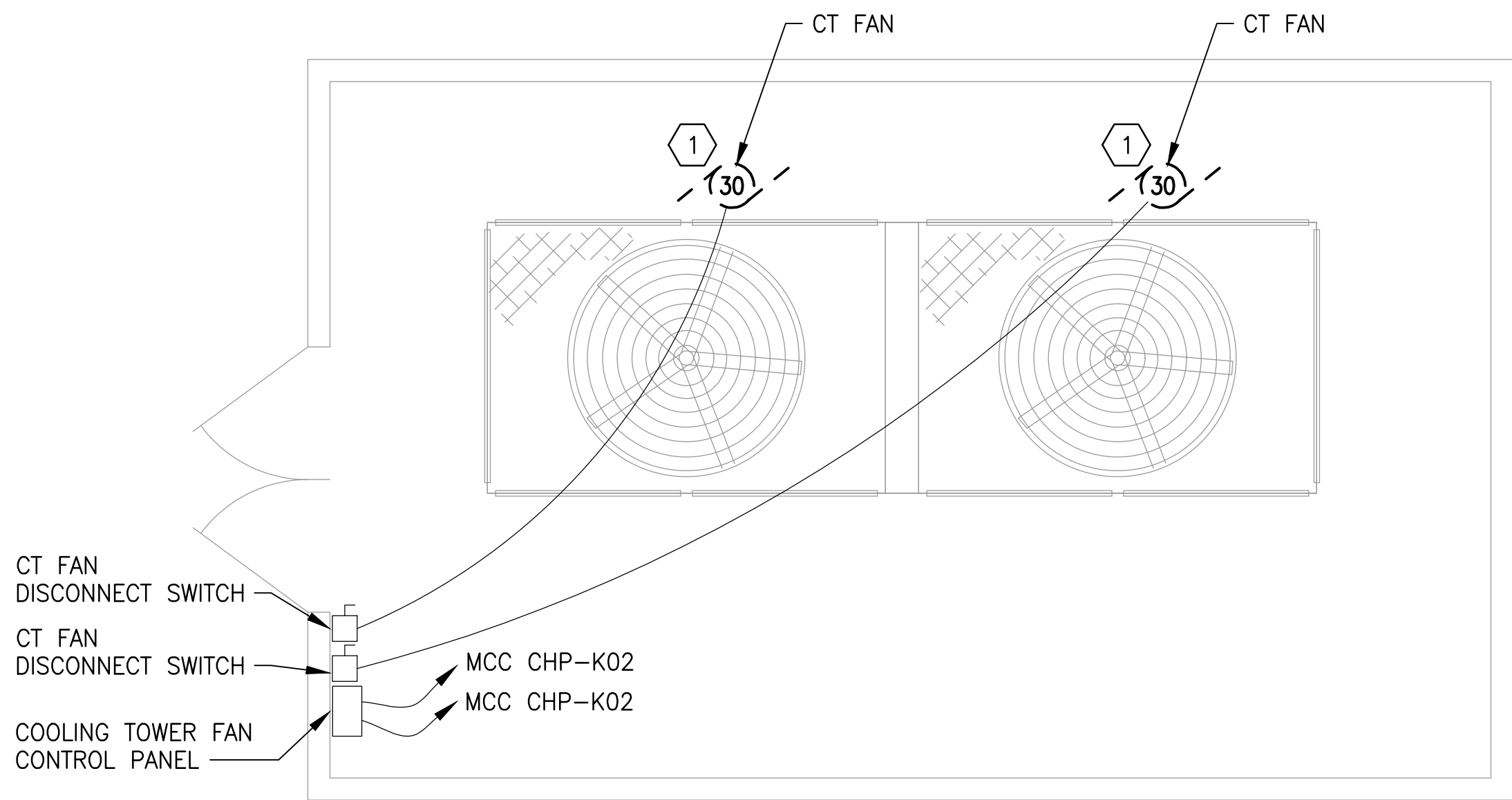
1 ELECTRICAL PLAN - DEMOLITION
CWPK2-E-100

