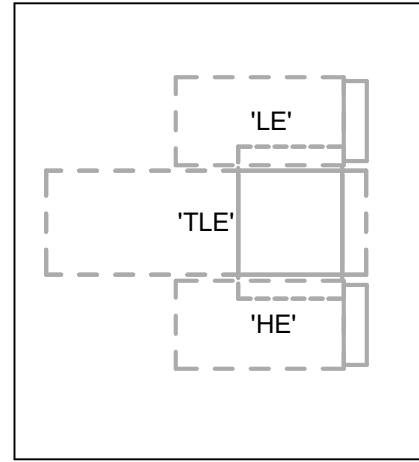




CARPENTRY SHOP
ELECTRICAL PANEL
APPROXIMATE
LOCATION

EXISTING
ONE STORY
METAL BLDG

ELECTRICAL POWER GENERAL NOTES

- A. CONDUIT LINES ARE DIAGRAMMATIC. CONTRACTOR SHALL FIELD VERIFY CONDITIONS AND CHOOSE APPROPRIATE CONDUIT ROUTING. IN THE EVENT THAT THE APPROXIMATE CONDUIT ROUTING SHOWN ON PLANS IS NOT FEASIBLE CONTRACTOR SHALL NOTIFY ARCHITECT/ENGINEER.
- B. RECEPTACLES LOCATED WITHIN 6" OF ANY PLUMBING FIXTURE, IN BREAK ROOMS, AT THE EXTERIOR, IN THE PARKING GARAGE OR OTHERWISE EXPOSED TO WATER SHALL BE TYPE GFCI. "WP" INDICATES A WEATHERPROOF "WHILE-IN-USE" COVER.
- C. ALL WIRING DEVICES ARE NEW UNLESS NOTED OTHERWISE.
- D. ALL ELECTRICAL EQUIPMENT IS EXISTING TO REMAIN UNLESS NOTED OTHERWISE.
- E. COORDINATE DISCONNECT SWITCHES, VFDs AND STARTER LOCATIONS WITH EQUIPMENT INSTALLERS TO MAINTAIN PROPER MAINTENANCE AND CODE REQUIRED CLEARANCES.
- F. COORDINATE RECEPTACLE AND DATACOM LOCATIONS SO THAT DEVICES ON SIMILAR WALLS ARE ADJACENT TO ONE ANOTHER.
- G. REFERENCE EQUIPMENT CONNECTION SCHEDULE FOR REQUIREMENTS AND ADDITIONAL INFORMATION OF TAGGED EQUIPMENT SHOWN ON PLAN DRAWING.
- H. PROVIDE 120V POWER TO EACH HVAC DDC CONTROL PANEL. COORDINATE EXACT LOCATIONS AND QUANTITIES WITH MECHANICAL DRAWINGS.

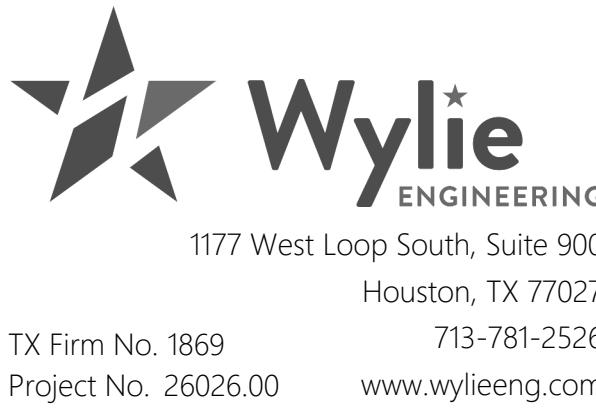
ELECTRICAL KEY NOTES

- 1 NEW HVAC AIR COOLED CHILLER EQUIPMENT. PROVIDE CIRCUITS, DISCONNECTS, RACEWAYS & CONDUITS, AND OTHER ELECTRICAL APPURTENANCES AS REQUIRED. COORDINATE WITH MECHANICAL FOR EXACT LOCATIONS, CIRCUIT REQUIREMENTS, CONNECTION REQUIREMENTS, AND APPURTENANCES.
- 2 NEW HVAC PUMP EQUIPMENT. PROVIDE CIRCUITS, DISCONNECTS, RACEWAYS & CONDUITS, AND OTHER ELECTRICAL APPURTENANCES AS REQUIRED. PULL NEW WIRE FROM THE EXISTING BREAKER TO THE NEW EQUIPMENT, REUSING THE EXISTING BREAKER. COORDINATE WITH MECHANICAL FOR EXACT LOCATIONS, CIRCUIT REQUIREMENTS, CONNECTION REQUIREMENTS, AND APPURTENANCES.
- 3 PROVIDE 120V SWITCHED JUNCTION BOXES FOR CHILLER CONTROL CIRCUITS AND VALVES. COORDINATE EXACT LOCATIONS WITH MECHANICAL CONTRACTOR. PROVIDE STRUT CHANNEL AND ALL ACCESSORIES FOR MOUNTING AS REQUIRED.
- 4 PROVIDE POWER AND CIRCUITING FOR CHILLED WATER PIPE HEAT TRACE SYSTEM AS INDICATED. COORDINATE EXACT CONNECTION POINTS AND CONTROLLER LOCATIONS WITH MECHANICAL CONTRACTOR. PROVIDE GFPE BREAKER AS REQUIRED BY NEC.
- 5 PROVIDE NEW RECEPTACLE WITH WEATHERPROOF-WHILE-IN-USE COVER. CONNECT TO CIRCUIT AS SHOWN. MOUNT AT 18" ABOVE GRADE TO RACK HOLDING MECHANICAL VFD EQUIPMENT.
- 6 NEW POLE LIGHT FIXTURE. CONNECT TO 120V CIRCUIT SERVING OUTLETS IN THIS AREA AS SHOWN. FIXTURE SHALL BE EQUIPPED WITH INTEGRAL PHOTOCELL FOR ON/OFF CONTROL. REFER TO LIGHTING FIXTURE SCHEDULE, SHEET ABCS-E3.00.



TOMBALL ISD - CHILLER
PACKAGE #2a

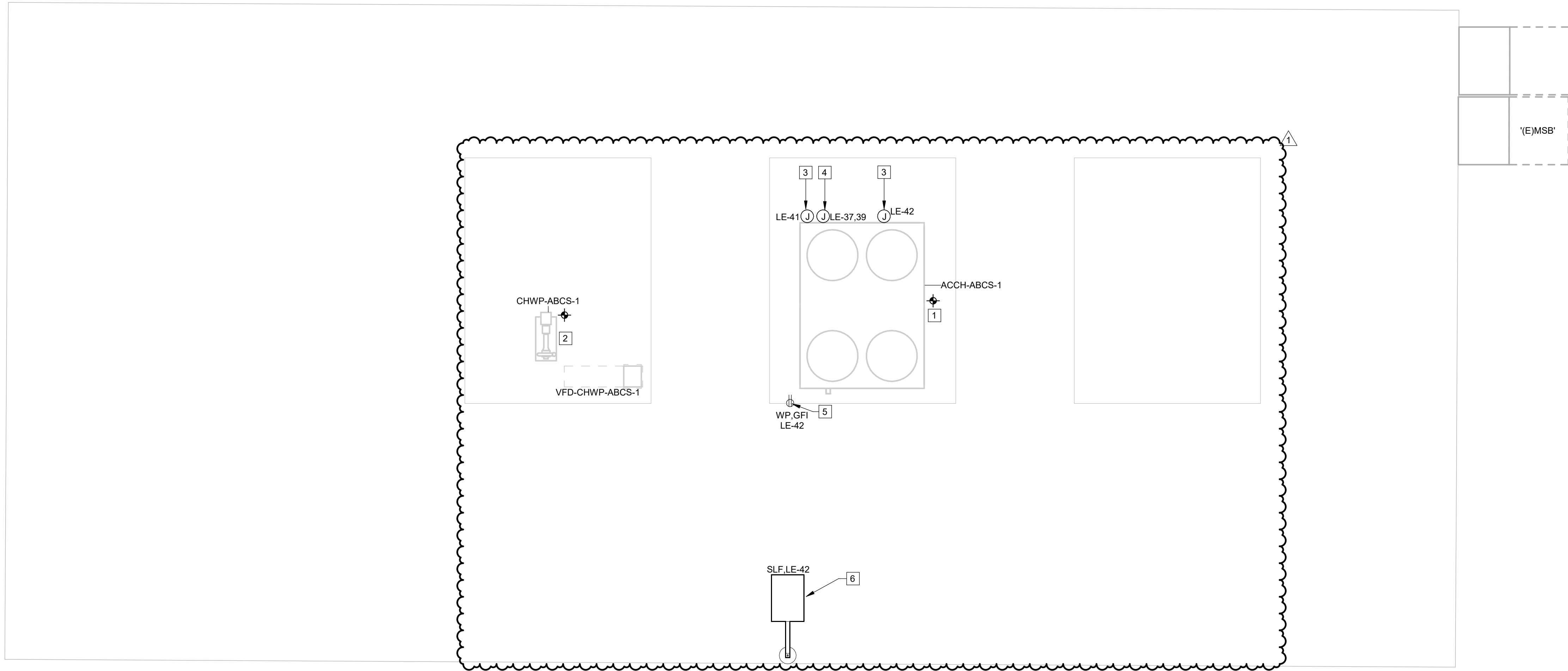
Ancillary Services Building
Baker Dr
Tomball, TX 77375



ELECTRICAL POWER
PLAN - MECHANICAL
YARD

ABCS-E2.01

Scale As indicated



CONTRACTOR TO RETURN ALL REMOVED CONTROLS CARDS AND CONTROLLERS TO THE OWNER.

