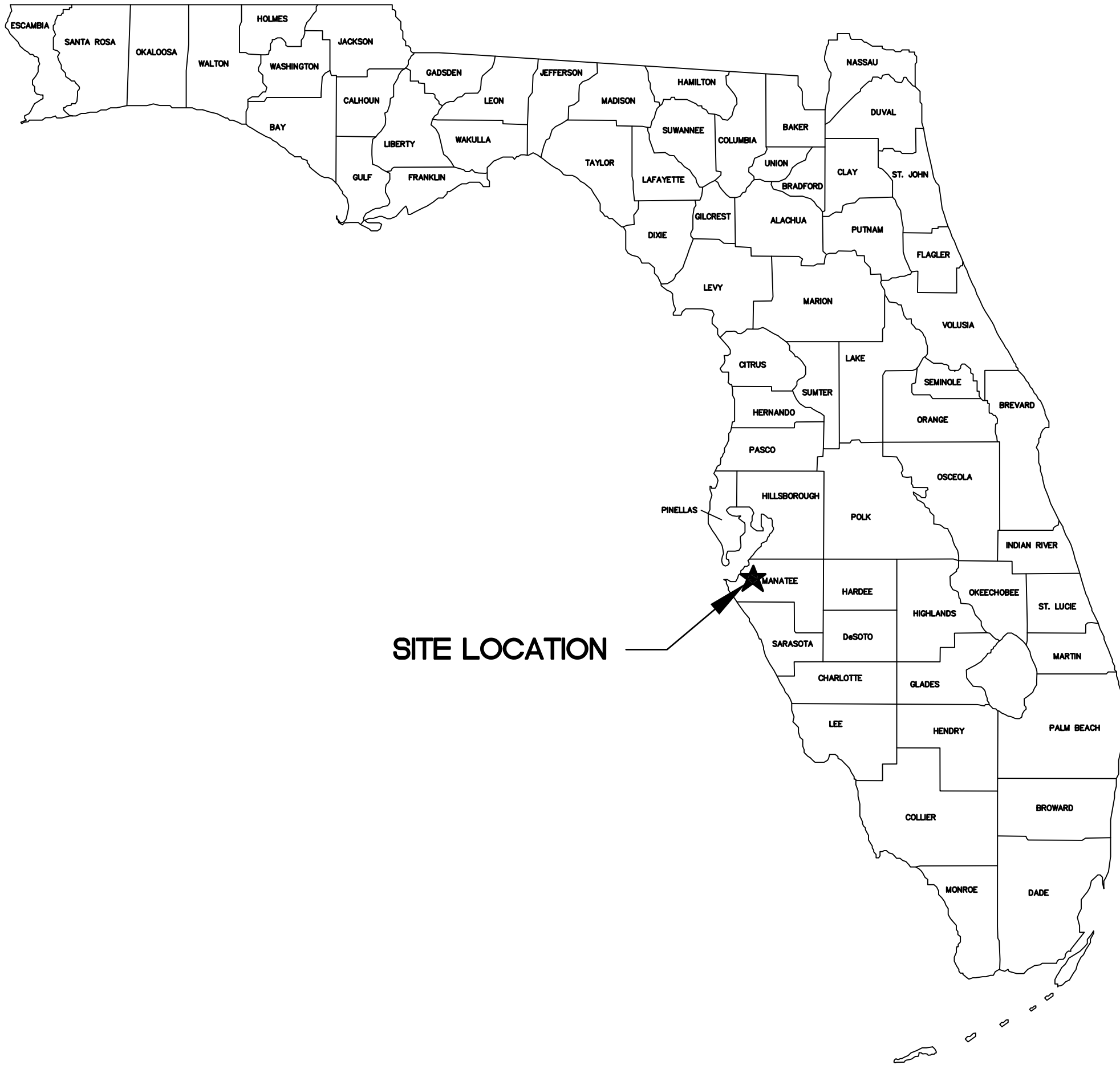


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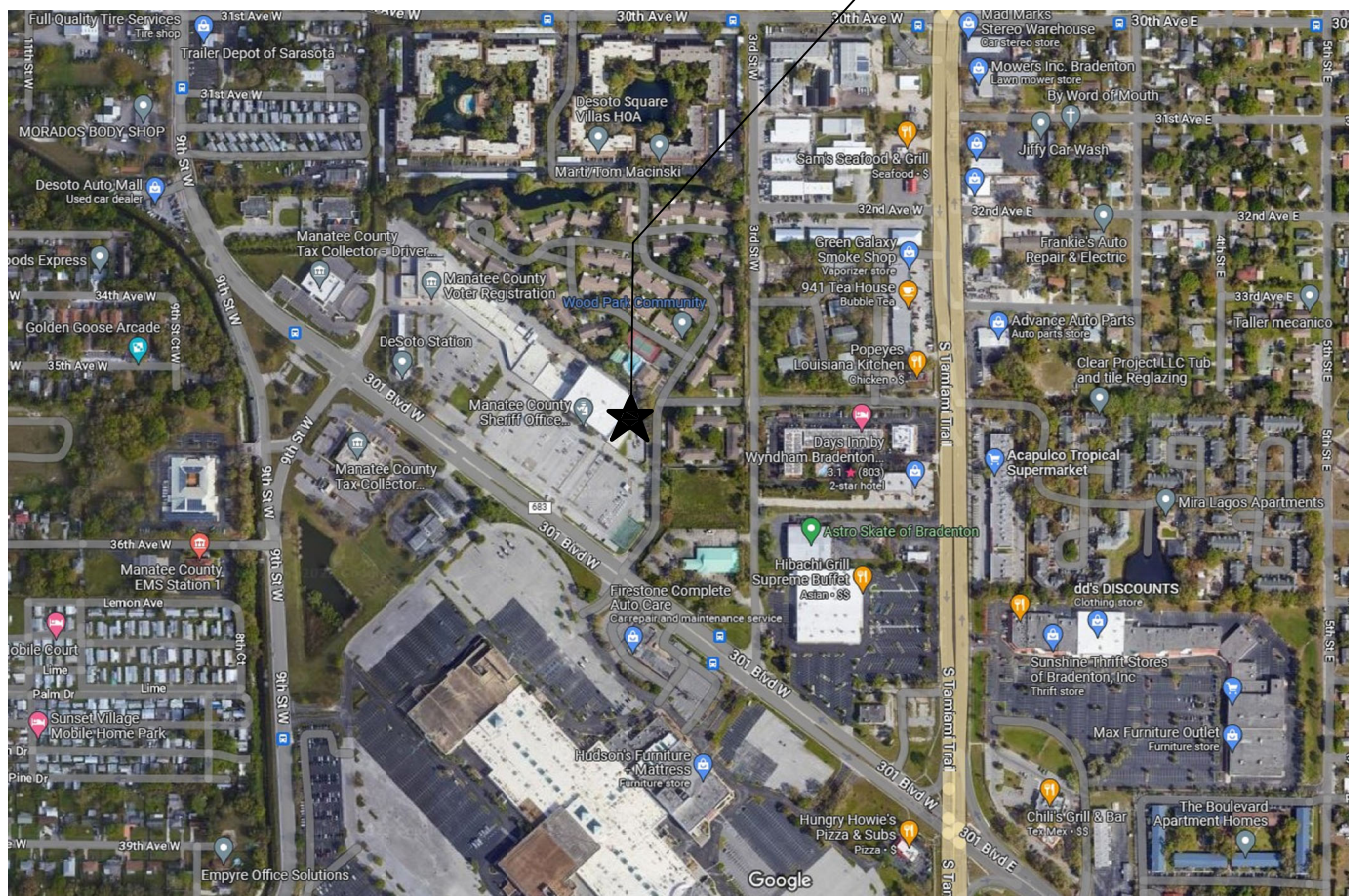
CHILLER PLANT REPLACEMENT

600 US 301

BRADENTON, FLORIDA 34211



LOCATION MAP
FLORIDA



SITE MAP

SHEET SCHEDULE	
SHEET	DESCRIPTION
COVER	PROJECT NAME, LOCATION and SITE MAPS, SHEET SCHEDULE
E1.0	ELECTRICAL SYMBOLS, LEGENDS AND GENERAL NOTES
E4.0	ELECTRICAL POWER AND SYSTEMS
E5.0	ELECTRICAL ONE-LINE RISER
E6.0	ELECTRICAL SPECS AND DETAILS
M1.0	MECHANICAL LEGEND AND GENERAL NOTES
M2.0	MECHANICAL FLOOR PLANS
M3.0	MECHANICAL SCHEDULE AND DETAILS
M5.0	MECHANICAL SPECIFICATIONS
M5.1	MECHANICAL SPECIFICATIONS

SEAL

MATTHEW J. CAMDEN
FL#79284

THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY MATTHEW J. CAMDEN, P.E. (FL#79284) ON 05-02-2023 USING AN SHA AUTHENTICATION CODE.

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To the best of the engineer's knowledge, said plans and specifications comply with the applicable building codes and the applicable minimum fire safety standards as determined in accordance with Chapters 553 and 633, Florida Statutes.

ELECTRICAL SYMBOLS AND ABBREVIATIONS

EQUIPMENT

SYMBOL	DESCRIPTION
	DISTRIBUTION PANELBOARD AND CABINET – RECESSED MOUNT
	DISTRIBUTION PANELBOARD AND CABINET – SURFACE MOUNT
	BRANCH PANELBOARD AND CABINET – RECESSED MOUNT
	BRANCH PANELBOARD AND CABINET – SURFACE MOUNT
	LOAD CENTER – SURFACE MOUNT
	LOAD CENTER – RECESSED MOUNT
	DENOTES PANEL/PANELBOARD DESIGNATION
	MOTOR "X" INDICATES HORSEPOWER "Y" INDICATES PHASE
	CAPACITOR "X" INDICATES KVAR
	DISCONNECT SWITCH – FUSED "X"= RATING, "Y" = FUSE SIZE
	DISCONNECT SWITCH – NON-FUSED
	DISCONNECT SWITCH – CIRCUIT BREAKER
	MOTOR STARTER
	COMBINATION MOTOR STARTER
	DRY TYPE TRANSFORMER – "XX" INDICATES KVA
	METER SOCKET
	CURRENT TRANSFORMER METER SOCKET
	TRANSIENT VOLTAGE SURGE SUPPRESSOR
	GENERATOR
	TRANSFER SWITCH
	ATS = AUTOMATIC TRANSFER SWITCH
	MTS = MANUAL TRANSFER SWITCH
	N = NORMAL POWER
	E = EMERGENCY POWER
	L = LOAD
	WIREWAY
	BUSWAY
	GROUND CONNECTION
	HORSEPOWER RATED MANUAL MOTOR STARTER TOGGLE SWITCH WITH THERMAL OVERLOAD PROTECTION "X" INDICATES AS FOLLOWS NONE – SINGLE POLE 2 – 2 POLE 3 – 3 POLE
	HORSEPOWER RATED MANUAL MOTOR STARTER TOGGLE SWITCH WITH THERMAL OVERLOAD PROTECTION WITH PILOT LIGHT "X" INDICATES AS FOLLOWS NONE – SINGLE POLE 2 – 2 POLE 3 – 3 POLE "Y" INDICATES AS FOLLOWS Y – YELLOW LENS G – GREEN LENS R – RED LENS W – WHITE LENS B – BLUE LENS A – AMBER
	LOW VOLTAGE DRAWOUT TYPE CIRCUIT BREAKER "X" INDICATES AS FOLLOWS A – AIR TYPE S – SF6 TYPE V – VACUUM TYPE
	MOLDED CASE CIRCUIT BREAKER
	FUSE
	DRAW OUT MOTOR STARTER ASSEMBLY

RACEWAY SYSTEM

SYMBOL	DESCRIPTION
	CONCEALED CONDUIT
	4" CONDUIT SLEEVE WITH BUSHINGS THRU WALL ABOVE CEILING
	LETTER DESIGNATION REFERS TO SYSTEM (SEE ABBREVIATIONS)
	QUANTITY OF CONDUCTORS OR CABLES IN CONDUIT
	"F50" DENOTES THE FEEDER SIZE
	"A-XX" DENOTES PANEL AND CIRCUIT #
	CONDUIT TURNED UP
	CONDUIT TURNED DOWN
	JUNCTION OR PULL BOX
	CABLE TRAY
	U/G CONDUIT TURNED UP
	U/G CONDUIT TURNED DOWN

LIGHTING

SYMBOL	DESCRIPTION
X-2-C	X = FIXTURE TYPE, 2 = CIRCUIT NUMBER, C = SWITCH LEG F – FLUORESCENT K – INCANDESCENT H – H.I.D.
	FLUORESCENT STRIP TYPE FIXTURE
	FLUORESCENT TYPE FIXTURE
	FLUORESCENT TYPE FIXTURE WITH EMERGENCY BATTERY BALLAST
	CEILING MOUNT LIGHT FIXTURE
	CEILING MOUNT RECESSED LIGHT FIXTURE (ROUND OR SQUARE, SEE SCHEDULE)
	INTERIOR WALL MOUNT FIXTURE
	EXTERIOR WALL MOUNT FIXTURE
	LIGHTED BOLLARD FIXTURE (ROUND OR SQUARE, SEE SCHEDULE)
	STEPLIGHT FIXTURE
	LIGHT POLE WITH ONE FIXTURE (FIXTURE LOCATION AND SPACING AS SHOWN)
	2 HEAD POLE LIGHT. LOCATION AND SPACING AS SHOWN.
	3 HEAD POLE LIGHT. LOCATION AND SPACING AS SHOWN.
	EXIT LIGHT –CEILING MOUNTED ARROWS DENOTE EGRESS PATH
	EXIT LIGHT – WALL MOUNTED ARROWS DENOTE EGRESS PATH
	EMERGENCY WALL MOUNT W/ BATTERY UNIT
	EXIT / EMERGENCY WALL MOUNT W/ BATTERY UNIT
	ARROWS DENOTE EGRESS PATH
	EMERGENCY WALL MOUNT REMOTE HEAD

DEVICES

SYMBOL	DESCRIPTION
	DUPLEX RECEPTACLE – NORMAL CIRCUIT "X" INDICATES AS FOLLOWS: NONE = 20 AMP, 125VAC GFI = 20 AMP, 125VAC, GROUND FAULT INTERRUPTER TYPE HM = 20 AMP, 125VAC, HORIZONTAL MOUNT TYPE IG = 20 AMP, 125VAC, ISOLATED GROUND TYPE S = 20 AMP, 125VAC, TVSS PROTECTION TYPE WP = 20 AMP, 125VAC, WEATHERPROOF TYPE
	DOUBLE DUPLEX RECEPTACLE
	DUPLEX RECEPTACLE – 1 OUTLET CONTROLLED BY SWITCH
	DUPLEX RECEPTACLE – 2 OUTLETS CONTROLLED BY SWITCH
	DOUBLE DUPLEX RECEPTACLE – 1 OUTLET CONTROLLED BY SWITCH
	DOUBLE DUPLEX RECEPTACLE – 2 OUTLETS CONTROLLED BY SWITCH
	DUPLEX RECEPTACLE – ABOVE COUNTER. 44" AFF
	DOUBLE DUPLEX RECEPTACLE – ABOVE COUNTER. 44" AFF
	SINGLE RECEPTACLE – SEE DRAWINGS AND SPECIFICATIONS.
	SPECIAL RECEPTACLE – SEE DRAWINGS AND SPECIFICATIONS.
	SINGLE RECEPTACLE – FLOOR, SEE DRAWINGS AND SPECIFICATIONS.
	DUPLEX RECEPTACLE – FLOOR, SEE DRAWINGS AND SPECIFICATIONS.
	CLOCK RECEPTACLE – 120VAC
	TOGGLE SWITCH – SINGLE POLE
	TOGGLE SWITCH – DOUBLE POLE
	TOGGLE SWITCH – 3-WAY
	TOGGLE SWITCH – 4-WAY
	TOGGLE SWITCH – 4-WAY
	SWITCH – DIMMER
	SWITCH – FAN SPEED CONTROL
	WALL MOUNTED OCCUPANCY SENSOR
	CEILING MOUNTED OCCUPANCY SENSOR x = TYPE, SEE PLANS
	HANDICAP PUSH BUTTON DOOR SWITCH
	JUNCTION BOX
	HVAC THERMOSTAT
	HVAC HUMIDISTAT
	FURNITURE POWER POLE
	FURNITURE CABLE MANAGEMENT POLE.
	MUSHROOM HEAD RED PUSH BUTTON

THESE DOCUMENTS HAVE BEEN PREPARED BASED ON INFORMATION PROVIDED BY OTHERS. THE CONSULTANT HAS NOT VERIFIED THE ACCURACY AND/OR COMPLETENESS OF THIS INFORMATION AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS THAT MAY BE INCORPORATED AS A RESULT OF ERRONEOUS INFORMATION PROVIDED BY OTHERS. NOTIFY THIS ENGINEER IMMEDIATELY OF ANY DISCREPANCIES FOUND.

FIRE ALARM SYSTEM

SYMBOL	DESCRIPTION
	HORN / STROBE
	○ = CEILING MOUNT
	□ = WALL MOUNT
	HORN
	○ = CEILING MOUNT
	□ = WALL MOUNT
	SPEAKER/STROBE
	○ = CEILING MOUNT
	□ = WALL MOUNT
	STROBE
	○ = CEILING MOUNT
	□ = WALL MOUNT
	BELL
	○ = CEILING MOUNT
	□ = WALL MOUNT
	SMOKE DETECTOR
	HEAT DETECTOR
	PULL STATION
	ELEVATOR WARNING LIGHT
	FIREFIGHTER PHONE JACK
	TAMPER SWITCH
	FLOW SWITCH
	F.A.A.P. REMOTE ANNUNCIATOR
	FIRE ALARM CONTROL PANEL
	DOOR RELEASE DEVICE – FIRE ALARM ACTIVATED
	SPEAKER – FIRE ALARM
	AUTOMATIC DUCT DETECTOR ("X" DENOTES AS FOLLOWS:) NONE = PHOTO ELECTRIC TYPE S= SUPPLY R= RETURN
	EQUIPMENT SHUT DOWN RELAY
	REMOTE DUCT DETECTOR INDICATOR LIGHT X= AIR HANDLER / ROOF TOP UNIT
	FSS FIRE SUPPRESSION SYSTEM

TELEVISION SYSTEM

SYMBOL	DESCRIPTION
	TELEVISION ROUGH-IN

DOOR SECURITY SYSTEM

SYMBOL	DESCRIPTION
	DOOR CONTACT ROUGH-IN
	PROXIMITY CARD READER ROUGH-IN
	ELECTRO-MAGNETIC DOOR LOCK
	DURESS / PANIC BUTTON

COMMUNICATION SYSTEMS

SYMBOL	DESCRIPTION
	WALL MOUNTED VOICE OUTLET
	WALL MOUNTED DATA OUTLET
	WALL MOUNTED COMBINATION VOICE / DATA OUTLET
	FLOOR MOUNTED VOICE OUTLET.
	FLOOR MOUNTED DATA OUTLET.
	FLOOR MOUNTED COMBINATION VOICE / DATA OUTLET.
	TELEPHONE CABINET
	COMMUNICATIONS CABINET

PAGING / AUDIO SYSTEM

SYMBOL	DESCRIPTION
	LOUDSPEAKER – CEILING MOUNTED CONTROLLED BY VOLUME CONTROL "1"
	VOLUME CONTROL – CONTROLS SPEAKERS "1"
	PAGING ROUGH-IN
	AUDIO JACK ROUGH-IN
	MICROPHONE ROUGH-IN
	PROJECTOR ROUGH-IN

DRAWING SYMBOLS

	DETAIL NUMBER
	DRAWING NUMBER WHERE DRAWN
	SECTION LETTER
	DRAWING NUMBER WHERE DRAWN
	REFER TO LIKE NUMBER NOTES.
	REFER TO LIKE NUMBER NOTES.