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



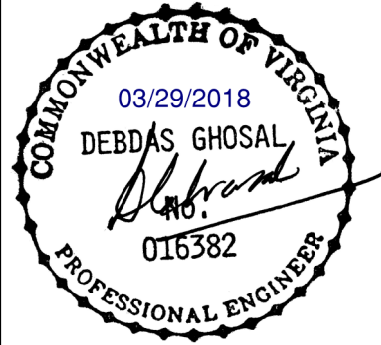
DESIGNED R. LAUFER 03/16/18 DATE DRAWN O. FAYEMI 03/16/18 DATE CHECKED D. KHAN 03/23/18 DATE			REFERENCE DRAWINGS NUMBER TITLE DATE NUM DESCRIPTION 0 FINAL CONTRACT DRAWINGS			REVISIONS DATE NUM DESCRIPTION			WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY DEPARTMENT OF DESIGN AND CONSTRUCTION SERVICES OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM GROUP APPROVED Mark H. Magnusson 03/2018 MARK MAGNUSSEN DATE MANAGER, ENV. PLANNING AND COMP			APPROVED Graham Spiller 03/2018 GRAHAM SPILLER DATE GFP DEPUTY PROGRAM MANAGER			REPLACEMENT OF CHILLERS AND COOLING TOWER ACCESSORIES AT EIGHT METRO-RAIL STATIONS CWPK2 - BALLSTON (K04) ELECTRICAL PLAN - DEMOLITION				M NO. M1304	CONTRACT NO. FQ-18102	SCALE 1/4" = 1'-0"	DRAWING NO. CWPK2-E-100	SHEET NO. 162 of 173
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- GENERAL NOTES:
1. ALL SHOWN EQUIPMENT IS EXISTING TO REMAIN UNLESS SHOWN OTHERWISE.
- KEYNOTES:
- 1 EXISTING COOLING TOWER FAN MOTOR TO BE REMOVED AND SALVAGED BY MECHANICAL CONTRACTOR. DISCONNECT AND PRESERVE WIRING FOR RE-USE.