- A. REFER TO MECHANICAL COVER SHEET FOR SYMBOLS, ABBREVIATIONS, AND ADDITIONAL INFORMATION.
- B. REFER TO MECHANICAL SCHEDULES AND DETAIL DRAWINGS FOR ADDITIONAL INFORMATION.
- C. MAINTAIN MANUFACTURER'S RECOMMENDED SERVICE CLEARANCE FOR NEW AND EXISTING MECHANICAL EQUIPMENT.
- D. THE CONTRACTOR SHALL VERIFY THAT ALL EXISTING AND NEW MECHANICAL EQUIPMENT ARE MOUNTED SO THAT ALL REQUIRED CLEARANCES ARE MAINTAINED AT THE BOTTOM AND SIDES OF EACH UNIT FOR PROPER SERVICING AND MAINTENANCE. COORDINATE COMPLETELY WITH ALL NEW WALLS TO STRUCTURE, AND RELOCATE AS REQUIRED TO MAINTAIN PROPER CLEARANCES.
- E. CONTRACTOR SHALL FIELD VERIFY ACTUAL LOCATIONS OF ALL EQUIPMENT, DUCTWORK, & PIPING PRIOR TO SUBMITTING A BID. COORDINATE COMPLETELY WITH ALL OTHER TRADES TO RELOCATE TERMINAL UNITS AND PROVIDE ADDITIONAL DUCTWORK, OFFSETS, FITTINGS, ETC. AS REQUIRED.

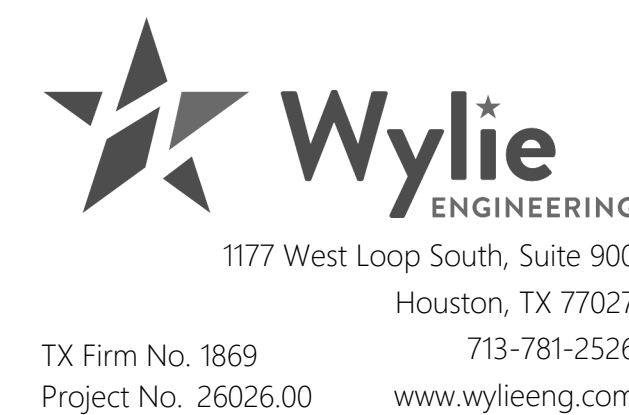
- 1 EXISTING 1 1/2" CWV FROM BELOW GRADE TO REMAIN, REPLACE SHUT-OFF BALL VALVE.
- 2 PROVIDE NEW 1-1/2" R282P/F, 1" WATTS MODEL 909 SERIES REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTER ASSEMBLY, RATED FOR HIGH-HAZARD APPLICATIONS, FOR HORIZONTAL INSTALLATION. COORDINATE WITH ELECTRICAL FOR HEAT TRACING POWER REQUIREMENTS. INSTALL NO MORE THAN 5'-0" ABOVE BURNING FLOOR AND 5'-0" ABOVE GRADE. PROVIDE FOR TESTING, MAINTENANCE, AND REPAIR. REFER TO 01/ABCS - MFS 01 FOR DETAIL.
- 3 1-1/2" CWV PIPING SHALL BE ROUTED, SUPPORTED, AND PROTECTED FROM PHYSICAL DAMAGE IN A MANNER SATISFACTORY TO THE OWNER. PIPING SHALL BE MOUNTED TO WALLS OR JOINTLY MOUNTED TO WALLS AND CEILING WITH COORDINATE PIPE CLAMPS AT 6'-0" C/C. MAXIMUM. PROVIDE ADDITIONAL SUPPORT WITHIN 24" OF ANY 90° TURN OR DIRECTLY UNDER VALVES AND ASSOCIATED APPURTENANCES. EQUIPMENT CONNECTIONS. DO NOT REST PIPE DIRECTLY ON FLOOR OR SLAB. MAINTAIN CLEAR ACCESS TO VALVES AND ASSOCIATED APPURTENANCES. REFER: ABCS-MPS 0007
- 4 ALL WATER PIPING, VALVES, BFFs, AND ASSOCIATED APPURTENANCES SUBJECT TO FLOOR FINISH SHALL BE INSULATED WITH FACTORY-APPLIED ALUMINUM JACKET AND HEAT TRACED. COORDINATE WITH ELECTRICAL.
- 5 CONTRACTOR SHALL PROVIDE AN ALTERNATE UNIT PRICE FOR REPLACEMENT OF THE EXISTING UNDERGROUND DOMESTIC COLD WATER PIPING FROM THE POINT INDICATED BACK TO THE NEAREST ACTIVE MAIN OR BRANCH IN THE EXISTING BUILDING. IF THE EXISTING PIPING IS DETERMINED TO BE IN EXCELLENT CONDITION, PROVIDE EXACT ROUTING, SIZE, CONDITION, AND EXTENT OF THE EXISTING 1-1/2" CWV PIPING PRIOR TO REMOVAL WORK.
- 6 1 1/2" CWV MAKE-UP (VALVED) TO SERVE MECHANICAL EQUIPMENT. COORDINATE WITH MECHANICAL FOR FINAL CONNECTION POINT.

- 1 NEW OUTDOOR TYPE PUMP MOTOR VFD UNIT. PROVIDE NEW MOUNTING BRACKET AND SUPPORTS IN CONCRETE BASE. INSTALLATION SHALL BE PER MANUFACTURER'S REQUIREMENT.
- 2 PROVIDE SPRING VIBRATION TYPE ON THE FIRST 4 PIPE SUPPORTS FROM AND TO THE PUMP. OTHER SUPPORTS TO BE RIGID TYPE. REFER TO DETAIL DRAWING.
- 3 PROVIDE NEOPRENE PAD AT THE BASE OF THE UNIT FOR MOUNTING.
- 4 PROVIDE HEAT TRACE TO ALL PIPING. REFER TO ELECTRICAL.
- 5 PROVIDE A NEW AIR-COOLED CHILLER. REFER TO MECHANICAL DETAILS AND PIPING SCHEMATICS FOR ALL PIPING ACCESSORIES REQUIRED, INCLUDING VALVES, GAUGES, ETC. CONTROLS CONTRACTOR TO PROVIDE AND INSTALL NEW CONTROL VALVES AND ASSOCIATED WIRING AND PROGRAMMING TO INCORPORATE BACK INTO EXISTING CONTROLS SEQUENCE.
- 6 PROVIDE A NEW CHILLED WATER PUMP TYING INTO NEW PIPING. PROVIDE ALL NEW GAUGES, VALVES, AND ASSOCIATED APPURTENANCES, ETC. PER MECHANICAL DETAIL. CONTRACTOR TO COORDINATE ALL PIPING CONNECTIONS TO ENSURE NO UNNECESSARY CONNECTIONS ARE CREATED WHICH WOULD POTENTIALLY CREATE AN ISSUE WITH CONTROLS, GAUGES, VALVES, ETC. TO BE INSTALLED IN THE PIPING. REFER TO SCHEDULE SHEET FOR ADDITIONAL INFORMATION.
- 7 PROVIDE A NEW EXPANSION TANK TYING INTO NEW PIPING. PROVIDE ALL NEW GAUGES, VALVES, AND ASSOCIATED APPURTENANCES, ETC. PER MECHANICAL DETAIL. CONTRACTOR TO COORDINATE ALL PIPING CONNECTIONS TO ENSURE NO UNNECESSARY CONNECTIONS ARE CREATED WHICH WOULD POTENTIALLY CREATE AN ISSUE WITH CONTROLS, GAUGES, VALVES, ETC. TO BE INSTALLED IN THE PIPING.
- 8 PROVIDE A CHEMICAL PLOT FEEDER TYING INTO NEW PIPING. PROVIDE ALL NEW GAUGES, VALVES, AND ASSOCIATED APPURTENANCES, ETC. PER MECHANICAL DETAIL. CONTRACTOR TO COORDINATE ALL PIPING CONNECTIONS TO ENSURE NO UNNECESSARY CONNECTIONS ARE CREATED WHICH WOULD POTENTIALLY CREATE AN ISSUE WITH CONTROLS, GAUGES, VALVES, ETC. TO BE INSTALLED IN THE PIPING.
- 9 PROVIDE A NEW AIR SEPARATOR TYING INTO EXISTING PIPING TO REMAIN.
- 10 NEW CHILLED WATER PIPES, ISOLATION VALVES COMPLETE WITH INSULATION AS REQUIRED.
- 11 CHWS/R EMERGENCY CONNECTION.
- 12 OUTLINE OF CHILLER UNIT SERVICE AND MAINTENANCE CLEARANCE.
- 13 PROVIDE WITH RIGID PIPE SUPPORT CLOSE TO THE BEND.
- 14 PIPE EXPANSION LOOP ASSOCIATED WITH SUPPORT.
- 15 PROVIDE WITH PIPE ROLLER SUPPORT.