GENERAL NOTES (APPLY TO ALL DRAWINGS):

- THE WORK INDICATED ON THESE DRAWINGS IS DIAGRAMMATIC AND IS INTENDED TO CONVEY THE SCOPE OF WORK AND INDICATE THE GENERAL ARRANGEMENT OF EQUIPMENT AND DEVICES FOR A COMPLETE SYSTEM IN EVERY RESPECT AND DETAIL. TESTED AND LEFT READY IN PERFECT OPERATING CONDITION FOR THE OWNER'S USE. MATERIALS AND EQUIPMENT SHALL BE LISTED BY UNDERWRITERS' LABORATORIES AND SHALL BE INSTALLED IN ACCORDANCE WITH SUCH LISTINGS. INSTALLATIONS SHALL BE MADE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. WORK SHALL MEET THE REQUIREMENTS OF THE SPECIFICATIONS AND CONFORM TO THE NEC (NFPA 70 & 72) 2017, 2020 FBC, AND ALL APPLICABLE CODES, AND BE COMPLETED BY A QUALIFIED, EXPERIENCED, LICENSED ELECTRICAL CONTRACTOR.
- THE ENGINEER HAS MADE AN EFFORT TO COORDINATE WORK WITH OTHER TRADES AND IDENTIFY ANY AND ALL CONFLICTS. THE CONTRACTOR IS RESPONSIBLE TO COORDINATE FIELD WORK BETWEEN TRADES AND TO IDENTIFY FIELD CONDITIONS PRIOR TO INSTALLATION AND REPORT ANY CONFLICTS TO THE ENGINEER.
- FOR BIDDING PURPOSES, WHEN A CONFLICT OCCURS BETWEEN THE SPECIFICATIONS AND DRAWINGS, THE ITEMS OF GREATER QUANTITY AND/OR COST SHALL BE PROVIDED. ANY SUCH CONFLICTS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER FOR RESOLUTION.
- CONTRACTOR SHALL VERIFY THE LOCATION AND ELECTRICAL REQUIREMENTS OF ALL EQUIPMENT FURNISHED BY OTHER TRADES PRIOR TO INSTALLATION. COORDINATE ROUGH-IN INSTALLATION WITH EQUIPMENT DETAILS.
- ALL OPENINGS IN FIRE AND SMOKE PARTITIONS SHALL BE SEALED AS REQUIRED BY THE NEC/ FLORIDA BUILDING CODE. PROVIDE UL LISTED COMPOUND TO MATCH PARTITION RATING.
- DO NOT SCALE DRAWINGS. VERIFY FIELD CONDITIONS PRIOR TO AND DURING CONSTRUCTION FOR EXACT DEVICE / EQUIPMENT LOCATION.
- DEMOLITION WORK: PROVIDE DEMOLITION AND REMOVAL WORK AS INDICATED OR NEEDED. EQUIPMENT THAT IS TO BE REMOVED INCLUDES ALL ASSOCIATED WIRING, BOXES AND CONDUIT BACK TO SOURCE. CLOSE ALL UNUSED OPENINGS IN JUNCTION BOXES THAT REMAIN WITH SUITABLE PLUG OR COVER. WHEN REMOVING OR RELOCATING LIGHT FIXTURES OR OTHER DEVICES, FIELD VERIFY REMAINING DEVICES IN THE SAME CIRCUIT AND RECONNECT FOR CONTINUED SERVICE. EXISTING ELECTRICAL WORK INTERFERING WITH NEW CONSTRUCTION SHALL BE RELOCATED OR REROUTED TO SUIT FINAL INSTALLATION. CUTTING AND PATCHING REQUIRED SHALL BE DONE TO RESTORE AREAS TO ORIGINAL CONDITION.
- CONTRACTOR SHALL PROVIDE TO LOCAL AHJ OR PERMITTING AGENCY A COPY OF ALL MAJOR EQUIPMENT CUT SHEETS AT TIME OF APPLICATION IF REQUESTED.
- LIGHT POLES , AND BASE DESIGNS ARE TO BE COMPLETED BY THE LIGHTING MANUFACTURER AND ELECTRICAL CONTRACTOR . THE ELECTRICAL CONTRACTOR SHALL PROVIDE SIGNED AND SEALED LIGHT POLE AND BASE DRAWINGS MEETING THE FBC WIND LOAD CRITERIA CH 16.
- ALL AS-BUILT DRAWINGS SHALL BE PROVIDED TO THE OWNER WITHIN 90 DAYS OF THE CERTIFICATE OF OCCUPANCY PER FLORIDA ENERGY CODE 405 AND 408. AS-BUILT DRAWINGS SHALL INCLUDE ALL PRIMARY AND SECONDARY FEEDERS WITH SIZES, PANEL SCHEDULES, EQUIPMENT DISCONNECTS WITH SIZES AND BREAKERS/FUSES, AND ALL CONNECTED BUILDING EQUIPMENT. ENSCRIBED PLAQUES WITH THE KAIC VALUE, ANALYSIS DATE, PANEL IDENTIFICATION, AND VOLTAGE SHALL BE PLACED ON EACH NEW PANEL BOARD ALONG WITH A TYPE WRITTEN SCHEDULE THAT IS LAMINATED. A COPY OF THE PANEL SCHEDULES SHALL BE PROVIDED TO THE OWNER FOR FUTURE REFERENCE ALONG WITH THE AS-BUILT PLANS.

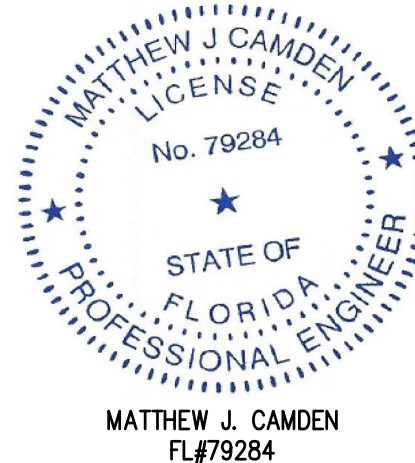
NOTE:

THESE ARE STANDARD SYMBOLS AND MAY NOT ALL APPEAR ON THE PROJECT DRAWINGS; HOWEVER WHEREVER THE SYMBOL APPEARS ON THE PROJECT DRAWINGS, THE ITEM SHALL BE PROVIDED AND INSTALLED

ABBREVIATIONS

A	AMPERE
AC	AIR CONDITIONING OR ALTERNATING CURRENT
ACC	ACCESS
AF	AMPERE FRAME
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHJ	AUTHORITY HAVING JURISDICTION
AHU	AIR HANDLER UNIT
AM	AMMETER
ARCH	ARCHITECT
AT	AMPERE TRIP
ATC	AUTOMATIC-OTFC TEMPERATURE CONTROL
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
C	CONDUIT
CAT	CATEGORY
CB	CIRCUIT BREAKER
CH	CHILLER
CKT	CIRCUIT
CL	CENTER LINE
CLF	CURRENT-LIMITING FUSE
CM	CEILING MOUNTED
CNTL	CONTROL
CU	COPPER
DWG(S)	DRAWING(S)
EC	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
EM	EMERGENCY
EMS	ENERGY MANAGEMENT SYSTEM
EMT	ELECTRICAL METALLIC TUBING
EPO	EMERGENCY POWER OFF
EWC	ELECTRIC WATER COOLER
EWI	ELECTRIC WATER HEATER
EX	EXISTING TO REMAIN
FA	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
FACC	FIRE ALARM COMMAND CENTER
FATC	FIRE ALARM TERMINAL CABINET
FLR	FLOOR
FMC	FURNISHED BY MECHANICAL CONTRACTOR
FO	FIBER OPTIC
FOTC	FIBER OPTIC TERMINAL CABINET
FSS	FIRE SUPPRESSION SYSTEM
FWE	FURNISHED WITH EQUIPMENT
GFI	GROUND FAULT INTERRUPTER
GRD	GROUND
GND,G	GALVANIZED RIGID STEEL CONDUIT
GRS	GRAND
HOA	HEATING/AIR CONDITIONING-RATED
HACR	HIGH INTENSITY DISCHARGE
HID	HIGH INTENSITY DISCHARGE
HPF	HIGH POWER FACTOR
HPS	HIGH PRESSURE SODIUM
HZ	HERTZ
HP	HORSEPOWER
IG	ISOLATED GROUND
IMC	INTERMEDIATE METALLIC CONDUIT
JB	JUNCTION BOX
KAIC	KILO AMPERE INTERRUPTING CAPACITY
KCMIL	THOUSAND CIRCULAR MILS
KVA	KILOVOLT AMPERE
KW	KILOWATT
LC	LIGHTING CONTACTOR
MC	MECHANICAL CONTRACTOR
MCC	MOTOR CONTROL CENTER
M-G	MOTOR GENERATOR
MDP	MAIN DISTRIBUTION PANEL
MH	METAL HALIDE
MOD	MOTOR OPERATED DAMPER OR DOOR
MTD	MOUNTED
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NF	NON-FUSED
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OCPD	OVER CURRENT PROTECTIVE DEVICE
PNL	PANEL
Ø	PHASE
PB	PUSHBUTTON
PE	PHOTOELECTRIC CONTROLLER
PC	PLUMBING CONTRACTOR
PVC	POLYVINYL CHLORIDE CONDUIT
RTU	ROOF TOP UNIT
SCH	SCHEDULE
SEC	SECURITY
SPD	SURGE PROTECTION DEVICE
SW	SWITCH
SWGR	SWITCHGEAR
TEL,T	TELEPHONE
TBB	TELEPHONE BACKBOARD
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
TC	TIME CLOCK
XFMR	TRANSFORMER
XFR	TRANSFER
TYP	TYPICAL
UG	UNDERGROUND
UH	UNIT HEATER
UL,U.L.	UNDERWRITERS LABORATORIES
UPS	UNINTERRUPTIBLE POWER SUPPLY
U.O.N.	UNLESS OTHERWISE NOTED
VT	VAPORTIGHT
VAV	VARIABLE AIR VOLUME
VFD	VARIABLE FREQUENCY DRIVE
VSD	VARIABLE SPEED DRIVE
V	VOLT
W	WATT
WP	WEATHER PROOF

SEAL



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DRAWING TITLE

ELECTRICAL LEGEND
AND SYMBOLS

FILE: DESOTO CENT. CHILL
JOB NO.: WA#16-2023.08
DATE : 05-02-2023
PLOT SIZE: 1:1
DRAWN BY: HG
CHECKED BY: MC
SHEET No:

E1.0

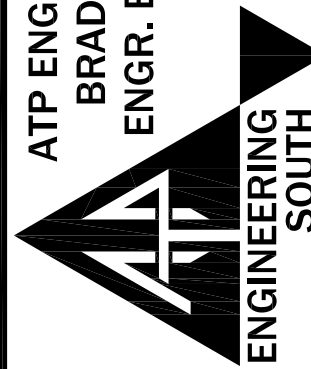
MSO DESOTO SHERIFF'S OFFICE
CHILLER PLANT
600 US 301
BRADENTON, FLORIDA 34211

REV / DESCRIPTION

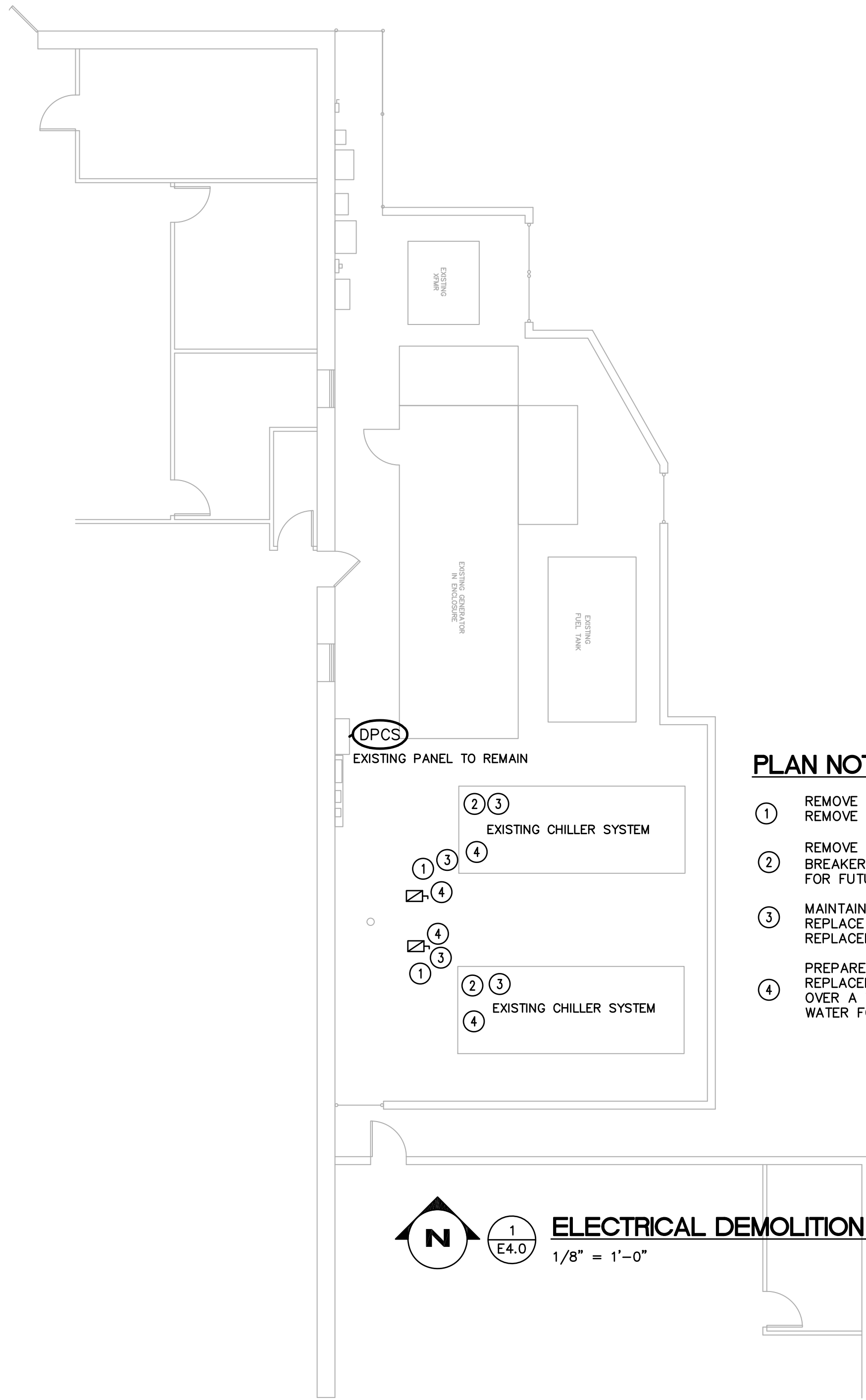
DATE

SEAL

ATP ENGINEERING SOUTH
BRADENTON, FLORIDA
ENGR. BUSINESS #8908
941-751-6485

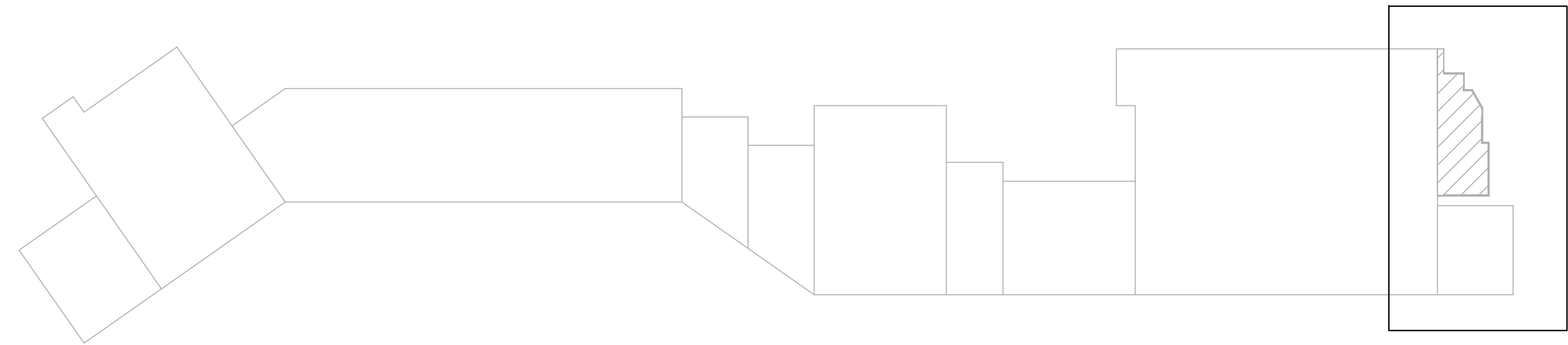


MATTHEW J. CAMDEN
FL#79284

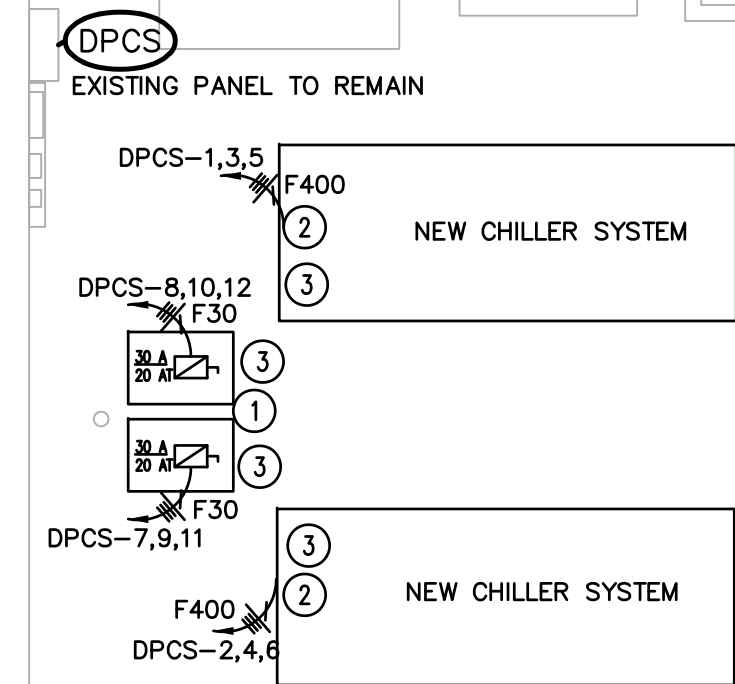


PLAN NOTES:

- 1 REMOVE EXISTING DISCONNECT AND WIRING TO THE PUMPS. REMOVE WIRING BACK TO THE BREAKER.
- 2 REMOVE EXISTING WIRING FROM THE BREAKER(CHILLER BREAKER) TO THE CHILLER MAINTAIN EXISTING CONDUIT FOR FUTURE PULL.
- 3 MAINTAIN EXISTING CONTROLS WIRING AND EQUIPMENT. REPLACE SENSORS AND WIRING AS REQUIRED FOR REPLACEMENT OF THE CHILLER.
- 4 PREPARE LOCATION FOR FUTURE CHILLERS. SEQUENCE REPLACEMENT - REPLACE A SINGLE CHILLER AT A TIME OVER A TWO WEEKEND TIME PERIOD TO MAINTAIN COLD WATER FOR THE FACILITY.