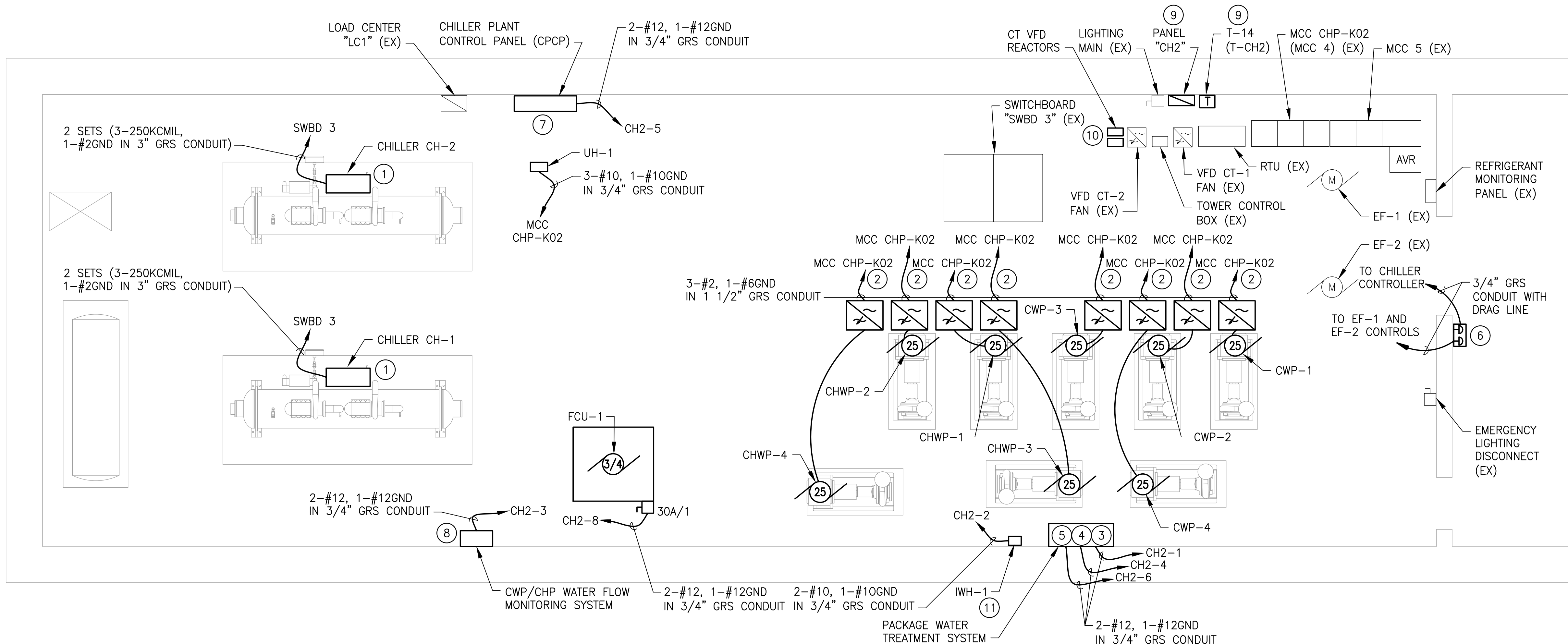


1 ELECTRICAL PLAN - DEMOLITION
CWPK2-E-101

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



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			NUMBER	TITLE	DATE	NUM	DESCRIPTION			M NO.	CONTRACT NO.	SCALE	DRAWING NO.	SHEET NO.
					03/30/2018	0	FINAL CONTRACT DRAWINGS		M1304	FQ-18102	1/4" = 1'-0"	CWPK2-E-101	163 of 173	

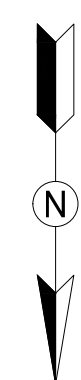


- GENERAL NOTES:
- SEE DWG. E-602 FOR ONE-LINE DIAGRAM.
 - ALL WIRING FROM VFDs SHALL BE VFD RATED CABLE.
 - RUN A 1/2" EMPTY CONDUIT FOR COMMUNICATION CABLES FROM THE WATER TREATMENT CONTROLLER TO INHIBITOR DISPENSERS. VERIFY DISPENSER LOCATION WITH MECHANICAL CONTRACTOR.

- KEYNOTES:
- CHILLER CONTROLLER SUPPLIED WITH CHILLER. INSTALLED AND WIRED BY ELECTRICAL CONTRACTOR.
 - PROVIDE AND INSTALL VFD/DISCONNECT FOR CHILLED WATER AND CONDENSER WATER PUMPS. PROVIDE CHANNEL SUPPORT SYSTEM AS NECESSARY. PROVIDE AND INSTALL WIRING FROM MOTOR TO VFD AND FROM VFD TO MCC CHP-K02.
 - WATER TREATMENT CONTROL PANEL; 2#12, 1#12 GND IN 3/4"C TO 20A/1P GFCI BREAKER. COORDINATE WITH OTHER WMATA CONTRACT INSTALLING WATER TREATMENT SYSTEM.