	ITEMS EXISTING TO REMAIN
	ITEMS EXISTING TO BE REMOVED
	NEW ITEMS

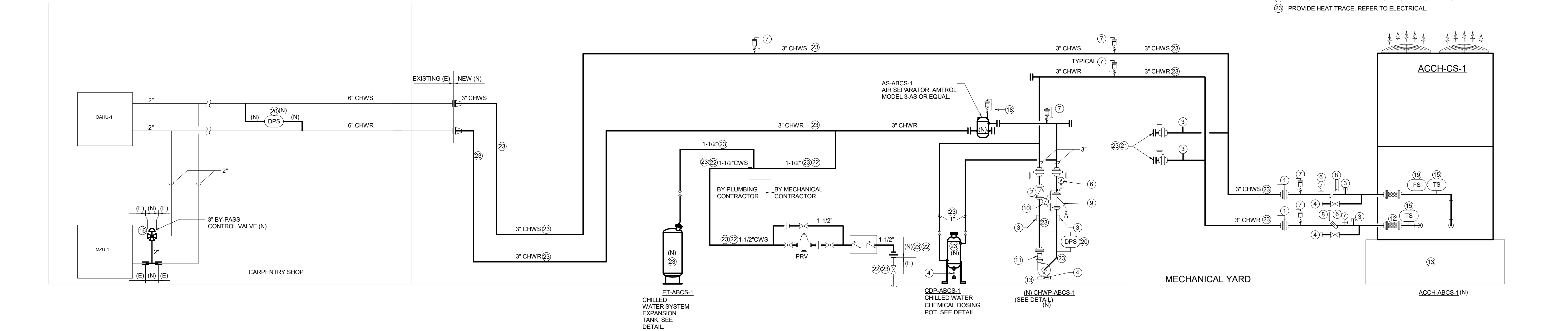
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Ancillary Services Building
Baker Dr
Tomball, TX 77375



ABCS - MP2.01

Scale	As indicated
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CHILLED WATER PIPING SCHEMATICS
SCALE: N.T.S.

CHILLER MANAGER AND PUMP SEQUENCE OF OPERATION

A. CHILLED WATER ACTIVATION

THE CHILLED WATER SYSTEM WILL BE ACTIVATED BY A REQUEST FOR COOLING FROM ANY AIR HANDLING UNITS OR COOLING EQUIPMENT SUPPLIED WITH CHILLED WATER.

B. CHILLER UNIT AND CHILLED WATER PUMP ACTIVATION

WHEN THE CHILLED WATER SYSTEM IS ACTIVATED, THE CHILLER CONTROL PROGRAM WILL START THE CHILLED WATER PUMP BY SENDING A 24 VAC SIGNAL TO A RELAY MOUNTED IN THE PUMP MOTOR VFD, WHICH WILL COMPLETE THE AUTO SIDE OF THE CONTROL CIRCUIT AND START THE PUMP. A FLOW SWITCH WILL PROVE STATUS TO THE BUILDING AUTOMATION SYSTEM (B.A.S.) AND WILL ALARM AT THE CENTRAL SITE IF THE SWITCH IS NOT MADE WITHIN THE ADJUSTABLE TIME PERIOD. AFTER 15 SECONDS (ADJUSTABLE), THE B.A.S. WILL SEND 24 VAC SIGNAL TO A RELAY, WHICH WILL COMPLETE THE REMOTE START TERMINALS IN THE CHILLER CONTROL CIRCUIT AND ALLOW THE CHILLER TO RUN. A FLOW SWITCH WILL NOT ALLOW THE CHILLER TO START UNTIL FLOW HAS BEEN PROVEN.

C. TEMPERATURE CONTROL AND STAGING

THE CHILLER WILL BE SET TO MAINTAIN A CHILLED WATER SUPPLY TEMPERATURE AS SPECIFIED IN THE SCHEDULE DRAWING (ADJUSTABLE). THE CHILLER UNIT WILL OPERATE ON PART LOADS THROUGH MULTI-COMPRESSOR STAGING FEATURING ELECTRONIC EXPANSION VALVES FOR PRECISE REFRIGERANT CONTROL.

THE ASSOCIATED CHILLED WATER PUMP WILL RUN VARIABLE FLOW TO PROVIDE STABLE CHILLED WATER TEMPERATURE CONTROL AND HELPS LIMIT UNACCEPTABLE SHORT CYCLING OF CHILLER COMPRESSORS.

THE CHILLER UNIT CONTROLLER ENABLES VARIABLE WATER FLOW PROVIDING +1.2°F LEAVING WATER TEMPERATURE ACCURACY AND TOLERATES 30% PER MINUTE WATER FLOW VARIATION WITH FLOW EQUAL OR ABOVE THE MINIMUM UNIT REQUIREMENT.

THE B.A.S. WILL INITIATE AN ALARM TO THE CENTRAL SITE IF THE BUILDING CHILLED WATER SUPPLY TEMPERATURE IS 5°F (ADJUSTABLE) AND ABOVE THE SETPOINT. AN ALARM OUTPUT FROM THE CHILLER PANEL WILL BE MONITORED FOR DISPLAY AT THE CENTRAL SITE.

D. CHILLED WATER PUMP AND DIFFERENTIAL PRESSURE SENSOR (DPS)

WHEN THE EXISTING AHU MEETS THE DEMAND LOAD, THE UNIT WILL GRADUALLY LIMITS THE FLOW OF CHILLED WATER INTO THE COIL VIA THE CONTROL VALVE. THE PRESSURE WILL GRADUALLY INCREASE. WHEN THE PRESET HIGH LIMIT DIFFERENTIAL PRESSURE IN THE DPS IS REACHED, A SIGNAL WILL BE SENT TO CONTROL THE PUMP VIA THE VFD TO MODULATE DOWN FOR LESS CHILLED WATER FLOW.

WHEN THE EXISTING AHU DEMANDS MORE LOAD, THE UNIT WILL GRADUALLY ALLOW MORE CHILLED WATER INTO THE COIL VIA THE CONTROL VALVE. THE DIFFERENTIAL PRESSURE PIPE WILL GRADUALLY DECREASE. WHEN THE PRESET LOW LIMIT DIFFERENTIAL PRESSURE IN THE DPS IS REACHED, A SIGNAL WILL BE SENT TO CONTROL THE PUMP VIA THE VFD TO MODULATE UP FOR MORE CHILLED WATER FLOW.

E. CHILLED WATER SYSTEM SHUTDOWN SEQUENCE

AFTER ALL REQUEST FOR COOLING BEEN SATISFIED OR HALTED BY THE B.A.S., THE CHILLER WILL CYCLE TO ITS OFF STATUS. THE ASSOCIATED CHILLED WATER PUMP WILL CONTINUE TO RUN FOR 5 MINUTES (ADJUSTABLE) TO ENSURE ADEQUATE FLOW DURING SHUTDOWN.

F. EQUIPMENT OFF CONDITIONS

WHEN THE CHILLED WATER SYSTEM IS INACTIVE, THE CHILLER AND ASSOCIATED PUMP WILL BE DE-ENERGIZED.

G. FREEZE AVOIDANCE AND WINTER CONDITION

FREEZE AVOIDANCE TO BE PRESENT TO ENABLE OR DISABLE. THE CHILLER UNIT SHALL BE CONFIGURED WITH THE PUMP CONTROLLER. WHEN FREEZE AVOIDANCE IS ENABLED, THE CHILLED WATER PUMP SHALL ACTIVATE WHEN THE AMBIENT TEMPERATURE DROPS BELOW THE LEAVING WATER TEMPERATURE CUTOFF. THE PUMP STAYS ENERGIZED UNTIL THE MINIMUM EVAPORATOR TEMPERATURE RISES 10°F ABOVE THE LEAVING WATER CUTOFF. THE PUMP WILL CYCLE OFF FOR A PERIOD OF TIME. AFTER THE TIME EXPIRES, THE PUMP OUTPUT MAY COME BACK ENERGIZED AGAIN IF THE AMBIENT TEMPERATURE IS AGAIN BELOW THE WATER CUTOFF.

THE PUMP SHALL BE SET TO OPERATE VIA THE VFD PROVIDING MINIMUM FLOW WITH THE BY-PASS VALVE AT OPEN POSITION.

CONTROL SCHEMATIC LEGEND

AI	ANALOG INPUT
AO	ANALOG OUTPUT
DI/BI	DIGITAL / BINARY INPUT
DO/BO	DIGITAL / BINARY OUTPUT
AFMS	AIR FLOW MEASURING STATION
MCV	CONTROL VALVE MODULATING TYPE
VFD	VARIABLE FREQUENCY RIVE
CSR	CURRENT SENSING RELAY
FRZ	FREEZE/STAT
HSL	HIGH STATIC LIMIT
SPT	DIFFERENTIAL PRESSURE TRANSDUCER
FM	FLOW METER
FS	FLOW SWITCH
DAT	DISCHARGE AIR TEMPERATURE SENSOR
S	WALL SENSOR
T	THERMISTAT
CO2	CARBON DIOXIDE
SP	SET POINT
S/A	SUPPLY AIR
R/A	RETURN AIR
O/A	OUTSIDE AIR
HC	HEATING COIL
CC	COOLING COIL
DX	DIRECT EXPANSION COOLING COIL
PICCV	PRESSURE INDEPENDENT CHARACTERIZED CONTROL VALVE
AFC	AIRFLOW CROSS
DPS	DIFFERENTIAL PRESSURE SWITCH

AIR COOLED CHILLER

TYPE	COUNT	NAME	DEVICE
AI	1	BUILDING CHW SUPPLY TEMPERATURE	10 kΩ IMMERSION SENSOR
AI	1	BUILDING CHW RETURN TEMPERATURE	10 kΩ IMMERSION SENSOR
AI	1	CHILLER CHW SUPPLY TEMPERATURE	10 kΩ IMMERSION SENSOR
AI	1	CHILLER CHW RETURN TEMPERATURE	10 kΩ IMMERSION SENSOR
AI	2	CHILLER AMPS	4-20 mA SENSOR
AI	1	OUTSIDE AIR TEMPERATURE	NORMALLY OPEN
DI	2	CHILLER PUMP STATUS	CURRENT SWITCH
DI	2	CHILLER ALARM	DRY CONTACT
DO	2	CHILLER START/STOP	24 VAC RELAY
DO	2	CHILLER PUMP START/STOP	24 VAC RELAY

CHILLER BACnet INTEGRATION

FURNISH AND INSTALL BACnet INTEGRATION MEANS AND PROVIDE ONE BACnet INTEGRATION SCREEN IN THE BAS GRAPHICS THAT INCLUDES THE FOLLOWING INFORMATION AT A MINIMUM FOR MONITORING PURPOSES ONLY.