KEY PLAN
1/64" = 1'-0"



PLAN NOTES:

- 1 CONCRETE PADS FOR PUMPS AND UNISTRUT/SCHEDULE 80 PIPING IN CONCRETE TO HANG VFD/DISCONNECT. PROVIDE AND INSTALL NEW WIRING. RE-USE EXISTING CONDUITS. INSTALL NEW CONDUIT AND WIRING TO VFD AS REQUIRED. COORDINATE WITH OWNER'S REPRESENTATIVE AND MAINTENANCE PERSONNEL FOR LOCATION OF VFD DRIVES/DISCONNECTS. UNITS SHALL BE WITHIN 25' OF MOTOR PER NEC REQUIREMENTS. SEE DETAIL 10 ON SHEET E6.0.
- 2 DISCONNECTS/BREAKER (OCPD) TO BE INTEGRATED INTO CHILLER SYSTEM. PROVIDE/INSTALL NEW WIRING. RE-USE EXISTING CONDUITS AND PULL NEW WIRING AS REQUIRED.
- 3 MAINTAIN EXISTING CONTROLS WIRING AND EQUIPMENT. REPLACE SENSORS AND WIRING AS REQUIRED FOR REPLACEMENT OF THE CHILLERS AND PUMPS. OWNER MAY REQUEST PRICING FOR NEW CONTROLS COMPLETE FOR ENTIRE CHILLER SYSTEM. PROVIDE AND INSTALL VFD DRIVE CONTROLLERS (10HP/480V-3P- NEMA 3R) AS REQUIRED FOR PUMP SYSTEMS. PROVIDE ETHERNET CONNECTIONS AND ALL WIRING AS REQUIRED FOR REPLACEMENT OF CONTROLS.

ELECTRICAL PROPOSED POWER AND SYSTEMS PLAN
1/8" = 1'-0"

SEAL

MATTHEW J. CAMDEN
LICENSE
No. 79284
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

MATTHEW J. CAMDEN
FL#79284

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SEAL

ATP ENGINEERING SOUTH
BRADENTON, FLORIDA
ENGR. BUSINESS #8908
941-751-6485

ATP
ENGINEERING
SOUTH

REV.	DESCRIPTION	DATE

MATTHEW J. CAMDEN
FL#79284

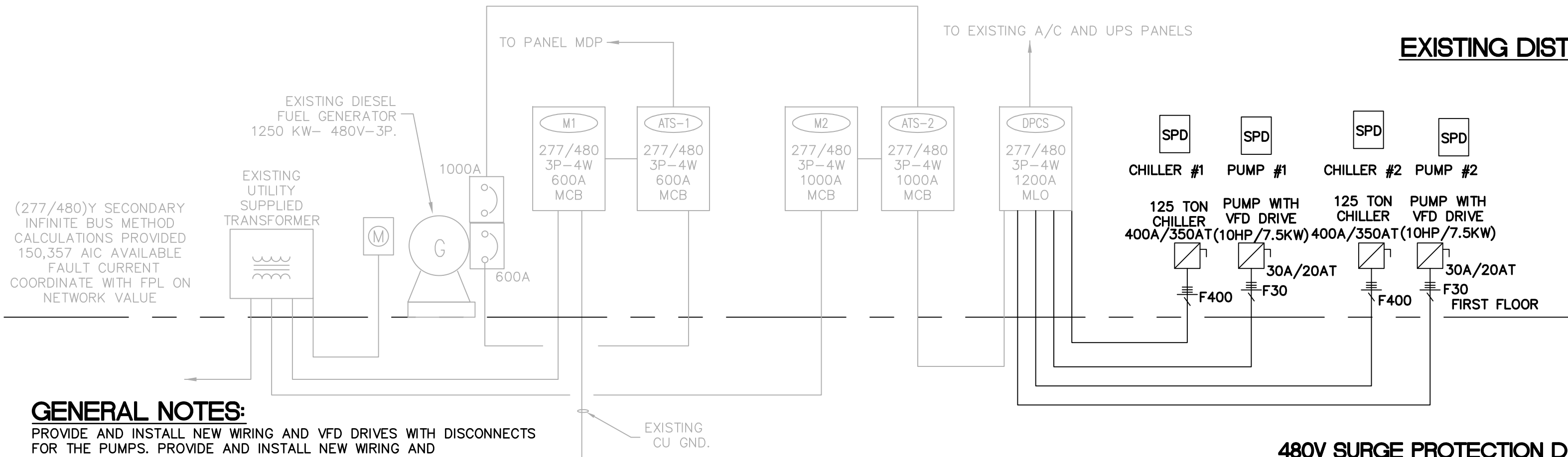
MDS DESOTO SHERIFF'S OFFICE
CHILLER PLANT
600 US 301
BRADENTON, FLORIDA 34211

DRAWING TITLE
ELECTRICAL POWER
AND SYSTEMS

FILE:	DESOTO CENT. CHILL
JOB NO.:	WA#16-2023.08
DATE :	05-02-2023
PLOT SIZE:	1:1
DRAWN BY:	HG
CHECKED BY:	MC
SHEET No.:	E4.0

FEEDER AND BRANCH CIRCUIT SCHEDULE									
FEEDER/BRANCH DESIGNATION	COPPER CONDUCTOR THHN, THWN, & THWN-2		SETS OF CONDUCTORS	CONDUIT SIZE AND QUANTITY [QUANTITY OF CONDUIT IS 1, UNLESS NOTED IN ()]					
	PHASE & NEUTRAL	EQUIPMENT GROUND		1P, 1N, 1G, 2P, 1G	2P, 1N, 1G, 3P, 1G	3P, 1N, 1G	3P, 2N, 1G	3P, 3N, 1G	3P, 1N, 2G
F20	12	12	1	3/4"	3/4"	3/4"	3/4"	3/4"	3/4"
F30	10	10	1	3/4"	3/4"	3/4"	1"	1"	1"
F50	8	10	1	3/4"	1"	1"	1 1/4"	1 1/4"	1 1/4"
F60	6	10	1	1"	1 1/4"	1 1/4"	1 1/4"	1 1/4"	1 1/4"
F80	4	8	1	1"	1 1/4"	1 1/4"	1 1/2"	1 1/2"	1 1/2"
F100	3	8	1	1 1/4"	1 1/4"	1 1/2"	1 1/2"	2"	1 1/2"
F110	2	6	1	1 1/4"	1 1/2"	1 1/2"	2"	2"	2"
F125	1	6	1	1 1/2"	2"	2"	2"	2 1/2"	2"
F150	1/0	6	1	1 1/2"	2"	2"	2 1/2"	2 1/2"	2 1/2"
F175	2/0	6	1	2"	2"	2 1/2"	2 1/2"	3"	2 1/2"
F200	3/0	6	1	2"	2 1/2"	2 1/2"	3"	3"	3"
F225	4/0	4	1	2"	2 1/2"	3"	3"	3"	3"
F250	250	4	1	2 1/2"	3"	3"	3 1/2"	3 1/2"	3-1/2"
F300	350	4	1	3"	3"	3 1/2"	3 1/2"	4"	3 1/2"
F350	2/0	3	2	(2) 2"	(2) 2 1/2"	(2) 2 1/2"	(2) 2 1/2"	(2) 3"	(2) 2 1/2"
F400	3/0	3	2	(2) 2"	(2) 2 1/2"	(2) 2 1/2"	(2) 3"	(2) 3"	(2) 2 1/2"
F450	4/0	2	2	(2) 2"	(2) 2 1/2"	(2) 2 1/2"	(2) 3"	(2) 3"	(2) 3"
F500	250	2	2	(2) 2 1/2"	(2) 3"	(2) 3"	(2) 3"	(2) 3 1/2"	(2) 3 1/2"
F600	350	1	2	(2) 2 1/2"	(2) 3"	(2) 3"	(2) 3"	(2) 3 1/2"	(2) 3"
F800	300	1/0	3	(3) 2 1/2"	(3) 3"	(3) 3"	(3) 3 1/2"	(3) 3 1/2"	(3) 3 1/2"
F900	350	2/0	3	(3) 3"	(3) 3"	(3) 3 1/2"	(3) 3 1/2"	(3) 4"	(3) 3 1/2"
F1000	400	2/0	3	(3) 3"	(3) 3"	(3) 3 1/2"	(3) 3 1/2"	(3) 4"	(3) 4"
F1200	350	3/0	4	(4) 3"	(4) 3"	(4) 3 1/2"	(4) 3 1/2"	(4) 4"	(4) 4"

NOTES:
1. DO NOT COMBINE NEUTRAL CONDUCTORS FOR ALL CIRCUITS. USE SEPARATE INDEPENDENT NEUTRAL CONDUCTORS FOR ALL CIRCUITS.



GENERAL NOTES:

PROVIDE AND INSTALL NEW WIRING AND VFD DRIVES WITH DISCONNECTS FOR THE PUMPS. PROVIDE AND INSTALL NEW WIRING AND BREAKERS/DISCONNECTS FOR THE CHILLERS (THE CHILLERS MAY HAVE INTEGRAL DISCONNECTS). PROVIDE ALL NEW CONTROLS CONNECTIONS FROM ALC(AUTOMATED LOGIC CONTROLS) TO EXISTING CONTROLS FOR CHILLER SYSTEM AND PUMPS. UPGRADE ITEMS AS NECESSARY. PROVIDE AND INSTALL ALL LOW VOLTAGE WIRING AND CONDUITS (CONTROLS) AS NECESSARY TO MAKE A COMPLETE AND FUNCTIONING SYSTEM.

1 E5.0 PARTIAL ONE-LINE RISER DIAGRAM NTS

480V SURGE PROTECTION DEVICE

SURGE PROTECTION DEVICE TO BE LIKE LEVITON 52277-M3, TYPE 2 PANEL MOUNT, OR APPROVED EQUAL- COORDINATE WITH EQUIPMENT MANUFACTURER ON SPD TYPE.

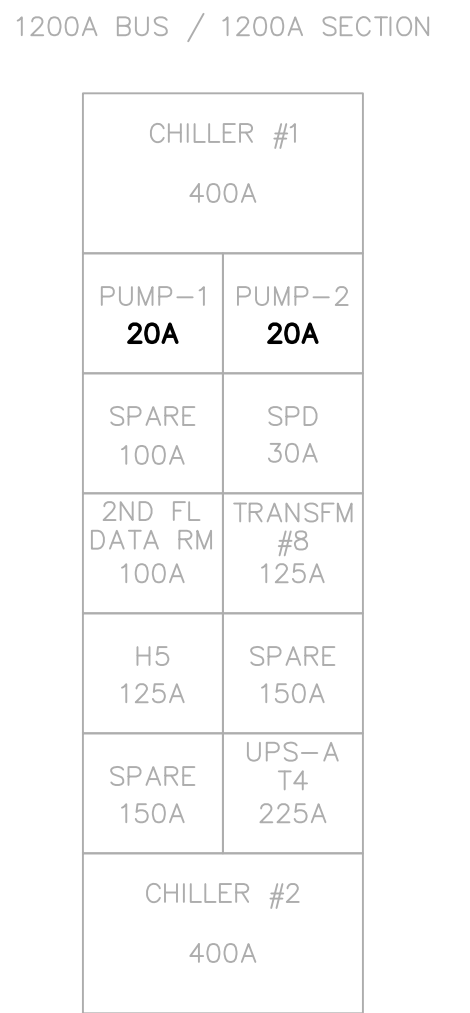
- ELECTRICAL SPECIFICATIONS
 - VOLTAGE CONFIGURATION: 277/480V 3 PHASE WYE
 - FREQUENCY: 50/60HZ
 - SURGE TECHNOLOGY: 40MM MOV DESIGN
 - RECOMMENDED CIRCUIT BREAKER RATING: 30A, 277/480V
- ENVIRONMENTAL SPECIFICATIONS
 - ENCLOSURE TYPE: NEMA 12 ENCLOSURE
 - OPERATING TEMPERATURE: -20°C TO 40°C
 - STORAGE TEMPERATURE: -4°F TO 185°F (-20°C TO 85°C)
 - FLAMMABILITY: RATED V-2 PER UL94
 - RELATIVE HUMIDITY: 5% TO 95% NON-CONDENSING
- MECHANICAL SPECIFICATIONS
 - CONNECTION TYPE: PARALLEL-HARDWIRED, FEED-THROUGH DUAL WIRE TERMINAL BLOCK: ACCEPTS UP TO #3 AWG WIRE
- PERFORMANCE DATA
 - MOV: L-N:320V, L-G:640V, N-G:320V, L-L640V
 - VPR: L-N:1500V, L-G:2500V, N-G:1200V, L-L:2500V
 - PROTECTION MODE: 4-MODE
 - MAXIMUM SURGE CURRENT, PER MODE (PER PHASE): 100KA (100KA)
 - SHORT CIRCUIT CURRENT RATING: 100KA
 - NOMINAL DISCHARGE CURRENT RATING: 20KA
 - NOISE REACTION: -20 TO -40 DB AT 5KHZ-10MHZ
 - DIAGNOSTICS: REAL TIME PROTECTION STATUS LEDS & AUDIBLE ALARM
 - REMOTE MONITORING: DRY CONTACT LEADS-N.O./N.C. FORM C RATED AT 7AMPS @ 240VAC OR 30 VDC
- PRODUCT FEATURES
 - VOLTAGE: 277/480 VOLT 3PY
 - POLE: 4
 - WIRE: 5
 - DIAGNOSTICS: LED
 - SURGE COUNTER: WITHOUT
 - MODULE NO.: (3) 2277 & (1) 8320-GN
 - MOV: 320V AC
 - UL1449 IMPULSE 6KV/500A L-N/L-G/N-G/L-L: 800/1800/800/1800
 - STANDARDS AND CERTIFICATIONS: UL1449 / CSA / ANSI/IEEE
 - WARRANTY: 10 YEAR LIMITED
- STANDARDS AND CERTIFICATIONS
 - UL1449 3RD EDITION: CSA CERTIFIED AND UL LISTED TYPE 2
 - ANSI/IEEE CATEGORY A, B & C: C-62.41 & 62.45
- WARRANTY
 - PRODUCT WARRANTY: LIMITED LIFETIME
 - REPLACEMENT MODULE WARRANTY: LIMITED LIFETIME

FAULT CURRENT CALCULATIONS:

FAULT CURRENT VALUES ARE BASED UPON INFINITE BUS METHOD CALCULATIONS. EXISTING CONDITIONS ARE PRESENT FOR ALL PANELS. NEW BREAKERS AND WIRING MAY BE INSTALL TO THE EXISTING PANELS. DIRECT REPLACEMENT EQUIPMENT IS BEING INSTALLED FOR THE CHILLER AND PUMPING SYSTEMS. ALL BREAKERS IN PANEL DPCS ARE RATED AT 65KAIC.

- NETWORK FAULT CURRENT VALUES ARE THE MOST ACCURATE VALUES. PLACE A PLACARD ON THE PANELS BEING TOUCHED WITH THE EXISTING VOLTAGE, AMPERAGE RATING, FREQUENCY, CALCULATED FAULT CURRENT VALUE AND DATE OF THE FAULT CURRENT VALUE: 3-28-2023.
- USE AIC RATINGS SHOWN ONLY FOR BID PURPOSES.
- VERIFY AIC RATINGS WITH THIS ENGINEER PRIOR TO PURCHASING ANY ELECTRICAL GEAR.

PANEL "DPCS"



EXISTING DISTRIBUTION PANEL LAYOUT:

Voltage Drop Calculation			
Data Entry			
Voltage			480 V
Max Voltage Drop			2 %
Select Phase			3
Stranded Copper			
Size of Wire			
Length of Run			150
Amperage Max			1000
Number of Parallel Wires			3
Maximum Voltage Drop Allowed =		Circuit Voltage	x Max. Voltage drop
Minimum Voltage Drop allowed at load = Voltage -Max Voltage Drop			
Multiplier			
Resistance/1000' of wire			
Distance(feet)			
Max Amps			
Number of Parallel Wires			
Actual Voltage Drop = Resistance x Amps x Distance x Multiplier			
Actual Voltage with Load = Voltage - Actual Voltage Drop			
Voltage Difference = Actual Voltage - Min Voltage			
Distance for wire size and load (Max Voltage Drop x Parallel Wires)/(Amps x Lengths x Multipliers)			

Maximum Voltage Drop for Wire Rating					
Designation	Wire Size	Amperage Rating	Parallel Wire	Maximum Distance (ft)	Resistance
F30	10	30	1	147	1.26
F50	8	50	1	141	0.786
F60	6	60	1	181	0.51
F80	4	80	1	216	0.321
F100	3	100	1	218	0.254
F110	2	110	1	251	0.201
F125	1	125	1	277	0.16
F150	1/0	150	1	291	0.127
F175	2/0	175	1	314	0.101
F200	3/0	200	1	348	0.0797
F225	4/0	225	1	394	0.0626
F250	250	250	1	414	0.0535
F300	350	300	1	484	0.0382
F350	2/0	350	2	314	0.101
F400	3/0	400	2	348	0.0797
F450	4/0	450	2	394	0.0626
F500	250	500	2	414	0.0535
F600	350	600	2	484	0.0382
F800	500	800	3	486	0.0446
F900	350	900	3	484	0.0382
F1000	400	1000	3	502	0.0331

2 E5.0 VOLTAGE DROP CALCULATIONS SIZED TO PREVENT A TOTAL VOLTAGE DROP OF 5% PER FBC ENERGY CODE COMPLIANCE

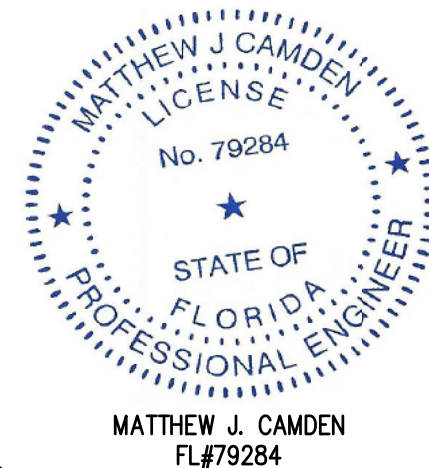
PANELBOARD SCHEDULE		DESIGNATION: DPCS				MAINS: 1200 A MCB			
		LOCATION: 480V/277 3 PHASE, 4 WIRE				BUS SIZE: 1200 AMP			
		VOLTAGE: 480V/277 3 PHASE, 4 WIRE				PANEL MOUNTING: SURFACE			
		PHASE:				ALL BREAKERS: 10,000 AIC			
CKT NO.	LOAD DESCRIPTION	LOAD CODE	CONN. KVA	BREAKER AMPS POLE	CONNECTED LOAD A B C	BREAKER AMPS POLE	CONN. KVA	LOAD CODE	CKT NO.
1	125 TON CHILLER #1	M	71.22	400 3	142.44	400 3	71.22	M	2
3		M	71.22		142.44		71.22	M	4
5		M	71.22		142.44		71.22	M	6
7	PUMP # 1	M	2.50	20* 3	5.00	20* 3	2.50	M	8
9		M	2.50		5.00		2.50	M	10
11		M	2.50		5.00		2.50	M	12
13	SPARE			100 3	0.00	30 3			14
15					0.00				16
17					0.00				18
19	AC UNIT DATA ROOM	M	16.63	100 3	37.41	125 3	20.78	P	20
21		M	16.63		37.41		20.78	P	22
23		M	16.63			37.38	20.75	P	24
25	PANELBOARD H5	P	20.78	125 3	20.78	150 3			26
27		P	20.78		20.78				28
29		P	20.78		20.78				30
31	PANELBOARD H6	P	24.90	150 3	62.31	225 3	37.41	P	32
33		P	24.90		62.31		37.41	P	34
35		P	24.90		62.31		37.41	P	36
37	SPACE				0.00				38
39					0.00				40
41					0.00				42
TOTAL CONNECTED AMPS:			967.29 AMPS		267.94 267.94 267.91		KVA		
TOTAL CONNECTED LOAD:			803.79 KVA		967.29 967.29 967.18		AMPS		
TOTAL DEMAND AMPS:			819.21 AMPS						
TOTAL DEMAND LOAD:			680.74 KVA						
LOAD CODES:									
L=	LIGHTING								
R=	RECEPTACLES								
M=	MECHANICAL/EQUIPMENT								
C=	COMPUTER								
K=	KITCHEN								
P=	PANELBOARD								

20* - Replace breaker as necessary to meet VFD requirements (10hp/7.5kVA)

EXISTING PANEL "DPCS" WITH NEW PUMPS AND CHILLERS (REPLACEMENT OF EXISTING SYSTEMS)

NTS SEE EXISTING DISTRIBUTION LAYOUT ABOVE

SEAL



THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY MATTHEW J. CAMDEN, P.E. (FL#79284) ON 05-02-2023 USING AN SHA AUTHENTICATION CODE.

PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGNED AND SEALED AND THE SHA AUTHENTICATION CODE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.

M50 DESOTO SHERIFF'S OFFICE
CHILLER PLANT
600 US 301
BRADENTON, FLORIDA 34211

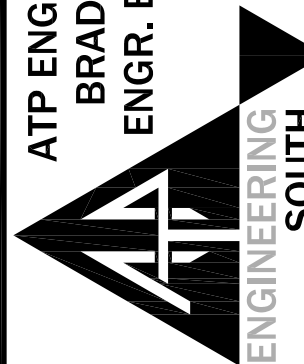
DRAWING TITLE:
ELECTRICAL ONE-LINE
RISER DIAGRAM

FILE: DESOTO CENT. CHILL
JOB NO.: WA#16-2023.08
DATE : 05-02-2023
PLOT SIZE: 1:1
DRAWN BY: HG
CHECKED BY: MC
SHEET No.:

E5.0

SEAL

ATP ENGINEERING SOUTH
BRADENTON, FLORIDA
ENGR. BUSINESS #8908
941-751-6485



DATE

REV. # DESCRIPTION

SEAL

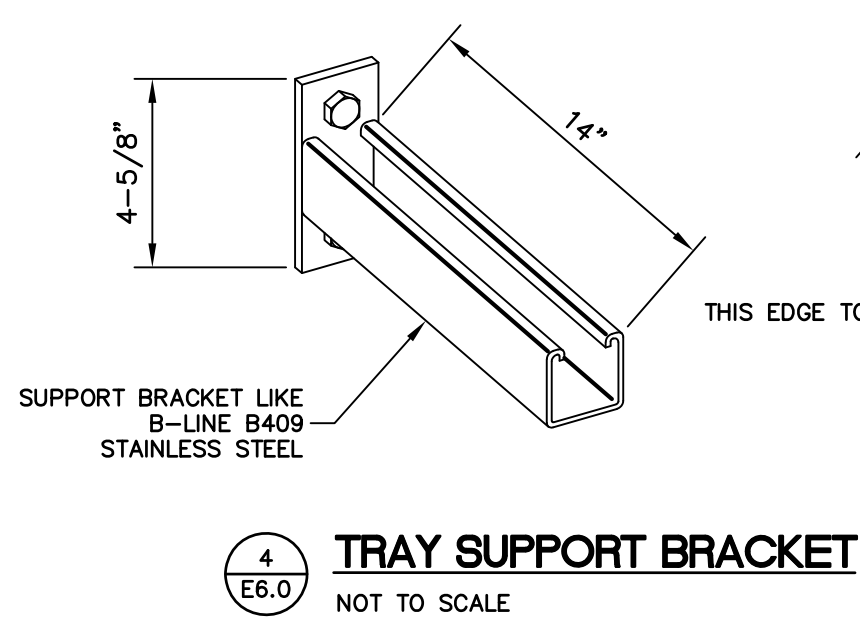
MATTHEW J. CAMDEN
FL#79284

SPECIFICATIONS:

(APPLY TO ALL ELECTRICAL SHEETS)

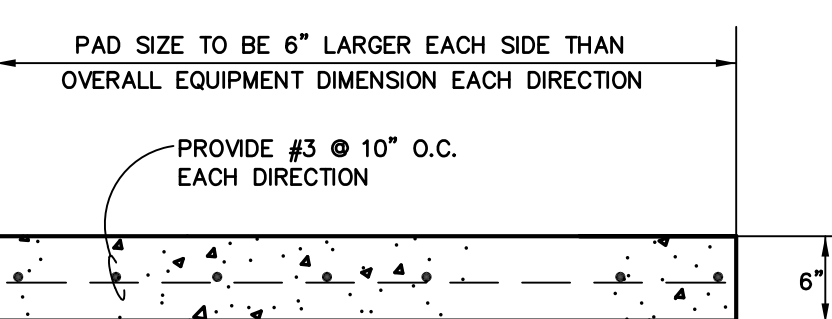
- PROVIDE AND INSTALL NEW GREEN INSULATED COPPER GROUNDING CONDUCTORS AS THE EQUIPMENT GROUNDING MEANS FOR ALL ELECTRICAL DEVICES AND EQUIPMENT.
- ALL PANELBOARDS AND SWITCHBOARDS SHALL HAVE COPPER BUS, COPPER GROUND BAR, AND RATINGS AS SPECIFIED. RE-USE EXISTING CUTLER HAMMER PANELS AND DISTRIBUTION. BREAKERS FOR CHILLER WERE KT3400T- 400AMP. BREAKERS FOR THE PUMPS ARE 40AMP-3P BREAKERS.
- PROVIDE LABELING FOR ALL PANELBOARDS, SWITCHBOARDS, AND DISCONNECT SWITCHES TO INCLUDE AN ENGRAVED PLASTIC LABEL IDENTIFYING THE EQUIPMENT AND WHERE IT IS FED FROM.
 - ALL BRANCH DEVICES IN THE MAIN SWITCHBOARD SHALL HAVE AN ENGRAVED PLASTIC LABEL.
 - ALL PANELBOARDS SHALL INCLUDE A TYPEWRITTEN DIRECTORY. ALL RECEPTACLES SHALL HAVE CIRCUIT NUMBERS WRITTEN ON THE INSIDE OF THE COVERPLATE.
 - ALL JUNCTION BOX COVERS SHALL BE IDENTIFIED TO INDICATE CIRCUITS CONTAINED.
 - WHERE MULTIPLE SWITCHES ARE GANGED TOGETHER THE SWITCHES SHALL BE IDENTIFIED.
 - PROVIDE (1) 3/4" SPARE CONDUIT FOR EACH 3 SPACES OR SPARES IN EACH FLUSH MOUNTED PANEL FROM PANEL TO ABOVE ACCESSIBLE CEILING FUTURE USE.
 - ALL RECEPTACLES SHALL HAVE CIRCUIT NUMBERS WRITTEN ON THE INSIDE OF THE COVERPLATE.
 - ALL JUNCTION BOXES ON EMERGENCY POWER SHALL BE RED IN COLOR.
- ALL CONDUIT INSIDE THE BUILDING SHALL BE A ELECTRICAL METALLIC TUBING (EMT) AND SHALL BE A MINIMUM 1/2" UNLESS OTHERWISE NOTED. ALL CONDUIT INSTALLED UNDERGROUND SHALL BE SCHEDULE 40 PVC UNLESS OTHERWISE NOTED. ALL CONDUIT INSTALLED ABOVE GRADE OUTSIDE THE BUILDING SHALL BE GALVANIZED RIGID STEEL. NO PVC CONDUIT SHALL BE USED ABOVE THE FLOOR SLAB.
- ALL ELECTRICAL CONNECTORS, LUGS, BREAKERS, EQUIPMENT, ETC. SHALL BE RATED AT A MINIMUM OF 75 DEG. C.
- WIRING METHODS:

ALL WIRING SHALL BE COPPER. NO ALUMINUM WIRING WILL BE ALLOWED.
MC TYPE CABLE SHALL NOT BE USED.
- SWITCHES SHALL BE 20 AMPERE RATED, 120/277 VOLT, LEVITON 1221S SERIES OR APPROVED EQUIVALENT, UNLESS OTHERWISE NOTED.
 - SWITCHES CONTROLLING LIGHTING SHALL HAVE NEUTRAL CONDUCTOR.
- COMMON AREA/PUBLIC USE AREA RECEPTACLES SHALL BE 20A, 120V GROUNDING TYPE LIKE LEVITON 5362S SERIES, UNLESS OTHERWISE NOTED.
 - WHITE IN COLOR
 - PROVIDE GROUND FAULT CIRCUIT-INTERRUPTER (GFI) TYPE RECEPTACLE IF SHOWN OR AS REQUIRED BY NEC.
- ARC-FAULT CIRCUIT-INTERRUPTER RECEPTACLES SHALL BE 20A, 120V GROUNDING TYPE LIKE LEVITON AFR2-W.
 - WHITE IN COLOR.
- ALL COVERPLATES FOR INTERIOR WIRING DEVICES SHALL BE WHITE NYLON TYPE. DEVICES SHALL BE WHITE IN COLOR.
- ALL EXTERIOR RECEPTACLES SHALL BE GFCI (GFI) TYPE AND HAVE IN-USE TYPE WEATHERPROOF COVERPLATES.
- SURGE PROTECTION SHALL BE PLACED ON EQUIPMENT PER THE MANUFACTURER AS AN OPTION- PROVIDE SURGE PROTECTION(SPD) ON THE EQUIPMENT. AN SPD MAY BE PLACED ON VFD DRIVES OR CHILLER EQUIPMENT FOR PROTECTION OF EQUIPMENT FROM LIGHTNING AND POWER SURGES.
- PROVIDE AND INSTALL VFD DRIVES FOR THE 10HP/7.5KW PUMPS. RECOMMENDED VFD DRIVE MANUFACTURERS ARE ABB, YAKISAWA, AND HITACHI. PROVIDE AT LEAST A NEMA 3R BOX FOR DRIVE AND DISCONNECT. UNITS SHALL HAVE A BYPASS BUILT INTO THE VFD DRIVE FOR MAINTENANCE AND PARTS REPLACEMENT.



- NOTE:
- SIX SUPPORTS REQUIRED.
 - MOUNT AT 12" ON CENTERS.
 - VERIFY HEIGHT WITH EQUIPMENT SUPPLIER PRIOR TO INSTALLATION.
 - ALL MOUNTING HARDWARE SHALL BE 316 STAINLESS STEEL.

COORDINATE ALL POWER AND COMMUNICATIONS ITEMS WITH LOCAL PROVIDER. ALL ITEMS SHALL MEET ALL LOCAL, STATE, AND NFPA 70 NEC REQUIREMENTS.



NOTES:
COORDINATE DIMENSIONS OF THE EQUIPMENT THAT IS BEING PROVIDED. PITCH PAD 1/2" PER FOOT SO THAT IT WILL DRAIN. PAD SHALL BE A MINIMUM OF 6" IN HEIGHT. PROVIDE AT LEAST 3" OF WORKING SPACE IN FRONT OF AND BEHIND EQUIPMENT.

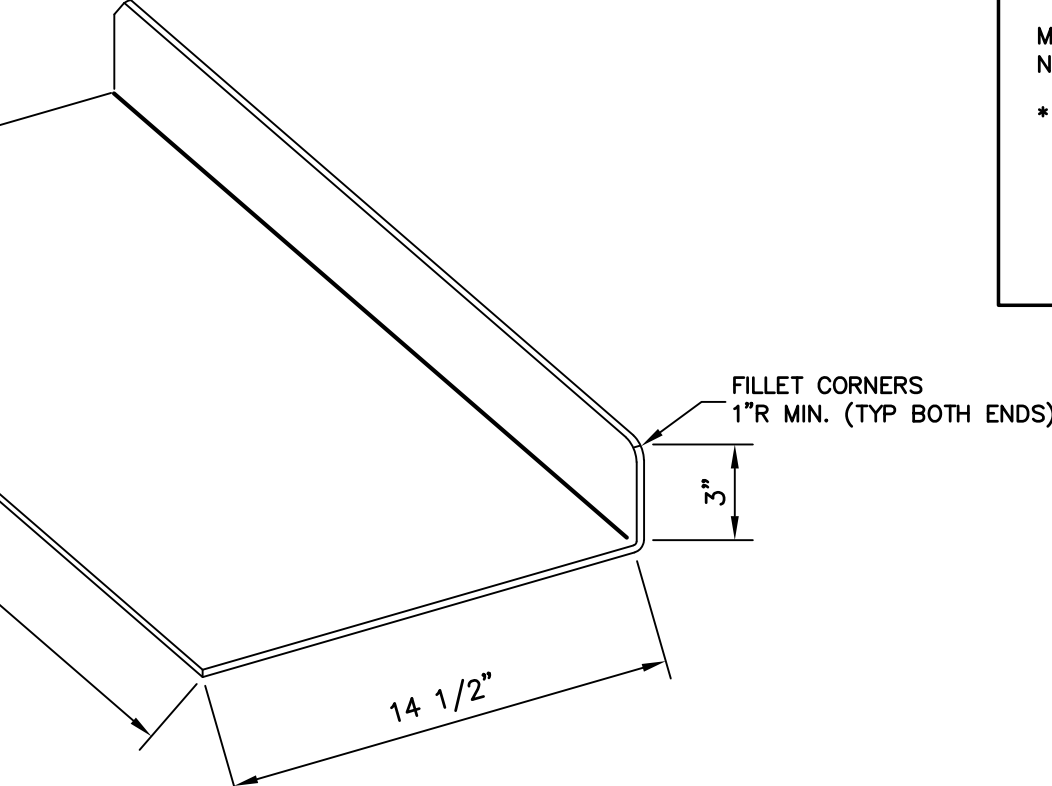
HOUSEKEEPING PAD DETAIL

NOT TO SCALE

GENERAL NOTES:

(APPLY TO ALL ELECTRICAL SHEETS)

- PROVIDE COMPLETE AND OPERATIONAL ELECTRICAL SYSTEM.
- ALL WORK SHALL CONFORM TO OR EXCEED THE MINIMUM REQUIREMENTS OF THE CURRENT ANSI/NFPA 70 WITH STATE OF FLORIDA AMENDMENTS, ANSI/IEEE C2 AND ALL FEDERAL, STATE, LOCAL, AND MUNICIPAL CODES AND ORDINANCES. THE ELECTRICAL SUBCONTRACTOR SHALL COMPLY WITH THE DIRECTIONS OF ALL AUTHORITIES HAVING JURISDICTION.
- INSTALL WORK USING PROCEDURES DEFINED IN NECA STANDARDS OF INSTALLATION. ALL WORK SHALL PRESENT A NEAT MECHANICAL APPEARANCE WHEN COMPLETED.
- REFER TO THE ARCHITECTURAL DRAWINGS FOR CEILING AND MILLWORK WORK BY THE SEPARATE GENERAL CONTRACT. COORDINATE ALL ELECTRICAL WORK.
- THE ELECTRICAL SUBCONTRACTOR SHALL PROVIDE ALL FLOOR, WALL, AND CEILING PENETRATIONS TO COMPLETE HIS WORK. PROVIDE PROPER FIRE SAFING FOR ALL PENETRATIONS MADE.
- COORDINATE ALL ELECTRICAL WORK WITH ALL OTHER TRADES TO ENSURE EFFECTIVE AND EFFICIENT OVERALL INSTALLATION.
- COORDINATE ALL ELECTRICAL SYSTEM DOWNTIME WITH THE OWNER, PERFORMANCE SERVICES, AND OTHER TRADES. DOWNTIME OF THE SYSTEM SHALL BE MINIMIZED. WEEKEND AND AFTER HOUR WORK SHALL BE REQUIRED TO PREVENT OR MINIMIZE INTERFERENCE WITH THE OWNER'S OPERATION.
- THE LOCATIONS OF RECEPTACLES, PHONE/DATA JACKS, AND ROOM EQUIPMENT SHOWN ON THESE DRAWINGS ARE APPROXIMATE. FINAL LOCATIONS WILL BE DETERMINED DURING THE CONSTRUCTION PHASE- COORDINATE AND REFER TO ARCHITECTURAL DRAWINGS.
- ALL NEW EQUIPMENT SHALL BE SUBMITTED FOR APPROVAL PRIOR TO ORDERING. PROVIDE COPIES OF ALL LIGHTING EQUIPMENT AND CONTROLS DATA SHEETS FOR THE LEED CONSULTANT AND COMMISSIONING CONSULTANT. ALL LIGHTING SYSTEMS SHALL MEET OR EXCEED ASHRAE 90.1 IN ENERGY USAGE PER SQUARE FOOT.
- PHYSICAL SIZES AND LOCATIONS OF ALL MECHANICAL EQUIPMENT SHOWN ON THESE DRAWINGS ARE APPROXIMATE. COORDINATE ELECTRICAL WORK FOR THIS EQUIPMENT WITH THE OTHER TRADES.
- PROVIDE APPROPRIATE SEALANT (I.E. FIRESAFING) TO MAINTAIN CONSTRUCTION INTEGRITY FOR ANY PENETRATIONS THROUGH FLOORS, STRUCTURAL CEILINGS, AND FIRE WALLS.
- ALL BRANCH CIRCUITS SHALL UTILIZE SEPARATE INDEPENDENT NEUTRAL CONDUCTOR, AND INSULATED GROUNDING CONDUCTOR. DO NOT COMBINE NEUTRAL CONDUCTORS.
- ALL FEEDER NEUTRAL/GROUNDED CONDUCTORS SHALL BE CONSIDERED CURRENT CARRYING. DERATE MULTIPLE CONDUCTORS IN A RACEWAY ACCORDINGLY WITH NEC TABLES.
- INSTALL ALL CONDUITS, RACEWAYS, AND CABLE TRAY FOR MAXIMUM HEAD CLEARANCE IN MECHANICAL AREAS, AND ATTIC. COORDINATE CLEARANCES WITH PERFORMANCE SERVICES AND THE OWNER.
- ALL ELECTRICAL SERVICE WORK SHALL COMPLY WITH THE LOCAL UTILITY. COORDINATE ALL REQUIREMENTS AND MAXIMUM AVAILABLE FAULT CURRENT PRIOR TO BID AND INCLUDE ALL NECESSARY MATERIAL AND LABOR REQUIRED FOR THE ADDITION TO THE ELECTRICAL SERVICE. PROVIDE PRICING FOR ANY UTILITY FEES.
- TEST GROUNDING SYSTEM AFTER COMPLETION OF JOB TO INSURE PROPER GROUND CONDUCTIVITY.
- RECORD DRAWINGS: PROVIDE AMPERE READINGS ON ALL PANELBOARDS TO PROVE PANELS ARE BALANCED. PROVIDE PHASE ROTATION READINGS ON ALL PANELBOARDS. PROVIDE ALL RECORD DRAWINGS TO THE OWNER'S REPRESENTATIVE.
- PROVIDE AND INSTALL ALL CONDUIT AND WIRING AS REQUIRED FOR CHILLER CONTROLS. PROVIDE REPLACEMENT CONTROLS AS REQUIRED. INSTALL VFD CONTROLS TO SEQUENCE BETWEEN PUMPS AND CHILLER DEMAND REQUIREMENTS.
- PROVIDE AND INSTALL SPD DEVICES AS REQUIRED ON CHILLERS, PUMPS, AND VFD TO PROTECT FROM SURGE.