 - BIOCIDE FEEDERS; 2#12, 1#12 GND IN 3/4"C TO 20A/1P BREAKER. COORDINATE WITH OTHER WMATA CONTRACT INSTALLING WATER TREATMENT SYSTEM.
 - INHIBITOR FEED PUMP; 2#12, 1#12 GND IN 3/4"C TO 20A/1P BREAKER. RUN EMPTY 3/4" GRS WITH DRAG LINE CONDUIT FOR COMMUNICATION TO AEMS. COORDINATE WITH OTHER WMATA CONTRACT INSTALLING WATER TREATMENT SYSTEM.
 - EMERGENCY PUSH BUTTONS IN A TAMPER PROOF BOX. ONE FOR SHUTTING DOWN THE CHILLER, AND THE OTHER FOR TURNING ON THE VENTILATION FAN(S). REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.
 - CHILLER PLANT CONTROL PANEL (CPCP); 2#12, 1#12 GND IN 3/4"C TO 20A/1P BREAKER.
 - CHILLER WATER AND CONDENSER WATER FLOW MONITORING SYSTEM; 2#12, 1#12 GND IN 3/4"C TO 20A/1P BREAKER.
 - PANEL "CH2" AND ASSOCIATED TRANSFORMER, INSTALL IN EXISTING LOCATION. RECONNECT EXISTING BRANCH CIRCUITS (EXTEND AS NEEDED).
 - LINE AND LOAD REACTORS FOR COOLING TOWER VFDs. PROVIDE CHANNEL SUPPORT SYSTEM AS NECESSARY.
 - INSTANTANEOUS WATER HEATER BY MECHANICAL CONTRACTOR.