- LOCAL REMOTE MODE
- ACTIVE ALERT / ALARM WITH ALARM MODE (NOTE: INCLUDE CROSS-REFERENCE TABLE FOR ODE DECIPHERING)
 - ACTIVE DEMAND LIMIT
 - ENTERING / LEAVING TEMPERATURES
 - RUNNING STATUS / MODE
 - COMPRESSOR DISCHARGE PRESSURE
 - COMPRESSOR WINDING TEMPERATURE
 - OUTDOOR AIR TEMPERATURE
 - SUCTION PRESSURE
 - NUMBER OF COMPRESSOR RUNNING OR CIRCUITS
 - CAPACITY
 - OIL PRESSURE ON EACH CIRCUIT
 - WATER SET-POINT
 - WATER FLOW

HEAT TRACE BAS INTEGRATION

THE HEAT TRACING SHALL BE CONTROLLED VIA TEMP OUTSIDE AIR TEMPERATURE SENSORS PROVIDED BY HEAT TRACE MANUFACTURER. BAS TO MONITOR STATUS ONLY. CONTRACTOR IS RESPONSIBLE TO PROVIDE THIS INTEGRATION EITHER THROUGH A RELAY PROVIDED BY THE CONTROLS CONTRACTOR TO THE BAS OR VIA HEAT TRACE MANUFACTURER BACNET INTEGRATION.

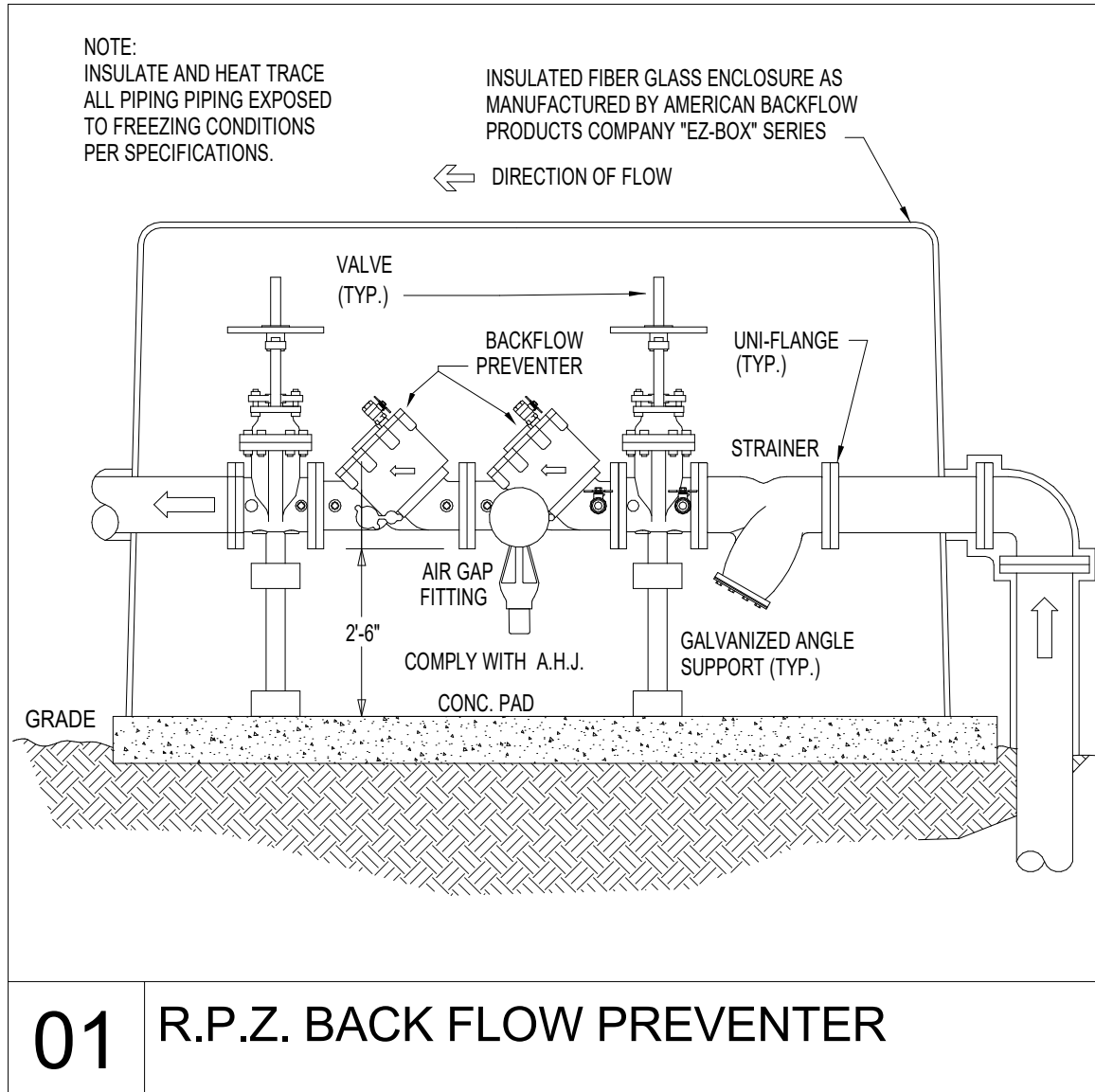
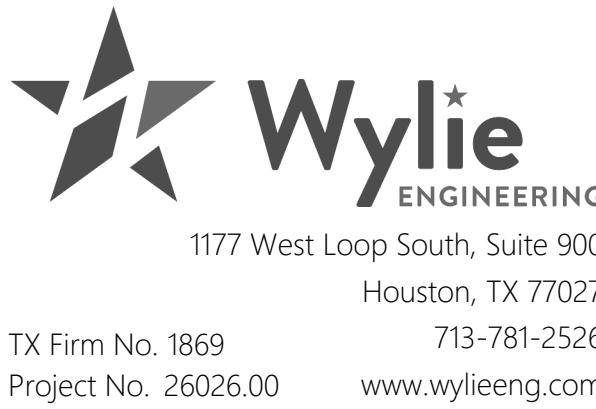
MECHANICAL KEYED NOTES:

- STOP VALVE, REFER TO SPECIFICATIONS.
- CHECK VALVE, REFER TO SPECIFICATIONS.
- PRESSURE/TEMPERATURE TEST PLUG. REFER TO SPECIFICATIONS.
- DRAIN VALVE WITH HOSE END ADAPTER.
- SUCTION DIFFUSER, REFER TO SPECIFICATIONS.
- PRESSURE GAUGE WITH GAUGE COCK. REFER TO SPECIFICATIONS.
- AUTOMATIC AIR VENT, REFER TO SPECIFICATIONS.
- THERMOMETER, REFER TO SPECIFICATIONS.
- "Y" STRAINER, REFER TO SPECIFICATIONS.
- DIFFERENTIAL PRESSURE GAUGE, REFER TO SPECIFICATIONS.
- CONCENTRIC REDUCER, REFER TO SPECIFICATIONS.
- FLEXIBLE CONNECTION, REFER TO SPECIFICATIONS.
- EXISTING HOUSEKEEPING PAD.
- BACKFLOW PREVENTER.
- TEMPERATURE SENSOR. TIE-IN TO B.A.S. AND DISPLAY ON THE GRAPHICS.
- CONTROL VALVE
- EXISTING TO REMAIN
- ROUTE TO THE NEAREST PLANTER AREA
- FACTORY INSTALLED WATER FLOW SWITCH
- DIFFERENTIAL PRESSURE SENSOR (DPS) INSTALLED ON A STRAIGHT PIPE (EQUAL TO 10X DIAMETER)
- 3" CHWS/R PROVISION FOR EMERGENCY CONNECTION
- MAKE-UP WATER PIPE WITH INSULATION AND CLADDING.
- PROVIDE HEAT TRACE. REFER TO ELECTRICAL.