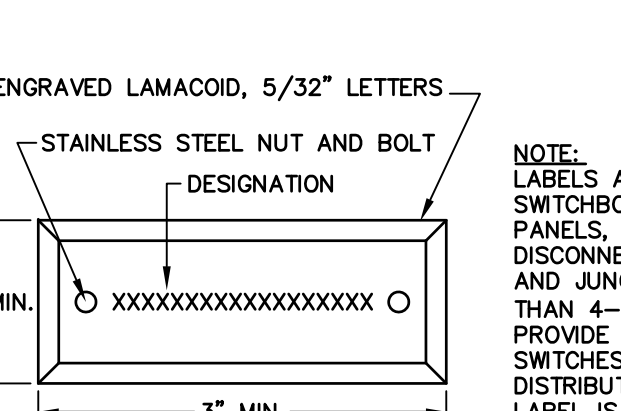


CONDUIT/HOSE TRAY

NOT TO SCALE

NOTE:

22 GA. 316 STAINLESS STEEL ATTACH TO TRAY SUPPORT WITH STAINLESS STEEL HARDWARE.



NOTE: LABELS ARE REQUIRED ON ALL SWITCHBOARDS, DISTRIBUTION PANELS, PANEL BOARDS, STARTERS, DISCONNECT SWITCHES, RELAYS, AND JUNCTION BOXES GREATER THAN 4-11/16" SQUARE. ALSO PROVIDE LABELS ON BRANCH SWITCHES OF SWITCHBOARDS AND DISTRIBUTION PANELS. SIZE OF THE LABEL IS DEPENDENT UPON THE AMOUNT OF INFORMATION ON THE LABEL. MINIMUM DIMENSIONS ARE SHOWN.

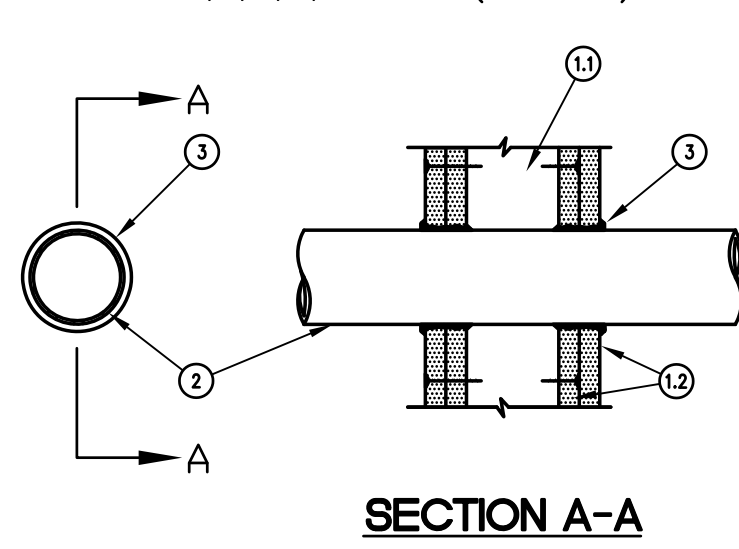
STANDARD COLORS:
1. NORMAL POWER- BLACK BACKGROUND, WHITE LETTERS
2. EMERGENCY POWER- RED BACKGROUND, WHITE LETTERING
3. IN ADDITION TO THE FUNCTION LABELS, PROVIDE LABELS IDENTIFYING ALL "MAIN SERVICE LABEL DISCONNECTS"- RED BACKGROUND, WHITE LETTERING

EQUIPMENT LABELING DETAIL

NOT TO SCALE

SYSTEM NO. WL1001

(FORMERLY SYSTEM NO. 147)
F RATING - 1, 2, 3 AND 4HR. (SEE ITEM 2 AND 3)
T RATINGS- 0, 1, 2, 3, AND 4 HR. (SEE ITEM 3)



SECTION A-A

- WALL ASSEMBLY - THE 1, 2, 3 OR 4 HOUR FIRE-RATED GYPSUM WALLBOARD / STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER DESCRIBED IN THE INDIVIDUAL U300 OR U400 SERIES WALL OR PARTITION DESIGN IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:
 - STUDS - WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS CONSIST OF NOMINAL 2 BY 4 IN. LUMBER SPACED 16 INCHES OC WITH NOMINAL 2 BY 4 IN. LUMBER END PLATES AND CROSS BRACES. STEEL STUDS TO BE MIN. 3-5/8 IN. WIDE BY 1-3/8 IN. DEEP CHANNELS SPACED MAX 24 IN. OC.
 - WALL BOARD GYPSUM* - 1/2 IN. OR 5/8 IN. THICK 4 FOOT WIDE WITH SQUARE OR TAPERED EDGES. THE GYPSUM WALLBOARD TYPE, THICKNESS, NUMBER OF LAYERS, FASTENER TYPE AND SHEET ORIENTATION SHALL BE AS SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES DESIGN IN THE UL FIRE RESISTANCE DIRECTORY. MAX DIAM OF OPENING IS 13-1/2 IN.
- PIPE OR CONDUIT - NOMINAL 12 IN. DIAM. (OR SMALLER) SCHEDULE 10 (OR HEAVIER STEEL CONDUIT, NOM. 4 IN. DIAM (OR SMALLER) STEEL ELECTRICAL CONDUIT MECHANICAL OR TYPE L OR (HEAVIER) COPPER TUBING OR MON. 1 IN. DIAM (OR SMALLER) FLEXIBLE STEEL CONDUIT.
- FILL, VOID OR CAVITY MATERIAL* - CAULK - CAULK FILL MATERIAL INSTALLED TO COMPLETELY FILL ANNULAR SPACE BETWEEN PIPE OR CONDUIT AND GYPSUM WALLBOARD AND W/ A MIN. 1/4 IN. DIAM BEAD OF CAULK APPLIED TO PERIMETER OF PIPE OR CONDUIT AT ITS EGRESS FROM THE WALL. CAULK INSTALLED SYMMETRICALLY ON BOTH SIDES OF WALL ASSEMBLY. THE HOURLY F RATING OF THE FIRESTOP SYSTEM IS DEPENDENT UPON THE HOURLY FIRE RATINGS OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED, AS SHOWN IN THE FOLLOWING TABLE. THE HOURLY T RATING OF THE FIRESTOP SYSTEM IS DEPENDENT UPON THE TYPE OR SIZE OF THE PIPE OR CONDUIT AND THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED, AS TABULATED BELOW:

MAXIMUM PIPE OR CONDUIT DIAMETER (IN INCHES)	ANNULAR SPACE (IN INCHES)	F RATING HR	T RATING HR
1	0 TO 3/16	1 OR 2	0+, 1 OR 2
1	1/4 TO 1/2	3 OR 4	3 OR 4
4	0 TO 1 1/2	1 OR 2	0
6	1/4 TO 1 1/2	3 OR 4	0
12	3/16 TO 3/8	1 OR 2	0

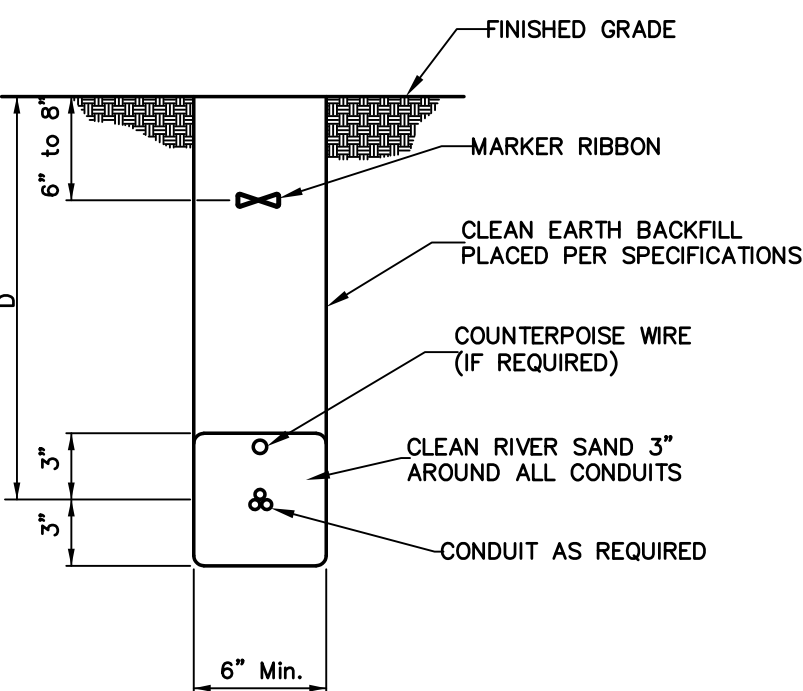
+WHEN COPPER PIPE IS USED, T RATING IS 0 H.

MINNESOTA MINING & MANUFACTURING CO. - TYPES CP-25 S/L, CP-25 N/S, CP-25 WB, CP-25 WB+

* BEARING THE UL CLASSIFICATION MARKING

UL PENETRATION DETAIL

NOT TO SCALE



SERVICE	"0"
CCTV cable	1"-6"
Telephone	2'-0"
Power under 600V	2'-0"
Medium voltage power	3'-0"

NOTE:

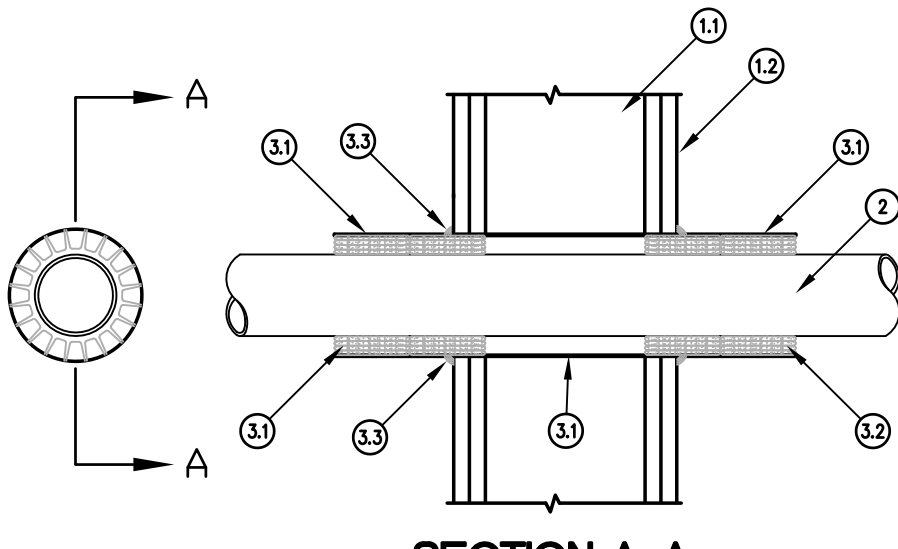
USE BURIAL DEPTHS SHOWN ON TABLE UNLESS NOTED OTHERWISE IN SPECIFICATIONS OR ON DRAWINGS. BURIAL DEPTHS FOR UTILITY COMPANY CABLES SHALL BE AS DIRECTED BY THE UTILITY COMPANY.

CONDUIT BURIAL DETAIL

NOT TO SCALE

SYSTEM NO. WL2154

F Ratings - 1 or 2 HR (See Item 1)
T Ratings - 1 or 2 HR (See Item 1)



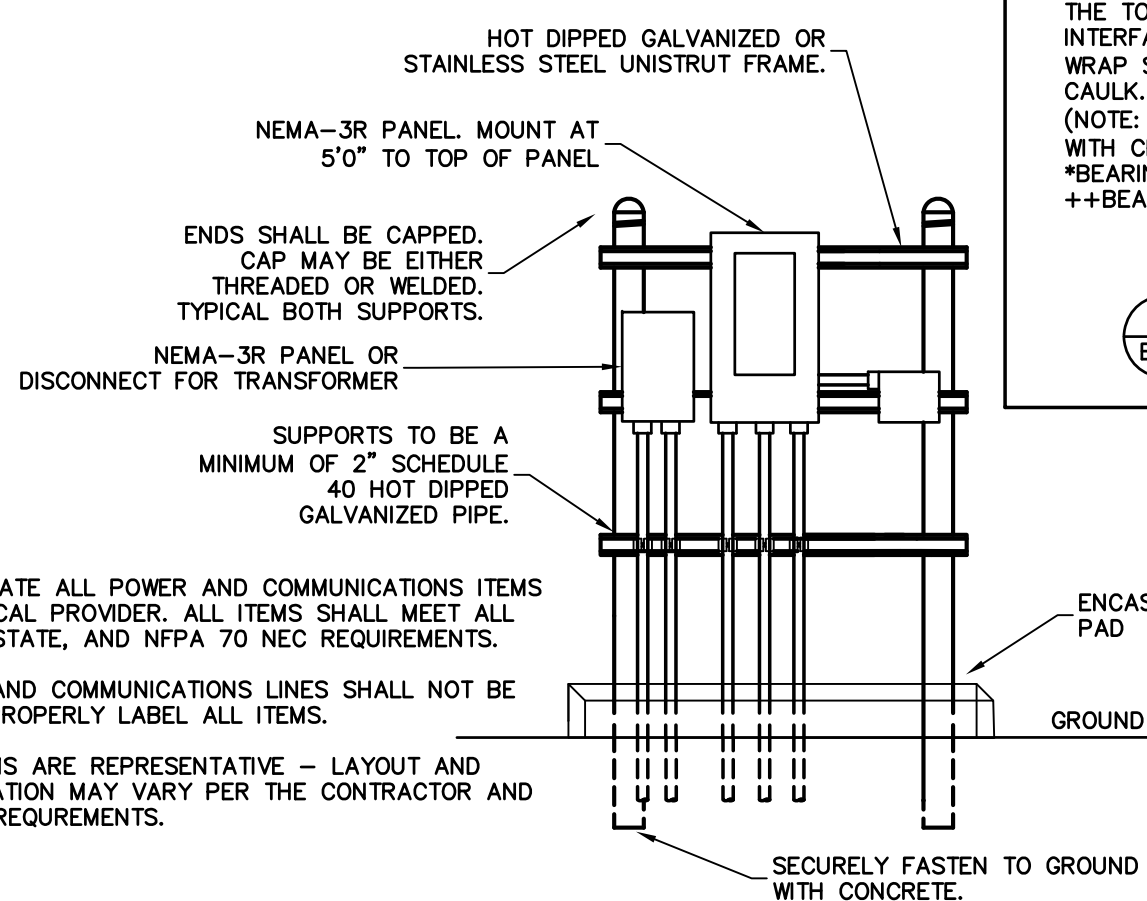
SECTION A-A

- WALL ASSEMBLY - THE 1 OR 2 HR FIRE RATED GYPSUM WALLBOARD / STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES WALL AND PARTITION DESIGN IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:
 - STUDS - WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM 2 BY 4 IN. LUMBER SPACED 16 IN. OC. STEEL STUDS TO BE MIN 3-1/2 IN. WIDE AND SPACED MAXIMUM 24 IN. OC.
 - WALLBOARD, GYPSUM BOARD* - THICKNESS, TYPE, NUMBER OF LAYERS AND FASTENERS AS REQUIRED IN THE INDIVIDUAL WALL AND PARTITION DESIGN. MAXIMUM DIAMETER OF OPENING IS 7-3/4 IN. THE HOURLY F AND T RATINGS OF THE FIRESTOP SYSTEM IS EQUAL TO THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED.
- THROUGH PENETRANTS - ONE NONMETALLIC PIPE OR CONDUIT TO BE CENTERED WITHIN OPENING WITH A NOM. 1/4 IN. ANNULAR SPACE BETWEEN PIPE OR CONDUIT AND PERIPHERY OF OPENING. PIPE OR CONDUIT TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF THE WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF NONMETALLIC PIPES OR CONDUITS MAY BE USED:
 - POLYVINYL CHLORIDE (PVC) PIPE - NOM. 6 IN. DIAMETER (OR SMALLER) SCHEDULE 40 SOLID CORE PVC PIPE FOR USE IN CLOSED (PROCESS OR SUPPLY) OR VENTED (DRAIN, WASTE OR VENT) PIPING SYSTEM.
 - RIGID NONMETALLIC CONDUIT ++ - NOM. 6 IN. DIAMETER (OR SMALLER) SCHEDULE 40 PVC CONDUIT INSTALLED IN ACCORDANCE WITH ARTICLE 347 OF THE NATIONAL ELECTRICAL CODE (NFPA NO. 70).
 - CHLORINATED POLYVINYL CHLORIDE (CPVC) PIPE - NOM. 6 IN. DIAMETER (OR SMALLER) SDRI7 CPVC PIPE FOR USE IN CLOSED (PROCESS OR SUPPLY) OR VENTED (DRAIN, WASTE OR VENT) PIPING SYSTEMS.
- FIRESTOP SYSTEM - THE DETAILS OF THE FIRESTOP SYSTEM SHALL BE AS FOLLOWS:
 - STEEL SLEEVE - MINIMUM 26 GAUGE GALVANIZED STEEL CUT 6 IN. LONGER THAN OVERALL WIDTH OF WALL WITH THE OUTSIDE DIAMETER EQUAL TO DIAMETER OF OPENING IN WALL WITH A MINIMUM 1 IN. OVERLAP ALONG LONGITUDINAL SEAM. SLEEVE PLACED IN WALL OPENING SUCH THAT 3 IN. EXTENDS BEYOND BOTH SIDES OF WALL. EDGES OF SLEEVE TO BE PROVIDED WITH 1/2 IN. LONG SLITS TO FORM RETAINING TABS.
 - FILL, VOID OR CAVITY MATERIALS* - WRAP STRIP - NOM. 1/8 IN. THICK INTUMESCENT MATERIAL SUPPLIED IN 2 IN. WIDE STRIPS. MINIMUM FOUR CONTINUOUS LAYERS OF WRAP STRIP TIGHTLY WRAPPED AROUND NONMETALLIC PIPE ON BOTH SIDES OF WALL, AND RECESSED WITHIN STEEL SLEEVE 2-1/2 IN. FROM THE END OF SLEEVE ON BOTH SIDES OF WALL. AN ADDITIONAL STACK OF FOUR CONTINUOUS LAYERS OF WRAP STRIP TIGHTLY WRAPPED AROUND NONMETALLIC PIPE ON BOTH SIDES OF THE WALL AND BUTTED TIGHTLY AGAINST SLEEVE. THE SLIT EDGES OF SLEEVE TO BE BENT 90 DEGREES TOWARD PIPE. TWO MINIMUM 1/2 IN. WIDE BY 0.028 IN. THICK STAINLESS STEEL BAND CLAMPS SHALL BE TIGHTLY FASTENED AROUND SLEEVE ON BOTH SIDES OF WALL, APPROXIMATELY 1/2 IN. FROM THE WALL SURFACES AND 3/4 IN. FROM EACH END OF SLEEVE. MINNESOTA MINING & MFG. CO. - ULTRA GS
 - FILL, VOID OR CAVITY MATERIALS* - CAULK - MINIMUM 1/2 IN. DIAMETER BEAD OF CAULK SHALL BE APPLIED TO OUTER PERIMETER OF SLEEVE ON BOTH SIDES OF WALL AT SLEEVE / WALL INTERFACE. MINNESOTA MINING & MFG. CO. - CP 25WB+ CAULK

* BEARING THE UL CLASSIFICATION MARKING
++ BEARING THE UL LISTED MARK

UL PENETRATION DETAIL

NOT TO SCALE



COORDINATE ALL POWER AND COMMUNICATIONS ITEMS WITH LOCAL PROVIDER. ALL ITEMS SHALL MEET ALL LOCAL, STATE, AND NFPA 70 NEC REQUIREMENTS.