1 ELECTRICAL PLAN - NEW WORK
CWPK2-E-102

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



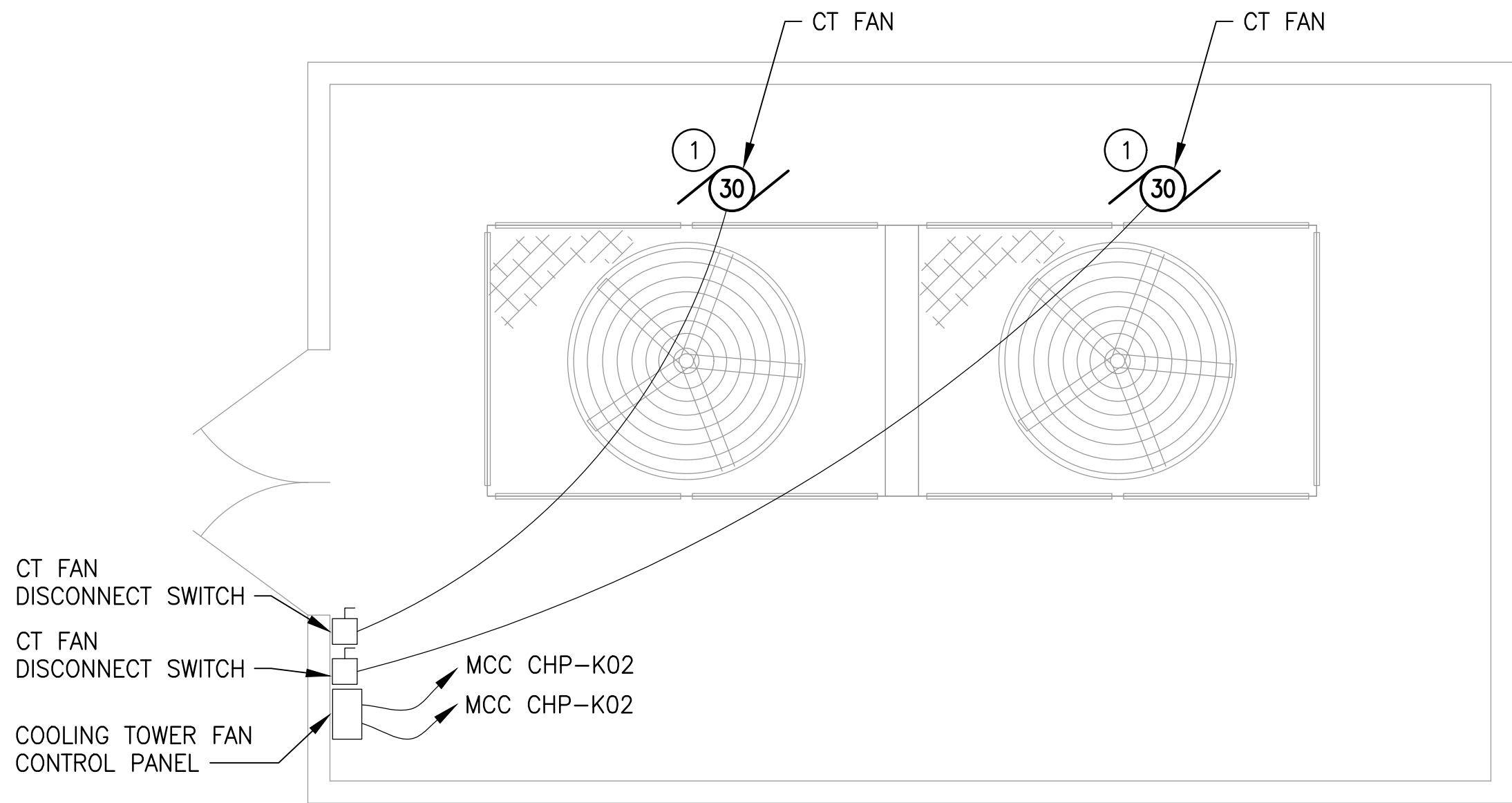
GFP A Gannett Fleming/Parsons
JOINT VENTURE