TOMBALL ISD - CHILLER
PACKAGE #2a

Ancillary Services Building
Baker Dr
Tomball, TX 77375

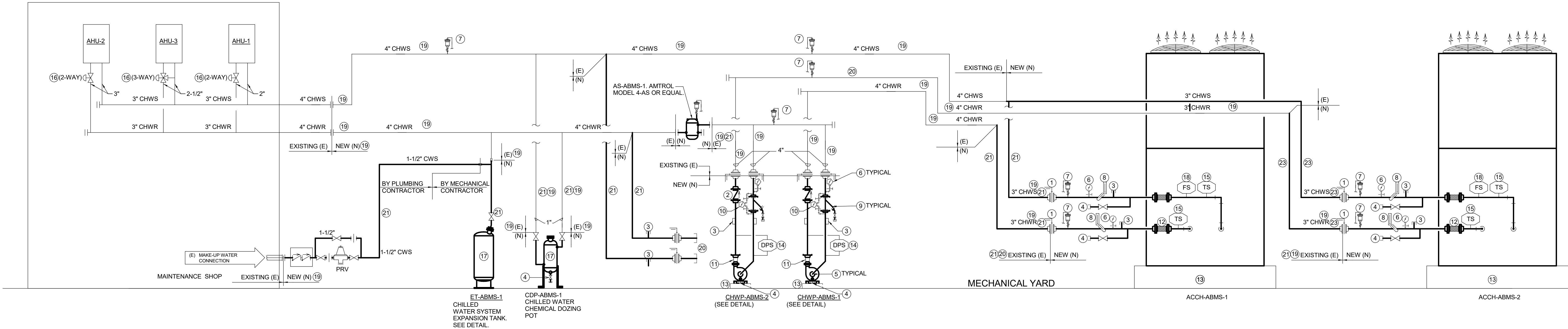


01 R.P.Z. BACK FLOW PREVENTER

MECHANICAL AND
PLUMBING PIPING
SCHEMATIC DIAGRAM

ABCS -
MP5.01

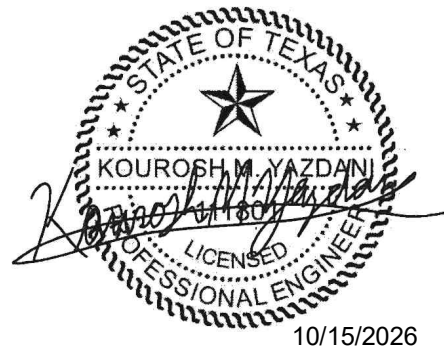
Scale 1/8" = 1'-0"



CHILLED WATER PIPING SCHEMATICS (ALTERNATE 1)
SCALE: N.T.S.

MECHANICAL KEYED NOTES:

- 1 STOP VALVE, REFER TO SPECIFICATIONS.
- 2 CHECK VALVE, REFER TO SPECIFICATIONS.
- 3 PRESSURE/TEMPERATURE TEST PLUG, REFER TO SPECIFICATIONS.
- 4 DRAIN VALVE WITH HOSE END ADAPTER.
- 5 SUCTION DIFFUSER, REFER TO SPECIFICATIONS.
- 6 PRESSURE GAUGE WITH GAUGE COCK, REFER TO SPECIFICATIONS.
- 7 AUTOMATIC AIR VENT, REFER TO SPECIFICATIONS.
- 8 THERMOMETER, REFER TO SPECIFICATIONS.
- 9 "Y" STRAINER, REFER TO SPECIFICATIONS.
- 10 DIFFERENTIAL PRESSURE GAUGE, REFER TO SPECIFICATIONS.
- 11 CONCENTRIC REDUCER, REFER TO SPECIFICATIONS.
- 12 FLEXIBLE CONNECTION, REFER TO SPECIFICATIONS.
- 13 EXISTING HOUSEKEEPING PAD.
- 14 DIFFERENTIAL PRESSURE SENSOR
- 15 TEMPERATURE SENSOR, TIE-IN TO B.A.S. AND DISPLAY ON THE GRAPHICS.
- 16 CONTROL VALVE (E)
- 17 EXISTING TO REMAIN
- 18 FACTORY APPLIED FLOW SWITCH
- 19 REPLACE PIPE INSULATION AND SHEET METAL CLADDING ON EXISTING PIPES.
- 20 4" CHWS/R PROVISION FOR EMERGENCY CONNECTION
- 21 PROVIDE HEAT TRACE, REFER TO ELECTRICAL.



TOMBALL ISD - CHILLER
PACKAGE #2b

Ancillary Services Building
1110 Baker Dr
Tomball, TX 77375

CHILLER MANAGER SEQUENCE OF OPERATION

A. CHILLED WATER ACTIVATION

THE CHILLED WATER SYSTEM WILL BE ACTIVATED BY A REQUEST FOR COOLING FROM ANY AIR HANDLING UNITS OR COOLING EQUIPMENT SUPPLIED WITH CHILLED WATER.

B. CHILLER UNITS AND CHILLED WATER PUMPS ACTIVATION

WHEN THE CHILLED WATER SYSTEM IS ACTIVATED, THE CHILLER CONTROL PROGRAM WILL START THE LEAD CHILLED WATER PUMP BY SENDING A 24 VAC SIGNAL TO A RELAY MOUNTED IN THE PUMP MOTOR VFD, WHICH WILL COMPLETE THE AUTO SIDE OF THE CONTROL CIRCUIT AND START THE PUMP. A FLOW SWITCH WILL PROVE STATUS TO THE BUILDING AUTOMATION SYSTEM (B.A.S.) AND WILL ALARM AT THE CENTRAL SITE IF THE SWITCH IS NOT MADE WITHIN THE ADJUSTABLE TIME PERIOD. AFTER 15 SECONDS (ADJUSTABLE), THE B.A.S. WILL SEND 24 VAC SIGNAL TO A RELAY, WHICH WILL COMPLETE THE REMOTE START TERMINALS IN THE CHILLER CONTROL CIRCUIT AND ALLOW THE LEAD CHILLER (DEDICATED TO THE PUMP) TO RUN. A FLOW SWITCH WILL NOT ALLOW THE CHILLER TO START UNTIL FLOW HAS BEEN PROVEN. THE B.A.S. CONTROL MODULE WILL AUTOMATICALLY START THE LAG CHILLER AND AN ALARM WILL BE SENT TO THE CENTRAL SITE, 15 MINUTES (ADJUSTABLE) TIME DELAYS WILL BE ASSIGNED TO EACH CHILLER START/ STOP CIRCUIT TO PREVENT SHORT CYCLING.

C. TEMPERATURE CONTROL AND STAGING

THE CHILLER WILL BE SET TO MAINTAIN A CHILLED WATER SUPPLY TEMPERATURE AS SPECIFIED IN THE SCHEDULE DRAWING (ADJUSTABLE). THE CHILLER UNIT WILL OPERATE ON PART LOADS THROUGH MULTI-COMPRESSOR STAGING FEATURING ELECTRONIC EXPANSION VALVES FOR PRECISE REFRIGERANT CONTROL.

THE ASSOCIATED CHILLED WATER PUMP WILL RUN VARIABLE FLOW TO PROVIDE STABLE CHILLED WATER TEMPERATURE CONTROL AND HELPS LIMIT UNACCEPTABLE SHORT CYCLING OF CHILLER COMPRESSORS.

THE CHILLER UNIT CONTROLLER ENABLES VARIABLE WATER FLOW PROVIDING +/-2°F LEAVING WATER TEMPERATURE ACCURACY AND TOLERATES 30% PER MINUTE WATER FLOW VARIATION WITH FLOW EQUAL OR ABOVE THE MINIMUM UNIT REQUIREMENT.

IF THE LEAD CHILLER UNIT AND ASSOCIATED PUMP AT FULL LOAD DELIVERS CHILLED WATER AT 2°F AND ABOVE THE SETPOINT FOR 5 MINUTES (ADJUSTABLE), A RUN REQUEST WILL BE SENT TO THE LAG CHILLER AND ASSOCIATED PUMP. BOTH CHILLERS WILL OPERATE AT SHARED LOAD. WHEN THE CHILLED WATER SUPPLY TEMPERATURE FALLS AT 2°F BELOW THE SETPOINT, THE LEAD UNITS WILL START DE-STAGING UNTIL THE LOAD IS HANDLED BY A SINGLE CHILLER WHICH THE LAG CHILLER WILL ASSUME FULL CONTROL.

THE B.A.S. WILL INITIATE AN ALARM TO THE CENTRAL SITE IF THE BUILDING CHILLED WATER SUPPLY TEMPERATURE IS 5°F (ADJUSTABLE) AND ABOVE THE SETPOINT. AN ALARM OUTPUT FROM THE CHILLER PANEL WILL BE MONITORED FOR DISPLAY AT THE CENTRAL SITE.

D. CHILLED WATER PUMP AND DIFFERENTIAL PRESSURE SENSOR (DPS)

WHEN THE EXISTING AHU MEETS THE DEMAND LOAD, THE UNIT WILL GRADUALLY LIMITS THE FLOW OF CHILLED WATER INTO THE COIL VIA THE 2-WAY AND 3-WAY CONTROL VALVES. THE PRESSURE IN THE PIPE WILL GRADUALLY INCREASE. WHEN THE PRESET HIGH LIMIT PRESSURE IN THE DPS IS REACHED, A SIGNAL WILL BE SENT TO CONTROL THE PUMP VIA THE VFD TO MODULATE DOWN THE OPERATION FOR LESS CHILLED WATER FLOW.

WHEN THE EXISTING AHU DEMANDS MORE LOAD, THE UNIT WILL GRADUALLY ALLOW MORE CHILLED WATER INTO THE COIL VIA THE 2-WAY AND 3-WAY CONTROL VALVES. THE PRESSURE IN THE PIPE WILL GRADUALLY DECREASE. WHEN THE PRESET LOW LIMIT PRESSURE IN THE DPS IS REACHED, A SIGNAL WILL BE SENT TO CONTROL THE PUMP VIA THE VFD TO MODULATE UP THE OPERATION FOR MORE CHILLED WATER FLOW.

E. LEAD / LAG ROTATION AND SEQUENCING (EQUAL RUN-TIME)

ON A DAILY BASIS, CHANGE THE CHILLER UNIT AND PUMP LEAD / LAG INDEXING. DAILY LEAD PUMP INDEXED TO RUN WITH THE LEAD CHILLER UNIT. DAILY LAG PUMP INDEXED TO RUN WITH THE LAG CHILLER.

UPON THE LAG PUMP STARTING, THE LEAD PUMP SHALL RAMP DOWN THAT BOTH PUMPS (LEAD/LAG) SHARE THE FLOW / LOAD AT 50% EACH TO PREVENT TOTAL FLOW SPIKES AND ALLOW BOTH PUMPS TO MODULATE IN PARALLEL.