POWER AND COMMUNICATIONS LINES SHALL NOT BE MIXED. PROPERLY LABEL ALL ITEMS.

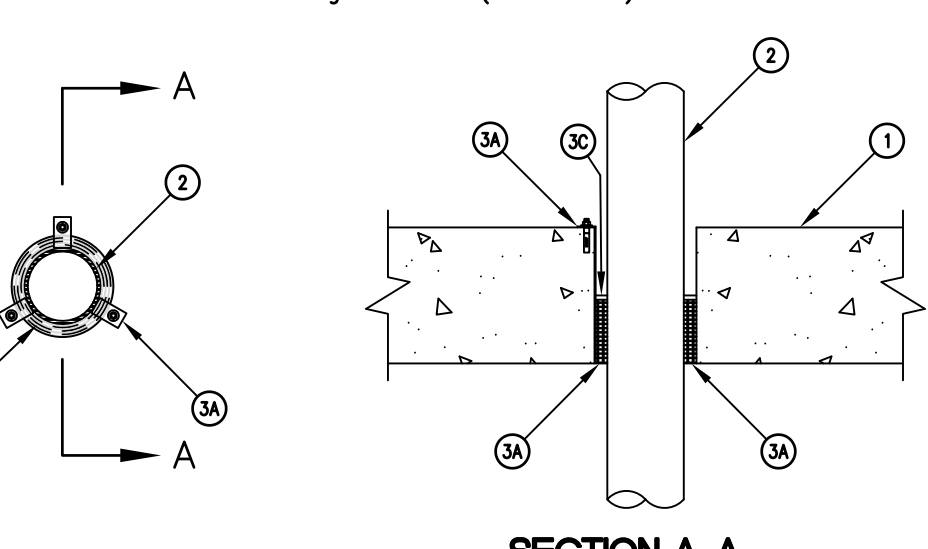
ALL ITEMS ARE REPRESENTATIVE - LAYOUT AND INSTALLATION MAY VARY PER THE CONTRACTOR AND UTILITY REQUIREMENTS.

EXAMPLE EXTERIOR PANEL/VFD MOUNT

NOT TO SCALE

SYSTEM NO. C-AJ-2002

May 18, 2005
F Rating - 2 Hr
T Ratings - 0 and 2 Hr
L Rating at Ambient - 7 CFM/sq ft
L Rating at 400 F - less than 1 CFM/sq ft (See Item 3C)
W Rating - Class 1 (See Item 3)



SECTION A-A

- FLOOR OR WALL ASSEMBLY - MIN 2-1/2 IN. (64 MM) THICK LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF OR 1600-2400 KG/M3) CONCRETE. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. MAX DIAM OF CIRCULAR OPENING IS 6-1/2 IN. (165 MM).
- SEE CONCRETE BLOCKS (CAZT) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.
- NONMETALLIC PIPE OR CONDUIT - NOM 4 IN. (102 MM) DIAM (OR SMALLER) SCHEDULE 40 SOLID CORE OR CELLULAR CORE, POLYVINYL CHLORIDE (PVC) PIPE FOR USE IN CLOSED (PROCESS OR SUPPLY) OR VENTED (DRAIN, WASTE OR VENT) PIPING SYSTEMS OR RIGID NONMETALLIC CONDUIT++ OR SDR 13.5 CHLORINATED POLYVINYL CHLORIDE (CPVC) PIPE FOR USE IN CLOSED (PROCESS OR SUPPLY) PIPING SYSTEMS. A MAX OF ONE PIPE OR CONDUIT IS PERMITTED IN THE FIRESTOP SYSTEM. EXCEPT AS NOTED IN ITEM B, THE PIPE OR CONDUIT SHALL BE CENTERED IN THE THROUGH OPENING. PIPE OR CONDUIT TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY.
- SEE RIGID NONMETALLIC CONDUIT (DZKT) CATEGORY IN THE UL ELECTRICAL CONSTRUCTION MATERIALS DIRECTORY FOR NAMES OF MANUFACTURERS.
- FIRESTOP SYSTEM - THE HOURLY T RATINGS FOR THE FIRESTOP SYSTEM ARE DEPENDENT UPON THE FIRESTOP ORIENTATION (WALL OR FLOOR), THE SIZE OF THE NONMETALLIC PIPE OR CONDUIT, AND THE FLOOR THICKNESS, AS TABULATED BELOW:

ORIENTATION (a)	NOMINAL PIPE DIAMETER In. (mm)	ANNULAR SPACE In. (mm)	F RATING HR	T RATING HR
F(b)	1/2-2 (13-51 mm)	1/4-1 (6-25 mm)	2	0
F(b)	2-1/2, 3 (64, 76 mm)	1/2-1 (13-25 mm)	2	0
W,F	1/2-2 (13-51 mm)	1/4-1 (6-25 mm)	2	2
W,F	2-1/2, 3 (64, 76 mm)	1/2-1 (13-25 mm)	2	2
W,F	3-1/2, 4 (89, 102 mm)	3/4-1 (19-25 mm)	2	2

(a) W = WALL, F = FLOOR

(b) MIN CONCRETE FLOOR THICKNESS IS 2-1/2 IN. (64 MM). THE DETAILS OF THE FIRESTOP SYSTEM SHALL BE AS FOLLOWS:

A. STEEL SUPPORT CLIPS - NOM 1 IN. (25 MM) WIDE BY NOM 0.019 IN. (0.5 MM) THICK (28 GAUGE) GALV STEEL STRIPS FIELD-FORMED INTO "Z"-SHAPE WITH HEIGHT OF Z-SHAPE EQUAL TO THE FLOOR THICKNESS AND WITH WIDTH OF BOTTOM (AS INSTALLED) LEG OF SUFFICIENT LENGTH TO SPAN ANNULAR SPACE. TOP (AS INSTALLED) LEG OF Z-SHAPE TO BE MIN 2 IN. (51 MM) LONG AND MAY OR MAY NOT BE SECURED TO TOP SURFACE OF FLOOR WITH MASONRY STOKERS. AS AN ALTERNATE TO THE Z-SHAPE CLIPS, THE GALV STEEL STRIPS MAY BE FORMED INTO "L"-SHAPE WITH HEIGHT EQUAL TO 2 IN. (51 MM) AND WITH BOTTOM (AS INSTALLED) LEG OF SUFFICIENT LENGTH TO SPAN ANNULAR SPACE. CLIPS SECURED TO OUTERMOST WRAP STRIP LAYER WITH STEEL WIRE THE PRIOR TO INSERTION IN THROUGH OPENING. MIN OF THREE STEEL SUPPORT CLIPS TO BE USED, SYMMETRICALLY LOCATED, WITH BOTTOM LEG OF CLIPS FLUSH WITH BOTTOM PLANE OF FLOOR. WHEN ANNULAR SPACE AROUND NOM 1/2 IN. TO 2 IN. (13 MM TO 51 MM) DIAM PIPE IN FLOOR ASSEMBLY IS 1/4 IN. TO 3/8 IN. (6 MM TO 10 MM), STEEL SUPPORT CLIPS ARE NOT REQUIRED.

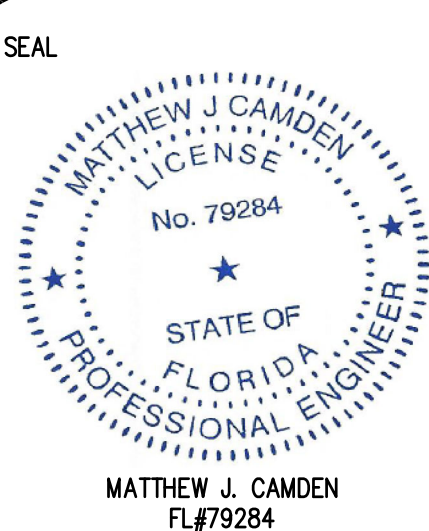
B. FILL, VOID OR CAVITY MATERIALS* - WRAP STRIP - NOM 1/4 IN. (6 MM) THICK INTUMESCENT ELASTOMERIC MATERIAL FACED ON ONE SIDE WITH ALUMINUM FOIL, SUPPLIED IN 2 IN. (51 MM) WIDE STRIPS. NOM 2 IN. (51 MM) WIDE STRIPS TIGHTLY WRAPPED AROUND NONMETALLIC PIPE (FOIL SIDE EXPOSED) TO FILL ANNULAR SPACE AROUND PIPE. A MIN OF ONE LAYER OF WRAP STRIP IS REQUIRED FOR NOM 1/2 IN. TO 2 IN. (13 MM TO 51 MM) DIAM PIPES. A MIN OF TWO LAYERS OF WRAP STRIP IS REQUIRED FOR NOM 2-1/2 IN. AND 3 IN. (64 MM AND 76 MM) DIAM PIPES. A MIN OF THREE LAYERS OF WRAP STRIP IS REQUIRED FOR NOM 3-1/2 IN. AND 4 IN. (89 MM AND 102 MM) DIAM PIPES. EACH LAYER OF WRAP STRIP TO BE INSTALLED WITH BUTTED SEAM WITH BUTTED SEAMS IN SUCCESSIVE LAYERS STAGGERED. WRAP STRIP LAYERS SECURELY BOUND WITH STEEL WIRE OR ALUMINUM FOIL TAPE AND SLID INTO THROUGH OPENING SUCH THAT THE BOTTOM EDGES ARE FLUSH WITH THE BOTTOM PLANE OF THE FLOOR AND ARE RESTING ON THE STEEL SUPPORT CLIP LEGS. WHEN NOM 2 IN. TO 4 IN. (51 MM TO 102 MM) DIAM PVC PIPE IS USED IN MIN 4-1/2 IN. (114 MM) THICK CONCRETE FLOOR, THE PIPE MAY BE INSTALLED ECCENTRICALLY IN THE THROUGH OPENING (MIN ZERO CLEARANCE AT POINT CONTACT LOCATION) PROVIDED THAT (1) THE INSIDE DIAM OF THE THROUGH OPENING IS 1.3 TO 1.5 TIMES LARGER THAN THE OUTSIDE DIAM OF THE PIPE, (2) THE ANNULAR SPACE BETWEEN THE PIPE AND THE SIDES OF THE OPENING AT THE BOTTOM 2 IN. (51 MM) OF THE THROUGH OPENING IS COMPLETELY FILLED WITH WRAP STRIP LAYERS INSTALLED FOLLOWING THE CONTOUR OF THE PIPE AND (3) THE BOTTOM EDGES OF THE WRAP STRIP LAYERS ARE RELIABLY SUPPORTED BY "Z"-SHAPED STEEL SUPPORT CLIPS ANCHORED TO THE TOP SURFACE OF THE CONCRETE FLOOR. IN WALL ASSEMBLIES, THE WRAP STRIP LAYERS ON THE NONMETALLIC PIPE ARE TO BE INSTALLED IN THE SAME MANNER USED FOR FLOOR ASSEMBLIES, BUT SHALL BE INSTALLED SYMMETRICALLY ON BOTH SIDES OF THE WALL WITH THE EXPOSED EDGES OF THE WRAP STRIP LAYERS FLUSH WITH THE WALL SURFACES.

C. FILL, VOID OR CAVITY MATERIALS* - CAULK OR SEALANT - MIN 1/4 IN. (6 MM) DIAM CONTINUOUS BEAD APPLIED TO INSIDE WALLS OF THROUGH OPENING PRIOR TO INSTALLATION OF STEEL SUPPORT CLIPS AND/OR WRAP STRIP. CAULK BEAD TO BE RECESSED 1 IN. (25 MM) FROM THE BOTTOM PLANE OR FLOOR. IN WALL ASSEMBLIES, CAULK BEAD TO BE RECESSED 1 IN. (25 MM) FROM WALL SURFACE ON BOTH SIDES OF WALL. IN FLOOR ASSEMBLIES, A NOM 1/2 IN. (13 MM) THICK COATING OF CAULK IS TO BE APPLIED TO THE TOP EDGES OF THE WRAP STRIP LAYERS AND TO FILL ALL GAPS AT THE WRAP STRIP / CONCRETE INTERFACE. IN WALL ASSEMBLIES, THE EXPOSED EDGES OF THE WRAP STRIP LAYERS AND ALL GAPS AT THE WRAP STRIP / CONCRETE INTERFACE ON BOTH SIDES OF THE WALL TO BE COATED WITH THIN LAYER OF CAULK. (NOTE: W RATING APPLIES ONLY WHEN FB-3000 WT SEALANT IS USED. CP 25WB+ NOT SUITABLE FOR USE WITH CPVC PIPES.)

++BEARING THE UL CLASSIFICATION MARKING
++BEARING UL LISTING MARK

CONCRETE WALL OR FLOOR PENETRATION DETAIL

NOT TO SCALE



THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY MATTHEW J. CAMDEN, P.E. (FL#79284) ON 05-02-2023 USING AN SHA AUTHENTICATION CODE.

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ATP ENGINEERING SOUTH
BRADENTON, FLORIDA
ENGR. BUSINESS #8908
941-751-6485

DATE: _____
REV: _____
DESCRIPTION: _____

SEAL
MATTHEW J. CAMDEN
FL#79284

MDS DESOTO SHERIFF'S OFFICE
CHILLER PLANT
600 US 301
BRADENTON, FLORIDA 34211

ELECTRICAL SPECS

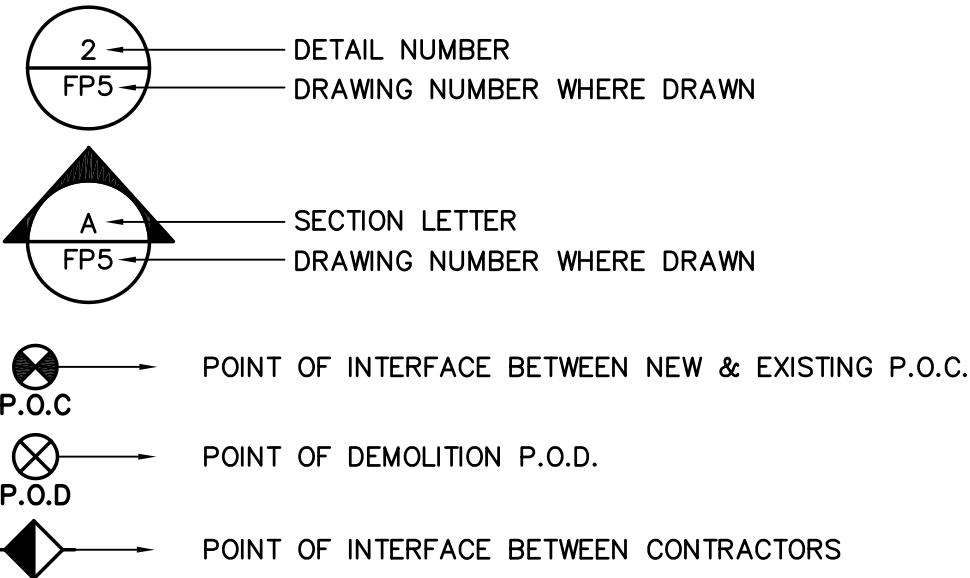
FILE: DESOTO CENT. CHILL
JOB NO.: WA#16-2023.08
DATE: 05-02-2023
PLOT SIZE: 1:1
DRAWN BY: HG
CHECKED BY: MC
SHEET No.: E6.0

ABBREVIATIONS

AC	AIR CONDITIONING
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AI	ANALOG INPUT
AO	ANALOG OUTPUT
AP	ACCESS PANEL
BFF	BELOW FINISHED FLOOR
BHP	BRAKE HORSE POWER
BOT	BOTTOM
CC	COILING COIL
CD	CONDENSATE DRAIN
CFM	CUBIC FEET PER MINUTE
CH	CHILLER
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CLG	CEILING
CO	CLEANOUT
CT	COOLING TOWER
CU	CONDENSING UNIT
CW	COLD WATER
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
DB	DRY BULB
DCC	DIRECT DIGITAL CONTROL
DG	DOOR GRILLE
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
DP	DEW POINT
DX	DIRECT EXPANSION
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
ECC	ENERGY CONTROL CENTER
EER	ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
ET	EXPANSION TANK
EL	ELEVATION
EQUIP	EQUIPMENT
EW	ELECTRIC WATER COOLER
EWT	ENTERING WATER TEMPERATURE
EXIST	EXISTING
FDR	FIRE DAMPER
FCU	FAN COIL UNIT
FD	FLOOR DRAIN
FL	FLOOR
FPI	FINS PER INCH
FPF	FINS PER FOOT
FB	FEET PER MINUTE
G	GUARD
GC	GENERAL CONTRACTOR
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
H	HUMIDITY
HB	HOSE BIBB
HC	HEATING COIL
HE	HEAT EXCHANGER
HP	HORSE POWER
HW	HOT WATER
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
KW	KILOWATT
LAT	LEAVING AIR TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
MC	MECHANICAL CONTRACTOR
MD	MOTORIZED DAMPER
MAX	MAXIMUM
MIN	MINIMUM
NC	NORMALLY CLOSED
NO	NORMALLY OPENED
OA	OUTSIDE AIR
OS&Y	OUTSIDE SCREW & YOKE
P	PUMP
PC	PLUMBING CONTRACTOR
PD	PRESSURE DROP
PRESS	PRESSURE
RA	RETURN AIR
RD	ROOF DRAIN
RL	RAIN LEADER
RTU	ROOF TOP UNIT
S	SANITARY
SDPR	SMOKE DAMPER
SA	SUPPLY AIR
SP	STATIC PRESSURE
TCC	TEMPERATURE CONTROL CONTRACTOR
T	TEMPERATURE
TYP	TYPICAL
UC	UNDERCUT
UG	UNDERGROUND
UN	UNLESS OTHERWISE NOTED
UV	UNIT VENTILATOR
V	VENT
VAC	VACUUM
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER
VFD	VARIABLE FREQUENCY DRIVE
VSD	VARIABLE SPEED DRIVE
VTR	VENT THRU ROOF
W	WASTE
WB	WET BULB
WCO	WALL CLEANOUT

LEGENDS, GENERAL NOTES AND ABBREVIATIONS

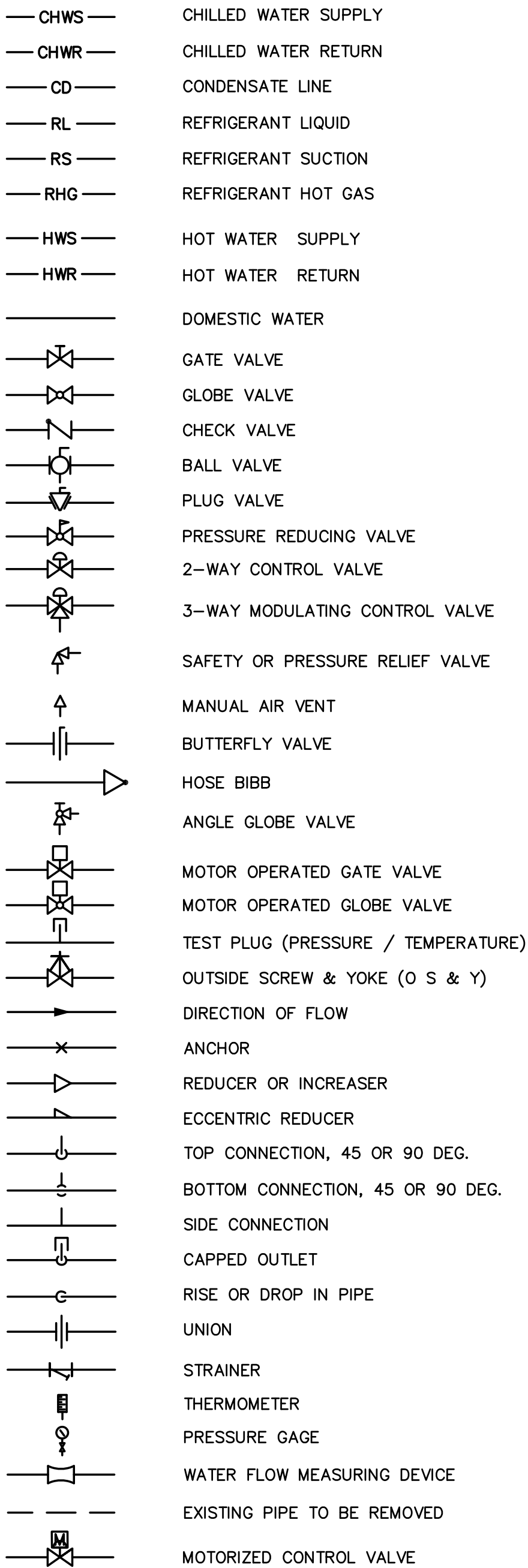
DRAWING SYMBOLS



NOTE:

THESE ARE STANDARD SYMBOLS AND MAY NOT ALL APPEAR ON THE PROJECT DRAWINGS; HOWEVER WHEREVER THE SYMBOL APPEARS ON THE PROJECT DRAWINGS, THE ITEM SHALL BE PROVIDED AND INSTALLED.