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DRAWN <u>O. FAYEMI</u> 03/16/18 DATE					03/30/2018	0	FINAL CONTRACT DRAWINGS					M NO.	CONTRACT NO.	SCALE	DRAWING NO.	SHEET NO.	
										M1304	FQ-18102	1/4" = 1'-0"	CWPK2-E-102	164 of 173			
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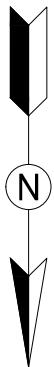
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 - ALL WIRING FROM VFDs SHALL BE VFD RATED CABLE.

- KEYNOTES:
- RECONNECT EXISTING FEEDER TO NEW CT FAN MOTOR.
EXTEND AS NECESSARY, WIRE SIZE TO MATCH EXISTING.

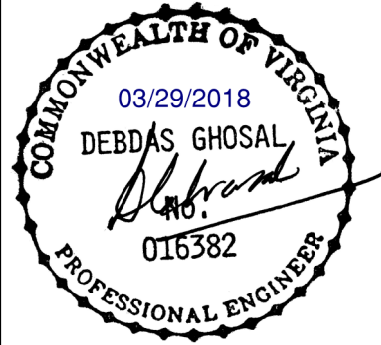


1 ELECTRICAL PLAN - NEW WORK
CWPK2-E-103

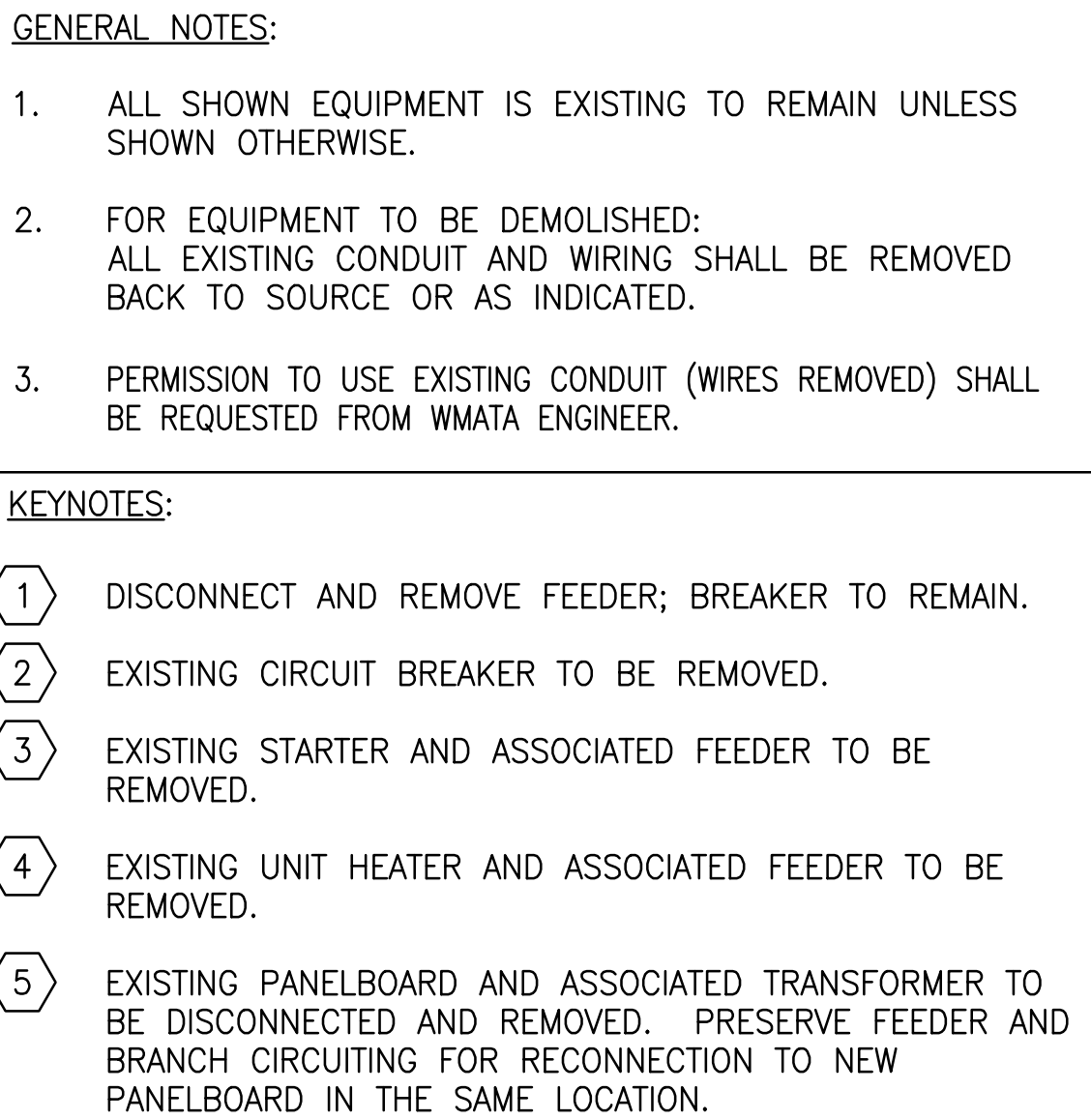
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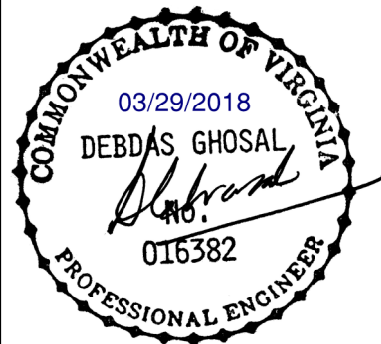
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M NO.		CONTRACT NO.		SCALE		DRAWING NO.		SHEET NO.			
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SCALE: NTS



DEPARTMENT OF DESIGN AND CONSTRUCTION SERVICES
OFFICE OF INFRASTRUCTURE RENEWAL PROGRAM GROUP

APPROVED  03/2018
GRAHAM SPILLER DATE
GFP DEPUTY PROGRAM MANAGER

REPLACEMENT OF CHILLERS
AND COOLING TOWER ACCESSORIES AT EIGHT METRO-RAIL STATIONS
CWPK2 - BALLSTON (K04)
ELECTRICAL SINGLE LINE DIAGRAM - DEMOLITION

M NO.	CONTRACT NO.	SCALE	DRAWING NO.	SHEET NO.
M1304	FQ-18102	1/4" = 1'-0"	CWPK2-E-601	166 of 173