THE BUILDING AUTOMATION SYSTEM (BAS) OR THE PROGRAMMABLE LOGIC CONTROLLER (PLC) SHALL ALTERNATE THE LEAD AND LAG DESIGNATIONS THAT TRIGGER THE ROTATION BASED ON CUMULATIVE RUN-HOURS (E.G. SWAPPING ROLES EVERY 500 HOURS) OR ON A WEEKLY SCHEDULE TO EQUALIZE WEAR AND TEAR ACROSS BOTH PUMPS.

F. CHILLED WATER SYSTEM SHUTDOWN SEQUENCE

AFTER ALL REQUEST FOR COOLING BEEN SATISFIED OR HALTED BY THE B.A.S., THE CHILLER WILL CYCLE TO ITS OFF STATUS. THE ASSOCIATED CHILLED WATER PUMP WILL CONTINUE TO RUN FOR 5 MINUTES (ADJUSTABLE) TO ENSURE ADEQUATE FLOW DURING SHUTDOWN.

G. EQUIPMENT OFF CONDITIONS

WHEN THE CHILLED WATER SYSTEM IS INACTIVE, THE CHILLER AND ASSOCIATED PUMP WILL BE DE-ENERGIZED.

H. FREEZE AVOIDANCE AND WINTER CONDITION

FREEZE AVOIDANCE TO BE PRESENT TO ENABLE OR DISABLE, THE CHILLER UNIT SHALL BE CONFIGURED WITH THE PUMP CONTROLLER. WHEN FREEZE AVOIDANCE IS ENABLED, THE CHILLED WATER PUMP SHALL ACTIVATE WHEN THE AMBIENT TEMPERATURE DROPS BELOW THE LEAVING WATER TEMPERATURE CUTOFF. THE PUMP STAYS ENERGIZED UNTIL THE MINIMUM EVAPORATOR TEMPERATURE RISES 13°F ABOVE THE LEAVING WATER CUTOFF. THE PUMP WILL CYCLE OFF FOR A PERIOD OF TIME. AFTER THE TIME EXPIRES, THE PUMP OUTPUT MAY COME BACK ENERGIZED AGAIN IF THE AMBIENT TEMPERATURE IS AGAIN BELOW THE WATER CUTOFF.

THE PUMP SHALL BE SET TO OPERATE VIA THE VFD PROVIDING MINIMUM FLOW WITH THE EXISTING 3-WAY VALVE LOCATED AT AHU-3 AT OPEN POSITION.

CONTROL SCHEMATIC LEGEND

AI	ANALOG INPUT
AO	ANALOG OUTPUT
DIBI	DIGITAL / BINARY INPUT
DOBO	DIGITAL / BINARY OUTPUT
AFMS	AIR FLOW MEASURING STATION
MCV	CONTROL VALVE MODULATING TYPE
VFD	VARIABLE FREQUENCY RIVE
CSR	CURRENT SENSING RELAY
FRZ	FREEZE/STAT
HSL	HIGH STATIC LIMIT
SPT	DIFFERENTIAL PRESSURE TRANSDUCER
FM	FLOW METER
FS	FLOW SWITCH
DAT	DISCHARGE AIR TEMPERATURE SENSOR
S	WALL SENSOR
T	THERMOSTAT
CO2	CARBON DIOXIDE
SP	SET POINT
S/A	SUPPLY AIR
R/A	RETURN AIR
O/A	OUTSIDE AIR
HC	HEATING COIL
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PICCV	PRESSURE INDEPENDENT CHARACTERIZED CONTROL VALVE
AFC	AIRFLOW CROSS
DPS	DIFFERENTIAL PRESSURE SWITCH

AIR COOLED CHILLER

TYPE	COUNT	NAME	DEVICE
AI	1	BUILDING CHW SUPPLY TEMPERATURE	10 KΩ IMMERSION SENSOR
AI	1	BUILDING CHW RETURN TEMPERATURE	10 KΩ IMMERSION SENSOR
AI	2	CHILLER CHW SUPPLY TEMPERATURE	10 KΩ IMMERSION SENSOR
AI	2	CHILLER CHW RETURN TEMPERATURE	10 KΩ IMMERSION SENSOR
AI	2	CHILLER AMPS	4-20 mA SENSOR
AI	1	OUTSIDE AIR TEMPERATURE (NORTH SIDE OF BLDG)	NORMALLY OPEN
DI	2	CHILLER PUMP STATUS	CURRENT SWITCH
DI	2	CHILLER ALARM	DRY CONTACT
DO	2	CHILLER START/STOP	24 VAC RELAY
DO	2	CHILLER PUMP START/STOP	24 VAC RELAY

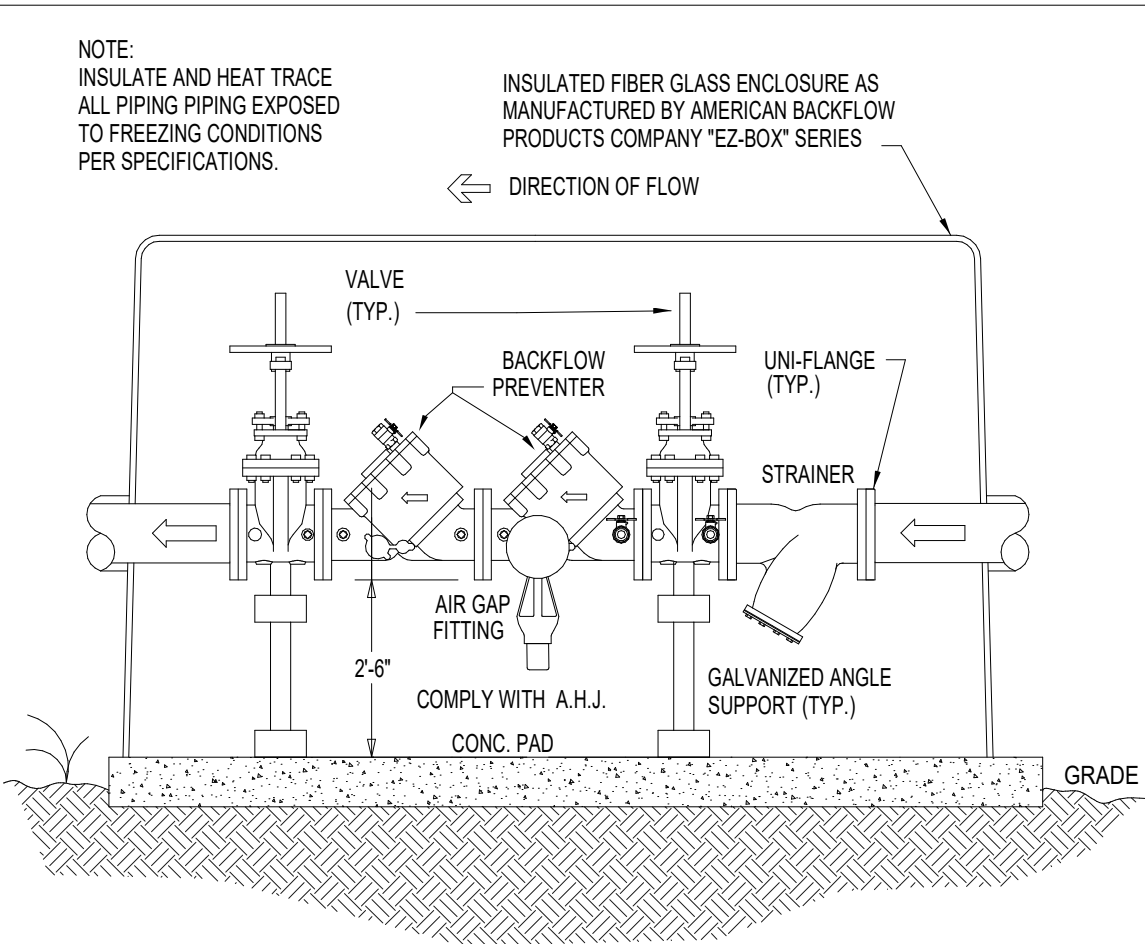
CHILLER BACnet INTEGRATION

FURNISH AND INSTALL BACnet INTEGRATION MEANS AND PROVIDE ONE BACnet INTEGRATION SCREEN IN THE BAS GRAPHICS THAT INCLUDES THE FOLLOWING INFORMATION AT A MINIMUM FOR MONITORING PURPOSES ONLY:

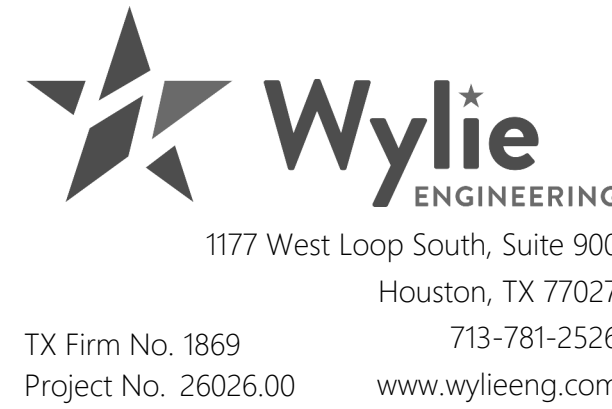
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 - ACTIVE DEMAND LIMIT
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 - SUCTION PRESSURE
 - NUMBER OF COMPRESSOR RUNNING OR CIRCUITS
 - CAPACITY
 - OIL PRESSURE ON EACH CIRCUIT
 - WATER SET-POINT
 - WATER FLOW

HEAT TRACE BAS INTEGRATION

THE HEAT TRACING SHALL BE CONTROLLED VIA TEMP OUTSIDE AIR TEMPERATURE SENSORS PROVIDED BY HEAT TRACE MANUFACTURER. BAS TO MONITOR STATUS ONLY. CONTRACTOR IS RESPONSIBLE TO PROVIDE THIS INTEGRATION EITHER THROUGH A RELAY PROVIDED BY THE CONTROLS CONTRACTOR TO THE BAS OR VIA HEAT TRACE MANUFACTURER BACNET INTEGRATION.