PIPING



GENERAL NOTES

1. WORK CONSISTS OF DEMOLITION OF EXISTING CHILLERS AND ASSOCIATED EQUIPMENT, PROVIDING AND INSTALLING TWO AIR COOLED CHILLERS, PUMPS, ELECTRICAL BREAKERS, CONDUCTORS, DISCONNECTS, MOTOR STARTERS, VALVES, PIPING, INSULATION, STRUCTURAL SUPPORT, VIBRATION ISOLATION, ELECTRICAL, TESTING AND ADJUSTMENT, PROGRAMMING, AND CONTROL SYSTEMS FOR A COMPLETE OPERATING SYSTEM AND AS INDICATED ON THE DRAWINGS. ALL WORK SHALL COMPLY WITH APPLICABLE CODES IN SPECIFICATIONS. IT IS THE INTENTION OF THE CONTRACT DRAWINGS AND SPECIFICATIONS TO CALL FOR COMPLETE, FINISHED WORK, TESTED, AND READY FOR OPERATION. THE USE OF THESE DRAWINGS IS FOR A REPLACEMENT OF TWO CHILLERS, TWO PUMPS, PIPING, ETC. DUE TO BUDGET CONSTRAINTS.
2. PLEASE PROVIDE FOR A PRICING (SEPERATE LINE ITEMS) FOR THE CHILLERS, WARRANTY, AND PUMPS IN THE CONTRACT.
3. ALL CONTRACTOR PERSONNEL CREDENTIALS LISTS WITH PERSONNEL NAME, DRIVERS LICENSE, AND DATE OF BIRTH SHALL BE SUBMITTED FOR CHECKS WITH THE STATE OF FLORIDA. ANY REJECTED INDIVIDUALS SHALL NOT BE ALLOWED ON SITE. RESUBMISSION OF NEW INDIVIDUALS SHALL BE COMPLETED PRIOR TO ADMISSION TO THE SITE.
4. OUTAGES OF THE CHILLER SYSTEM SHALL BE SCHEDULED WITH THE USER.
5. THE CHILLER SUPPLIER SHALL PROVIDE A 10 YEAR WARRANTY, PARTS, LABOR, TRAVEL, REFRIGERANT, AND EXPENSES COMPLETE FOR THE CHILLERS.
6. TEST AND BALANCE SHALL BE PROVIDED BY A COMPANY SPECIALIZING IN THE TESTING AND BALANCING OF HVAC SYSTEMS AS SUBCONTRACTOR TO THE HVAC CONTRACTOR, GENERAL CONTRACTOR, OR OWNER. THE TEST AND BALANCE CONTRACTOR SHALL BE A MEMBER OF EITHER AABC OR NEBB.
7. ALL PIPING SUBJECT TO THERMAL EXPANSION AND/OR CONTRACTION THAT PENETRATES A SMOKE, FIRE, OR FIRE/SMOKE WALL, PARTITION, OR FLOOR SLAB SHALL BE SUITABLY SLEEVED AND FIRE SAFED.
8. PROVIDE IDENTIFICATION OF THE LOCATION OF ALL PIPING AND FLOW DIRECTION AND VALVES. IDENTIFICATION TAGS SHALL BE AFFIXED TO THE VALVES AND PIPING AND SHALL BE VISIBLE FROM THE YARD GRADE.
9. ALL PIPING SHALL BE SUPPORTED WITH COMMERCIAL MANUFACTURED CLAMPS. PROVIDE ISOLATION SLEEVES TO PREVENT CONTACT OF DISSIMILAR METALS.
10. INSTALL ALL EQUIPMENT IN STRICT ACCORDANCE WITH THE MANUFACTURERS' INSTRUCTIONS AND RECOMMENDATIONS.
11. CONTRACTOR TO PROVIDE ALL SUPPLEMENTARY STEEL REQUIRED TO SUSPEND/ SUPPORT MECHANICAL EQUIPMENT AND MATERIALS. THE CONTRACTOR SHALL SUPPLY A LICENSED STRUCTURAL ENGINEER TO ASSURE EXISTING SUPPORTS CAN BE REUSED WITH NEW STRUCTURE TO SUPPORT PIPING, PUMPS, AND CHILLERS IN AN ELEVATED LEVEL AND MEET FBC WUIBD RATINGS.
12. PENETRATIONS THROUGH FIRE RATED ASSEMBLIES, PENETRATIONS FOR PIPES, CONDUITS, OR OTHER PURPOSES THROUGH ASSEMBLIES (WALLS, PARTITIONS, ETC.) WITH A REQUIRED FIRE RESISTANCE RATING FIRE STOP MATERIAL. FIRE STOP SEALANTS SHALL BE UL LISTED. APPLY FIRE STOP AS RECOMMENDED BY THE MANUFACTURER AND IN ACCORDANCE WITH ITS LISTING TO MEET OR EXCEED THE FIRE RATING OF THE ASSEMBLY IN WHICH IT IS INSTALLED.
13. ALL INSULATION SHALL BE FIRE RATED IN ACCORDANCE WITH ASHRAE 90A 50/25 SMOKE DEVELOPMENT AND FLAME SPREAD REQUIREMENTS. INSULATION "R" VALUES SHALL COMPLY WITH THE FLORIDA ENERGY CODE. ALL COVERS OVER THE INSULATION SHALL MATCH EXISTING ALUMINUM DUE TO THE EXTERIOR INSTALLATION.
14. MOUNT ALL THERMOMETERS, GAUGES, AND/OR SENSORS 4-6 FEET ABOVE THE FLOOR, UNLESS OTHERWISE NOTED.
15. SEE ELECTRICAL DRAWINGS FOR ELECTRICAL CHARACTERISTICS OF MECHANICAL EQUIPMENT.
16. THE CONTRACTOR IS RESPONSIBLE TO CHECK FIELD CONDITIONS PRIOR TO BIDDING AND REPORT ANY PROBLEMS/CONFLICTS. THE CONTRACTOR IS TO PROVIDE A 100% COMPLETE PROJECT.
17. THE WORK INDICATED ON THESE DRAWINGS IS GENERALLY DIAGRAMMATIC AND IS INTENDED TO CONVEY THE SCOPE OF WORK AND INDICATE THE GENERAL ARRANGEMENT OF DUCTWORK AND EQUIPMENT, ETC.
18. ALL CONSTRUCTION WORK IS TO BE FREE OF DEFECTS IN WORKMANSHIP/LABOR AND MATERIALS/ PARTS AND SERVICE AND TRAVEL FOR A PERIOD OF THREE YEARS FROM DATE OF FINAL ACCEPTANCE. ALL DEFECTS WHICH DEVELOP OR ARE DISCOVERED WITHIN THIS PERIOD SHALL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE OWNER AT NO ADDITIONAL COST TO THE OWNER.
19. UPON COMPLETION OF THE WORK UNDER THIS CONTRACT, THE CONTRACTOR SHALL REMOVE ALL TOOLS, APPLIANCES, SURPLUS MATERIALS, AND SCRAP. ALL IDENTIFIED EXISTING EQUIPMENT TO BE REMOVED SHALL BE TURNED OVER TO THE OWNER.
20. WHEN CONFLICTS OCCUR IN SPECIFICATIONS OR IN THE DRAWINGS, OR BETWEEN EITHER, THE ITEMS OF GREATER QUANTITY OR HIGHER COST SHALL BE PROVIDED.
21. THE CONTRACTOR SHALL COORDINATE WORK WITH OTHER TRADES IN ORDER TO AVOID CONFLICTS.
22. ALL WALL, COLUMN, AND GROUND ATTACHED EQUIPMENT AND APPURTENANCES INCLUDED IN THE SCOPE OF THIS PROJECT ARE REQUIRED TO BE SECURED TO THE UNDERLYING BUILDING STRUCTURE OR GROUND STRUCTURE. THE FASTENING AND STRUCTURAL SYSTEMS SHALL BE DESIGNED TO WITHSTAND A 180-190 MPH WIND LOAD. (CATEGORY IV.) REF. FBC STRUCTURAL WIND AREA MAP
23. CONTRACTOR SHALL PROVIDE TO LOCAL AHJ OR PERMITTING AGENCY A COPY OF ALL MAJOR EQUIPMENT CUTS SHEETS AT TIME OF APPLICATION.
24. ALL MECHANICAL WORK SHALL BE INSTALLED AND TESTED IN ACCORDANCE WITH FLORIDA MECHANICAL CODE, ENERGY CODE REQUIREMENTS LOCALLY LATEST ADOPTED EDITION.
25. THE OWNER OPERATES THIS FACILITY AND IS RESPONSIBLE FOR ALL SETPOINTS AND MAINTENANCE AND OPERATION OF SYSTEMS.
24. THE CONTROL SYSTEMS ARE ALC AND ALL SYSTEMS MUST BE BACNET CONTROLLABLE AND TIED TO THE CONTROL SYSTEM. REFER TO SHEET M3.0 AND M4.0.

SEAL

MATTHEW J. CAMDEN
No. 79284
STATE OF FLORIDA
PROFESSIONAL ENGINEER

THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY MATTHEW J. CAMDEN, P.E. (FL#79284) ON 05-02-2023 USING AN SHA AUTHENTICATION CODE.

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DRAWING TITLE
MECHANICAL LEGEND
AND GERNAL NOTES

FILE: DESOTO CENT. CHILL
JOB NO.: WA#16-2023.08
DATE : 05-02-2023
PLOT SIZE: 1:1
DRAWN BY: AZ
CHECKED BY: MC
SHEET No.: M1.0

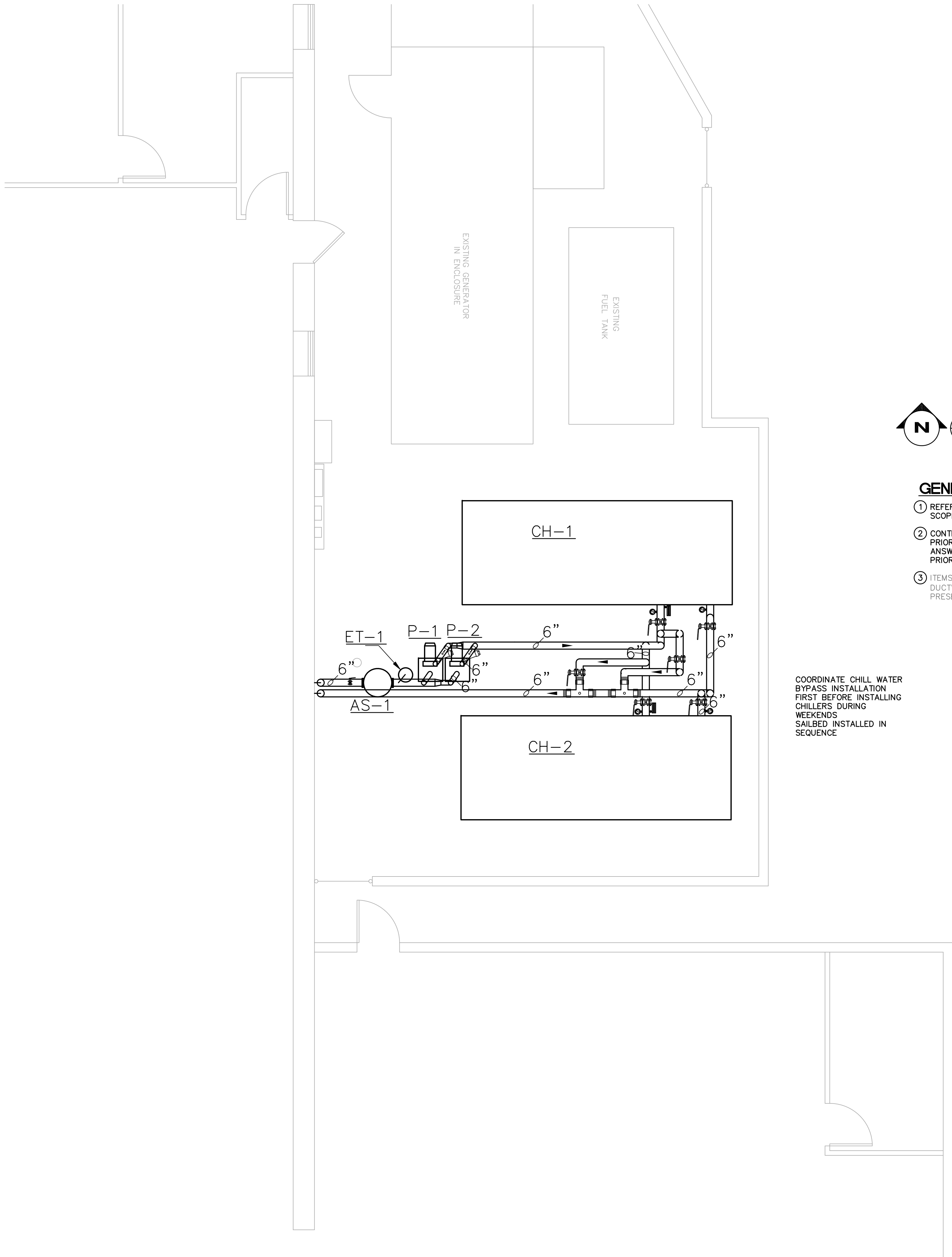
ATP ENGINEERING SOUTH
BRADENTON, FLORIDA
ENGR. BUSINESS #8908
941-751-6485

DATE

REV# DESCRIPTION

MSO DESOTO SHERIFF'S OFFICE
CHILLER PLANT
600 US 301
BRADENTON, FLORIDA 34211

MATTHEW J. CAMDEN
FL#79284

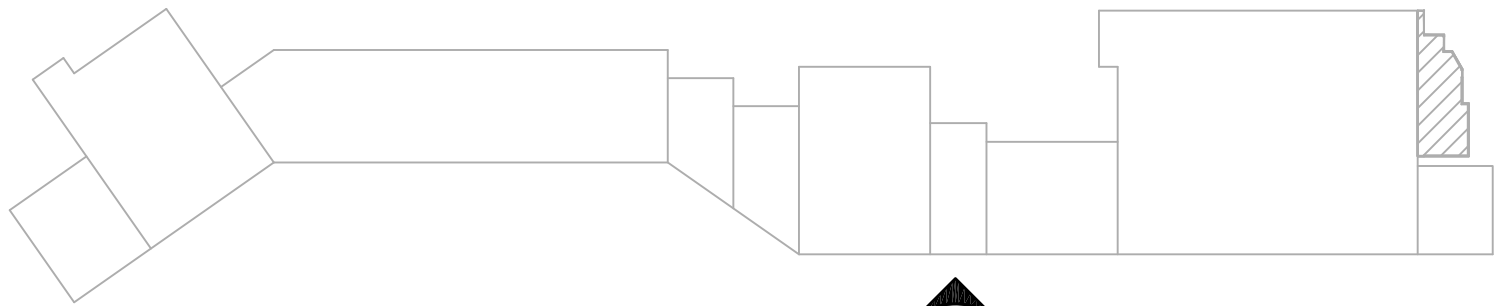



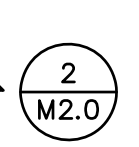
  **MECHANICAL PROPOSED FLOOR PLAN**
1/4" = 1'-0"

GENERAL NOTES:

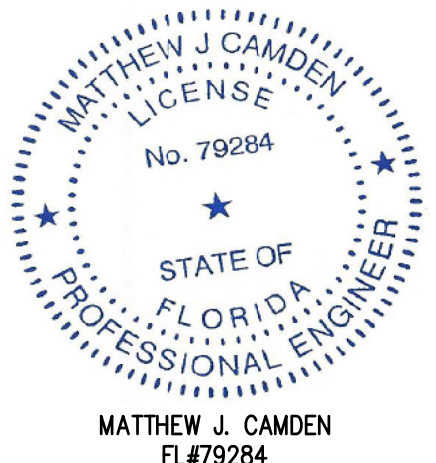
- 1 REFER TO PLANS AND SPECIFICATIONS FOR ADDITIONAL SCOPE OF WORK.
- 2 CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO START OF WORK. ANY QUESTIONS SHALL BE ANSWERED BY THE ARCHITECT AND PROJECT MANAGER PRIOR TO START WORK.
- 3 ITEMS IN GRAYSCALE ARE EXISTING AND TO REMAIN. FOR DUCTWORK AND DIFFUSERS THAT ARE "TO REMAIN" PRESERVE EXISTING LOCATION.

COORDINATE CHILL WATER BYPASS INSTALLATION FIRST BEFORE INSTALLING CHILLERS DURING WEEKENDS
SAILBED INSTALLED IN SEQUENCE



  **KEY PLAN**
1/128" = 1'-0"

SEAL

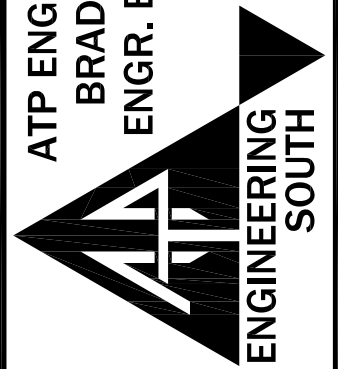


MATTHEW J. CAMDEN
FL#79284

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REV#	DESCRIPTION	DATE

SEAL
MATTHEW J. CAMDEN
FL#79284

MSO DESOTO SHERIFF'S OFFICE
CHILLER PLANT
600 US 301
BRADENTON, FLORIDA 34211

DRAWING TITLE
MECHANICAL
FLOOR
PLAN

FILE:	DESOTO CENT. CHILL
JOB NO.:	WA#16-2023.08
DATE :	05-02-2023
PLOT SIZE:	1:1
DRAWN BY:	AZ
CHECKED BY:	MC
SHEET No.:	M2.0

PUMP SCHEDULE			
ITEM NO.	----	P-1	P-2
SERVICE	----	CHILLER SYSTEM	CHILLER SYSTEM
TYPE	----	IMPELLER	IMPELLER
WATER FLOW	GPM	360	360
TOTAL DYNAMIC HEAD	FT. WTR.	59.8	59.8
MOTOR	HP	10	10
SPEED	RPM	1676	1676
EFFICIENCY	%	74	74
MOTOR TYPE	----	END SUCTION	END SUCTION
BASE TYPE	----	FOOT MOUNTED	FOOT MOUNTED
SUCTION DIA.	IN.	6	6
DISCHARGE DIA.	IN.	6	6
ELECTRICAL	V/PH/HZ	208-230/460/3/60	208-230/460/3/60
WEIGHT	LBS.	398	398
LOCATION	----	CHILLER AREA	CHILLER AREA
MANUFACTURER	----	BELL AND GOSSETT	BELL AND GOSSETT
MODEL NO.	----	E1510-3BD-SS-215T-S	E1510-3BD-SS-215T-S
NOTES: 1. REPLACE ONE PUMP AT A TIME AS CHILLERS ARE REPLACED. REBUILD THE STRUCTURAL SUPPORT, REPLACE GAUGES, THERMOMETERS, AND TRIPLE DUTY/ BALANCE VALVES, RIGHT ANGLE SUCTION DIFFUSER, AND FLEXIBLE CONNECTIONS, PROVIDE AND INSTALL NEW FRAME. 2. RE-TIE THE EXISTING TCC RELAYS IN FOR OPERATION OF THE CHILLER SYSTEM. 3. REINSULATE THE PUMPS AND PIPING COMPLETE. USE ARMAFLEX OR CELL GLASS WITH ALUM COVER ON THE PUMP. PIPING SHALL BE INSULATED CELL GLASS WITH ALUMINUM COVER 4. PUMP AND MOTOR UNIT SHALL BE MOUNTED EXTERIOR AND COATED, MOTOR SHALL BE TEFC.			