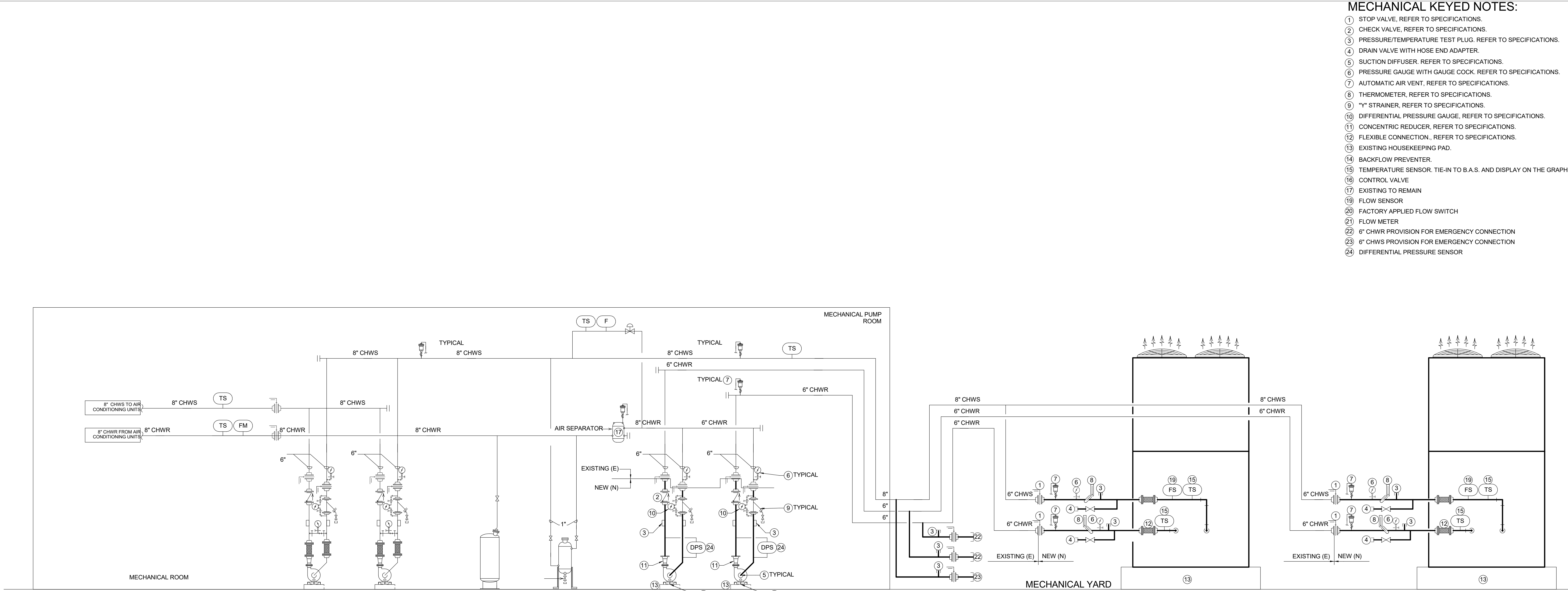


01 R.P.Z. BACK FLOW PREVENTER



MECHANICAL AND
PLUMBING PIPING
SCHEMATIC DIAGRAM
(ALTERNATE 1)
ADVIS -
MP5.01

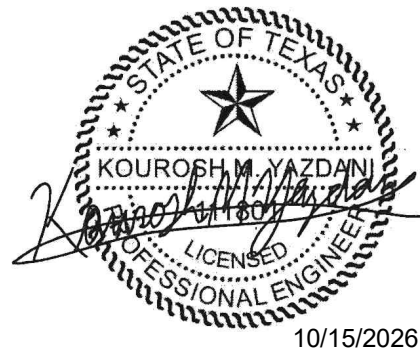
Scale 1/8" = 1'-0"



CHILLED WATER PIPING SCHEMATICS
SCALE: N.T.S.

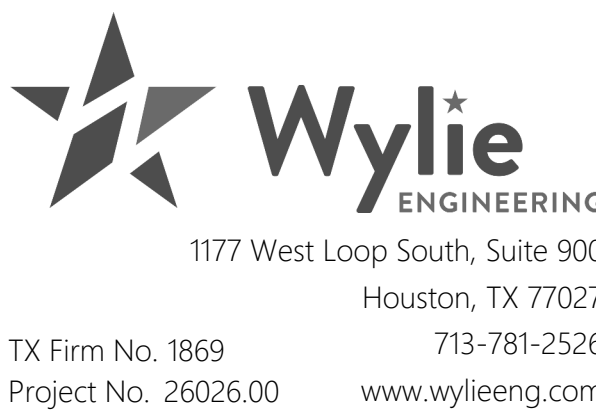
MECHANICAL KEYED NOTES:

- 1 STOP VALVE, REFER TO SPECIFICATIONS.
- 2 CHECK VALVE, REFER TO SPECIFICATIONS.
- 3 PRESSURE/TEMPERATURE TEST PLUG, REFER TO SPECIFICATIONS.
- 4 DRAIN VALVE WITH HOSE END ADAPTER.
- 5 SUCTION DIFFUSER, REFER TO SPECIFICATIONS.
- 6 PRESSURE GAUGE WITH GAUGE COCK, REFER TO SPECIFICATIONS.
- 7 AUTOMATIC AIR VENT, REFER TO SPECIFICATIONS.
- 8 THERMOMETER, REFER TO SPECIFICATIONS.
- 9 "Y" STRAINER, REFER TO SPECIFICATIONS.
- 10 DIFFERENTIAL PRESSURE GAUGE, REFER TO SPECIFICATIONS.
- 11 CONCENTRIC REDUCER, REFER TO SPECIFICATIONS.
- 12 FLEXIBLE CONNECTION, REFER TO SPECIFICATIONS.
- 13 EXISTING HOUSEKEEPING PAD.
- 14 BACKFLOW PREVENTER.
- 15 TEMPERATURE SENSOR, TIE-IN TO B.A.S. AND DISPLAY ON THE GRAPHICS.
- 16 CONTROL VALVE
- 17 EXISTING TO REMAIN
- 19 FLOW SENSOR
- 20 FACTORY APPLIED FLOW SWITCH
- 21 FLOW METER
- 22 6" CHWR PROVISION FOR EMERGENCY CONNECTION
- 23 8" CHWS PROVISION FOR EMERGENCY CONNECTION
- 24 DIFFERENTIAL PRESSURE SENSOR



TOMBALL ISD - CHILLER
PACKAGE #2d

Timber Creek ES
8455 Creekside Green Dr
The Woodlands, TX 77389



CHILLER MANAGER SEQUENCE OF OPERATION

- A. CHILLED WATER ACTIVATION**
- THE CHILLED WATER SYSTEM WILL BE ACTIVATED BY A REQUEST FOR COOLING FROM ANY AIR HANDLING UNITS OR COOLING EQUIPMENT SUPPLIED WITH CHILLED WATER.
- B. CHILLER UNITS AND CHILLED WATER PUMPS ACTIVATION**
- WHEN THE CHILLED WATER SYSTEM IS ACTIVATED, THE CHILLER CONTROL PROGRAM WILL START THE LEAD CHILLED WATER PUMP BY SENDING A 24 VAC SIGNAL TO A RELAY MOUNTED IN THE PUMP MOTOR VFD, WHICH WILL COMPLETE THE AUTO SIDE OF THE CONTROL CIRCUIT AND START THE PUMP. A FLOW SWITCH WILL PROVE STATUS TO THE BUILDING AUTOMATION SYSTEM (B.A.S.) AND WILL ALARM AT THE CENTRAL SITE IF THE SWITCH IS NOT MADE WITHIN THE ADJUSTABLE TIME PERIOD. AFTER 15 SECONDS (ADJUSTABLE), THE B.A.S. WILL SEND 24 VAC SIGNAL TO A RELAY, WHICH WILL COMPLETE THE REMOTE START TERMINALS IN THE CHILLER CONTROL CIRCUIT AND ALLOW THE LEAD CHILLER TO RUN. A FLOW SWITCH WILL NOT ALLOW THE CHILLER TO START UNTIL FLOW HAS BEEN PROVEN. THE B.A.S. CONTROL MODULE WILL AUTOMATICALLY START THE LAG CHILLER AND AN ALARM WILL BE SENT TO THE CENTRAL SITE, 15 MINUTES (ADJUSTABLE) TIME DELAYS WILL BE ASSIGNED TO EACH CHILLER START / STOP CIRCUIT TO PREVENT SHORT CYCLING.
- C. TEMPERATURE CONTROL AND STAGING**
- THE CHILLER WILL BE SET TO MAINTAIN A CHILLED WATER SUPPLY TEMPERATURE AS SPECIFIED IN THE SCHEDULE DRAWING (ADJUSTABLE). THE CHILLER UNIT WILL OPERATE ON PART LOADS THROUGH MULTI-COMPRESSOR STAGING FEATURING ELECTRONIC EXPANSION VALVES FOR PRECISE REFRIGERANT CONTROL.
- THE ASSOCIATED CHILLED WATER PUMP WILL RUN VARIABLE FLOW TO PROVIDE STABLE CHILLED WATER TEMPERATURE CONTROL AND HELPS LIMIT UNACCEPTABLE SHORT CYCLING OF CHILLER COMPRESSORS.
- THE CHILLER UNIT CONTROLLER ENABLES VARIABLE WATER FLOW PROVIDING +/-2°F LEAVING WATER TEMPERATURE ACCURACY AND TOLERATES 30% PER MINUTE WATER FLOW VARIATION WITH FLOW EQUAL OR ABOVE THE MINIMUM UNIT REQUIREMENT.
- IF THE LEAD CHILLER UNIT AND ASSOCIATED PUMP AT FULL LOAD DELIVERS CHILLED WATER AT 2°F AND ABOVE THE SETPOINT FOR 5 MINUTES (ADJUSTABLE), A RUN REQUEST WILL BE SENT TO THE LAG CHILLER AND ASSOCIATED PUMP. BOTH CHILLERS WILL OPERATE AT SHARED LOAD. WHEN THE CHILLED WATER SUPPLY TEMPERATURE FALLS AT 2°F BELOW THE SETPOINT, THE LEAD UNITS WILL START DE-STAGING UNTIL THE LOAD IS HANDLED BY A SINGLE CHILLER WHICH THE LAG CHILLER WILL ASSUME FULL CONTROL.
- THE B.A.S. WILL INITIATE AN ALARM TO THE CENTRAL SITE IF THE BUILDING CHILLED WATER SUPPLY TEMPERATURE IS 5°F (ADJUSTABLE) AND ABOVE THE SETPOINT. AN ALARM OUTPUT FROM THE CHILLER PANEL WILL BE MONITORED FOR DISPLAY AT THE CENTRAL SITE.
- D. CHILLED WATER PUMP AND DIFFERENTIAL PRESSURE SENSOR (DPS)**
- WHEN THE EXISTING AHU MEETS THE DEMAND LOAD, THE UNIT WILL GRADUALLY LIMITS THE FLOW OF CHILLED WATER INTO THE COIL VIA THE 2-WAY CONTROL VALVE. THE PRESSURE IN THE PIPE WILL GRADUALLY INCREASE. WHEN THE PRESET HIGH LIMIT PRESSURE IN THE DPS IS REACHED, A SIGNAL WILL BE SENT TO CONTROL THE PUMP VIA THE VFD TO MODULATE DOWN THE OPERATION FOR LESS CHILLED WATER FLOW.
- WHEN THE EXISTING AHU DEMANDS MORE LOAD, THE UNIT WILL GRADUALLY ALLOW MORE CHILLED WATER INTO THE COIL VIA THE 2-WAY CONTROL VALVES. THE PRESSURE IN THE PIPE WILL GRADUALLY DECREASE. WHEN THE PRESET LOW LIMIT PRESSURE IN THE DPS IS REACHED, A SIGNAL WILL BE SENT TO CONTROL THE PUMP VIA THE VFD TO MODULATE UP THE OPERATION FOR MORE CHILLED WATER FLOW.
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CONTROL SCHEMATIC LEGEND

- AI ANALOG INPUT
AO ANALOG OUTPUT
DI(BI) DIGITAL / BINARY INPUT
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MCV CONTROL VALVE MODULATING TYPE
VFD VARIABLE FREQUENCY RIVE
CSR CURRENT SENSING RELAY
FRZ FREEZESTAT
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SPT DIFFERENTIAL PRESSURE TRANSDUCER
FM FLOW METER
FS FLOW SWITCH
DAT DISCHARGE AIR TEMPERATURE SENSOR
S WALL SENSOR
T THERMOSTAT
CO2 CARBON DIOXIDE
SP SET POINT
S/A SUPPLY AIR
R/A RETURN AIR
O/A OUTSIDE AIR
HC HEATING COIL
CC COOLING COIL
DX DIRECT EXPANSION COOLING COIL
PICCV PRESSURE INDEPENDENT CHARACTERIZED CONTROL VALVE
AFC AIRFLOW CROSS
DPS DIFFERENTIAL PRESSURE SWITCH

AIR COOLED CHILLER

TYPE	COUNT	NAME	DEVICE
AI	1	BUILDING CHW SUPPLY TEMPERATURE	10 KΩ IMMERSION SENSOR
AI	1	BUILDING CHW RETURN TEMPERATURE	10 KΩ IMMERSION SENSOR
AI	2	CHILLER CHW SUPPLY TEMPERATURE	10 KΩ IMMERSION SENSOR
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AI	2	CHILLER AMPS	4-20 mA SENSOR
AI	1	OUTSIDE AIR TEMPERATURE (NORTH SIDE OF BLDG)	NORMALLY OPEN
DI	2	CHILLER PUMP STATUS	CURRENT SWITCH
DI	2	CHILLER ALARM	DRY CONTACT
DO	2	CHILLER START/STOP	24 VAC RELAY
DO	2	CHILLER PUMP START/STOP	24 VAC RELAY

CHILLER BACnet INTEGRATION

FURNISH AND INSTALL BACnet INTEGRATION MEANS AND PROVIDE ONE BACnet INTEGRATION SCREEN IN THE BAS GRAPHICS THAT INCLUDES THE FOLLOWING INFORMATION AT A MINIMUM FOR MONITORING PURPOSES ONLY:

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 - RUNNING STATUS / MODE
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 - COMPRESSOR WINDING TEMPERATURE
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 - SUCTION PRESSURE
 - NUMBER OF COMPRESSOR RUNNING OR CIRCUITS
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MECHANICAL AND
PLUMBING PIPING
SCHEMATIC DIAGRAM
TCES -
MP5.01

Scale 1/8" = 1'-0"



CHILLED WATER ACTIVATION

THE CHILLED WATER SYSTEM WILL BE ACTIVATED BY A REQUEST FOR COOLING FROM ANY AIR HANDLING UNITS OR COOLING EQUIPMENT SUPPLIED WITH CHILLED WATER.

B. CHILLER UNITS AND CHILLED WATER PUMPS CONNECTION

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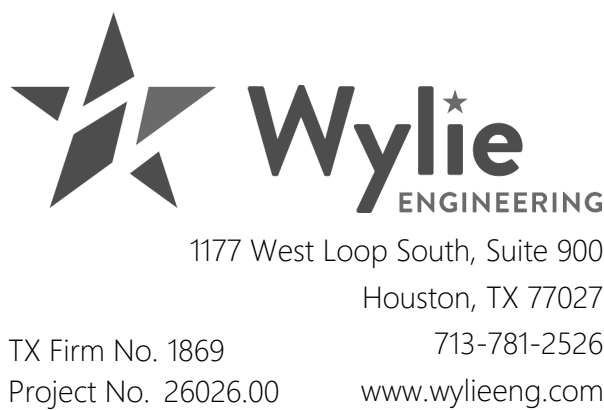
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[illegible]

TOMBALL ISD - CHILLER
PACKAGE #2c

Tomball ES
1110 Inwood St,
Tomball, TX 77375



AIR COOLED CHILLER			
TYPE	COUNT	NAME	DEVICE
AI	1	BUILDING CHW SUPPLY TEMPERATURE	10 KΩ IMMERSION SENSOR
AI	1	BUILDING CHW RETURN TEMPERATURE	10 KΩ IMMERSION SENSOR
AI	2	CHILLER CHW SUPPLY TEMPERATURE	10 KΩ IMMERSION SENSOR
AI	2	CHILLER CHW RETURN TEMPERATURE	10 KΩ IMMERSION SENSOR
AI	2	CHILLER AMPS	4-20 mA SENSOR
AI	1	OUTSIDE AIR TEMPERATURE (NORTH SIDE OF BLDG)	NORMALLY OPEN
DI	2	CHILLER PUMP STATUS	CURRENT SWITCH
DI	2	CHILLER ALARM	DRY CONTACT
DO	2	CHILLER START/STOP	24 VAC RELAY
DO	2	CHILLER PUMP START/STOP	24 VAC RELAY

FURNISH AND INSTALL BACnet INTEGRATION MEANS AND PROVIDE ONE BACnet INTEGRATION SCREEN IN THE BAS GRAPHICS THAT INCLUDES THE FOLLOWING INFORMATION AT A MINIMUM FOR MONITORING PURPOSES ONLY:

- LOCAL REMOTE MODE
- ACTIVE ALERT / ALARM WITH ALARM MODE (NOTE: INCLUDE CROSS-REFERENCE TABLE FOR ODE DEPICTING)
- ACTIVE DEMAND LIMIT
- ENTERING / LEAVING TEMPERATURE
- RUNNING STATUS / MODE
- COMPRESSOR DISCHARGE PRESSURE
- COMPRESSOR WINDING TEMPERATURE
- OUTDOOR AIR TEMPERATURE
- SUCTION PRESSURE
- NUMBER OF COMPRESSOR RUNNING OR CIRCUITS
- CAPACITY
- OIL PRESSURE ON EACH CIRCUIT
- WATER SET-POINT
- WATER FLOW

THE HEAT TRACING SHALL BE CONTROLLED VIA TEMP OUTSIDE AIR TEMPERATURE SENSORS PROVIDED BY HEAT TRACE MANUFACTURER. BAS TO MONITOR STATUS ONLY. CONTRACTOR IS RESPONSIBLE TO PROVIDE THIS INTEGRATION EITHER THROUGH A RELAY PROVIDED BY THE CONTROLS CONTRACTOR TO THE BAS OR VIA HEAT TRACE MANUFACTURER BACNET INTEGRATION.

Scale $1/8" = 1'-0"$