AIR COOLED CHILLER SCHEDULE			
ITEM NO.	----	CH-1	CH-1
CAPACITY	TONS	130	130
WATER FLOW	GPM	241	241
MAX. WATER PRESSURE DROP W/ STRAIN.	FT.WTR.	8.54	8.54
WATER TEMP., ENT./LVG.	°F/°F	54/44	54/44
CONDENSING TEMPERATURE	°F	110	110
REFRIGERANT	----	R410A	R410A
TOTAL POWER	KW	104.1	104.1
ELECTRICAL	V/PH/HZ	460/3/60	460/3/60
EFFICIENCY	EER/PLV/IP	9.98/15.85	9.98/15.85
WEIGHT	LBS.	8631	8631
LOCATION	----	EXTERIOR	EXTERIOR
AUXILIARY CONNECTIONS	----	X	X
MANUFACTURER	----	TRANE	TRANE
MODEL NO.	----	RTAF130	RTAF130
NOTES: NOTES APPLY TO ALL CHILLERS 1. ALL CHILLERS ARE 460 VOLT , 3 PHASE , 60 HERTZ., TRANE MCA 260 A, MOCP 350A, UNDER/OVER VOLTAGE CIRCUIT PROTECTION WITH LED. 2. SPRING/NEOPRENE ISOLATORS, SS RUBBER FLEXIBLE CONNECTIONS, FLEXIBLE EVAPORATOR HX INSULATION. 3. CHILLED WATER RESET BY MFR. TIED TO MASTER CONTROL, REMOTE PANEL IN PUMP ROOM SUPPLIED WITH UNIT INTERCONNECTION WIRING BY MFR. 4. EXISTING 120 VOLT OUTLET ON SITE ON CHILLER YARD WALL TO REMAIN. 5. CHILLER UNIT REMOTE CONTROLS, FLOW SWITCH BY MFR TIED TO MFR CONTROLS. 6. STANDARD COLOR BY MFR. 7. MOUNT UNIT WITH VIBRATION ISOLATORS PROVIDED BY MFR. 8. FUSED DISCONNECT/ CIRCUIT BREAKER WITH BY DIV. 16. DISCONNECT SHALL BE SERVICE RATED. 9. PROVIDE PIPING IN ACCORDANCE WITH DETAILS. 10. CONTROL COMMUNICATION INTERFACE - BACNET. 11. UNIT PROVIDED WITH COATED CONDENSER COILS. 12. EXTEND PIPING TO CONNECTIONS , VERIFY WITH CHILLER SUPPLIED. 13. REFER TO SHEET M1.0 FOR WARRANTY. 14. MFR. STARTUP AND TRAINING SHALL BE PROVIDED.			

AIR SEPARATOR SCHEDULE		
ITEM NO.	----	AS-1
SERVICE	----	CHILLED WATER PUMPS
FLOW RATE (MAX.)	GALLONS	671
MAX. PRESS. DROP	FT. WTR.	X
SIZE (IN.)	PIPE SIZE	6"
LOCATION	----	CHILLER AREA
MANUFACTURER	----	BELL AND GOSSETT
MODEL NO.	----	R-6F
NOTES: 1. UNIT SHALL BE SUSPENDED FROM STEEL STRUCTURE WITH MANUFACTURER'S SUPPLIED SUPPORT AND HANGERS. 2. UNIT SHALL HAVE FLANGED CONNECTIONS TO ALLOW FOR EASY REMOVAL.		

EXPANSION TANK SCHEDULE		
ITEM NO.	----	ET-1
SERVICE	----	CH-1, CH-2
CAPACITY	GALLONS	14
ACCEPTANCE	GALLONS	11.3
SIZE (IN.)	DIA./LENGTH	16/33
LOCATION	----	CHILLER AREA
MANUFACTURER	----	BELL AND GOSSETT
MODEL NO.	----	HFT-30
NOTES: 1. 1" CONNECTION		

SEAL

Matthew J. Camden

FL#79284

STATE OF FLORIDA

PROFESSIONAL ENGINEER

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BRADENTON, FLORIDA
ENGR. BUSINESS #8908
941-751-6485

Matthew J. Camden

FL#79284

DATE

REV / DESCRIPTION

MSO DESOTO SHERIFF'S OFFICE
CHILLER PLANT
600 US 301
BRADENTON, FLORIDA 34211

DRAWING TITLE
MECHANICAL
SCHEDULE

FILE: DESOTO CENT. CHILL

JOB NO.: WA#16-2023.08

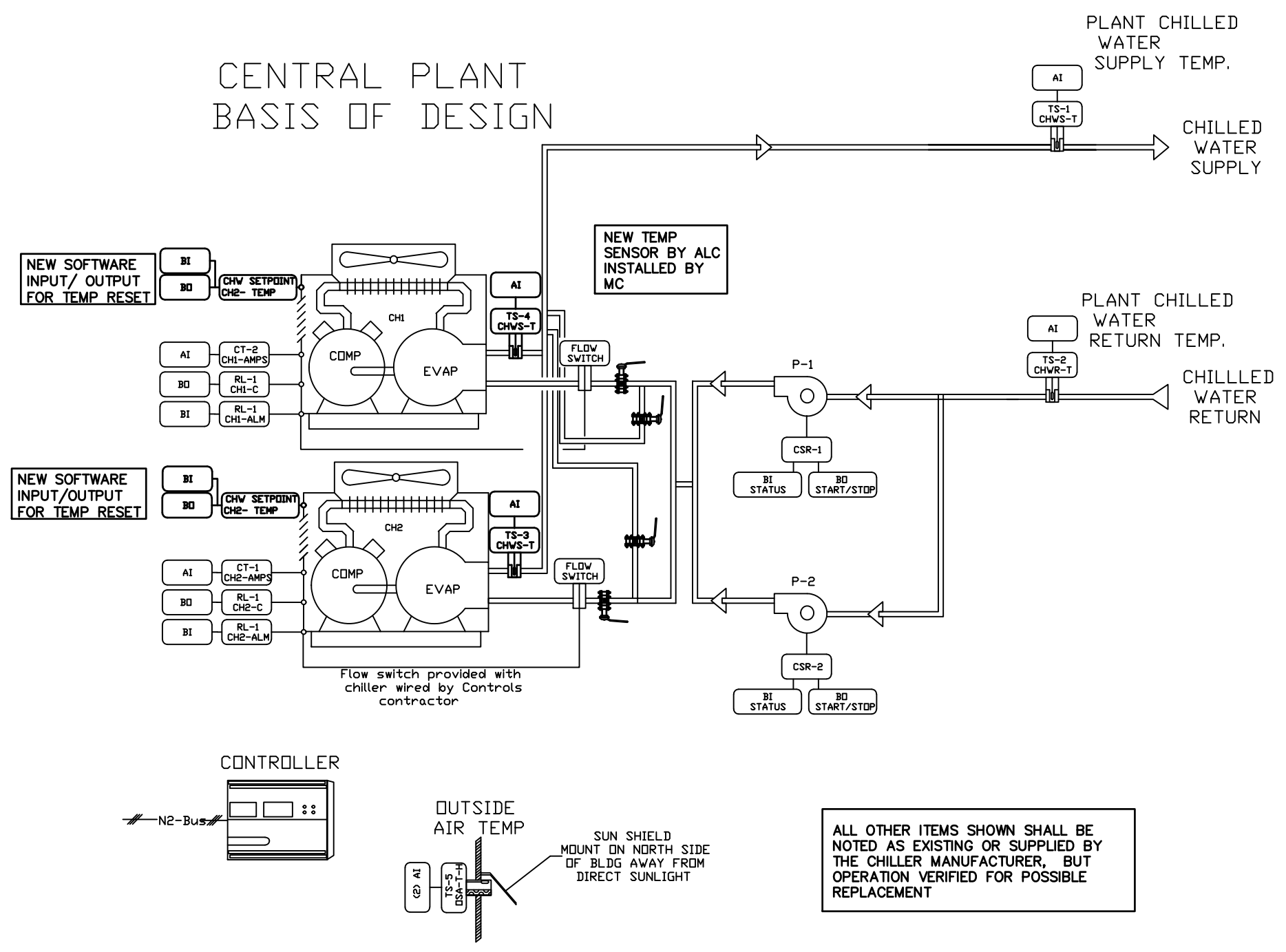
DATE : 05-02-2023

PLOT SIZE: 1:1

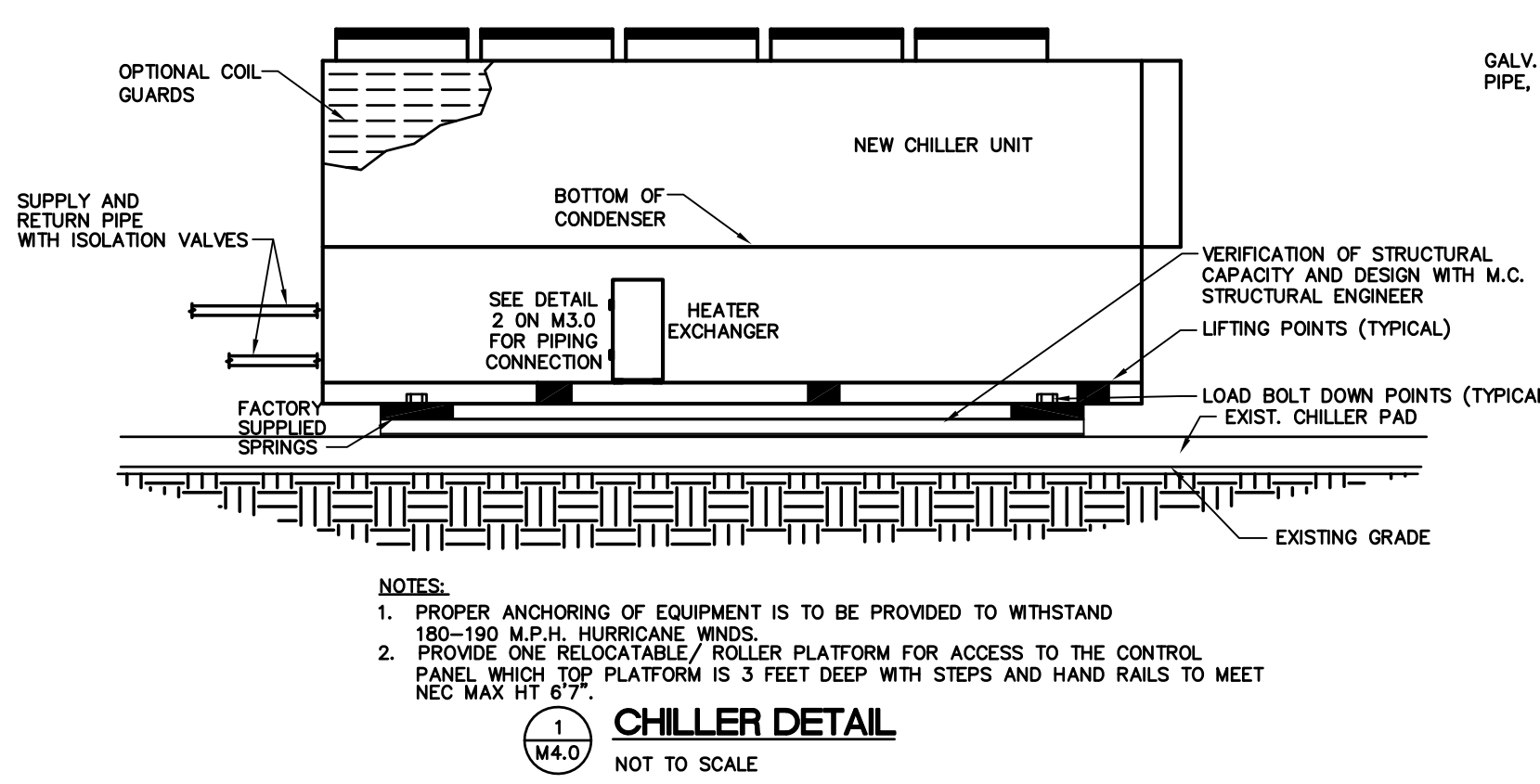
DRAWN BY: AZ

CHECKED BY: MC

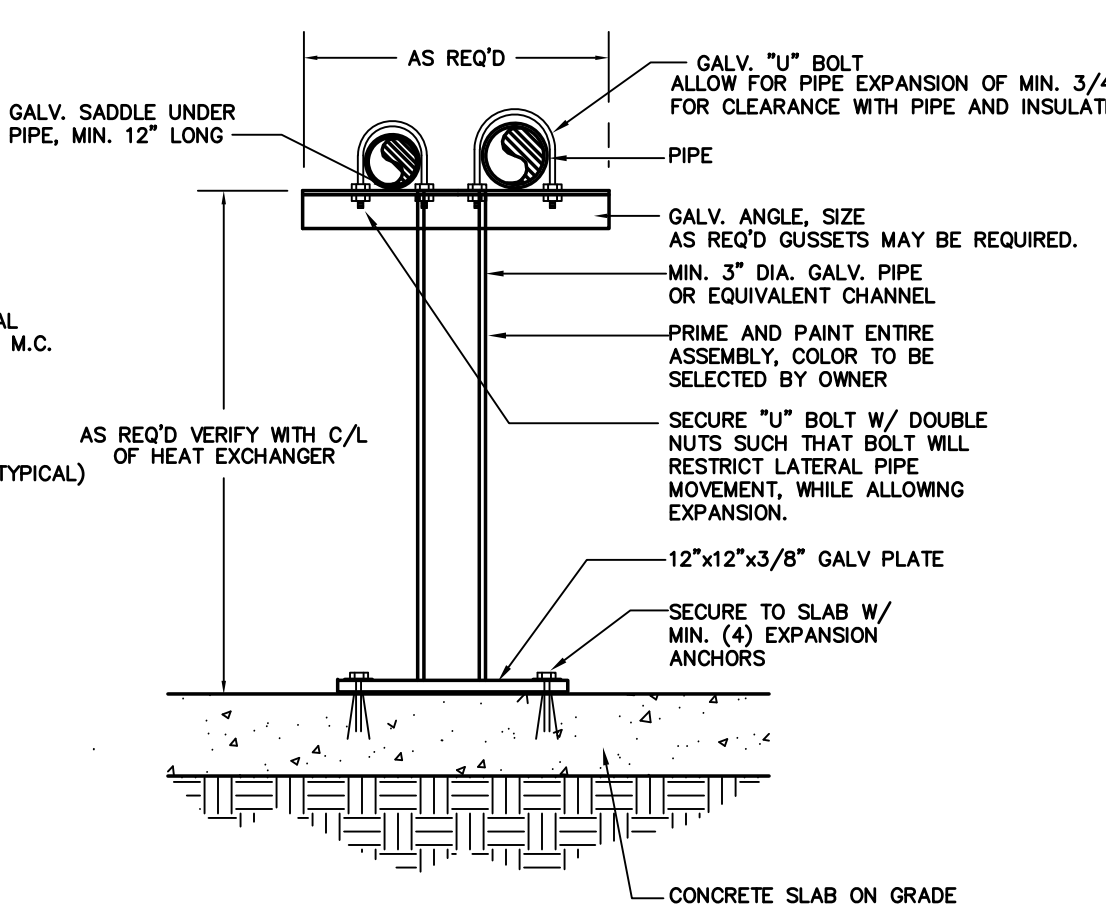
SHEET No.: M3.0



4 CHILLER PLANT CONTROL DIAGRAM
NOT TO SCALE



1 CHILLER DETAIL
NOT TO SCALE



3 PIPE SUPPORT DETAIL
NOT TO SCALE
COORDINATE DETAIL WITH M.C. STRUCTURAL ENGINEER

ENERGY MANAGEMENT SYSTEM SUMMARY:

THE BUILDING ENERGY MANAGEMENT SYSTEM (EMS) IS A NETWORK OF INTEROPERABLE, STAND-ALONE DIGITAL CONTROLLERS COMMUNICATING ON AN OPEN PROTOCOL COMMUNICATION NETWORK TO A HOST COMPUTER WITHIN THE FACILITY AND CAPABLE OF COMMUNICATING VIA THE INTERNET TO A HOST COMPUTER IN A REMOTE LOCATION. A MODEM IS PROVIDED FOR REMOTE ACCESS TO THE NETWORK AND FOR PAGING THE OPERATORS WHEN AN ALARM OCCURS.

THE CONTROLS CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS, EQUIPMENT, SOFTWARE, GRAPHICS AND SERVICE NECESSARY FOR THE REPLACEMENT OF TWO CHILLERS AND TWO PUMPS COMPLETE AND OPERATING WITH EMS, UTILIZING NEW OR REPLACED EXISTING DIRECT DIGITAL CONTROLS AS SHOWN ON THE DRAWINGS AND AS DESCRIBED HEREIN. DRAWINGS ARE DIAGRAMMATIC ONLY. THE REPROGRAMMED EXISTING EMS SHALL BE CAPABLE OF TOTAL INTEGRATION OF THE FACILITY INFRASTRUCTURE SYSTEMS WITH USER ACCESS TO ALL SYSTEM DATA EITHER LOCALLY OVER A SECURE INTRANET WITHIN THE BUILDING OR BY REMOTE ACCESS BY A STANDARD WEB BROWSER OVER THE INTERNET.

THE EXISTING EMS CONTROLS BY INCLUDE: (2) REPLACEMENT AIR COOLED CHILLERS, (2) REPLACEMENT CHILLED WATER PUMPS.

THE LOCATION OF THE DDC MASTER CONTROL PANEL AND FRONT END COMPUTER IS IN THE BUILDING.

SEQUENCE OF OPERATIONS:

CHILLER PLANT:

UPON PROOF OF ANY AIR HANDLER FAN RUNNING AND OUTSIDE AIR TEMPERATURE ABOVE COOLING LOCKOUT (55 DEGREES F, FIELD ADJUSTABLE), THE CHILLER PLANT SHALL BE ENABLED TO OPERATE.

THE CHILLERS SHALL BE ENABLED/DISABLED BASED ON A LEAD/LAG PROGRAM EXECUTED THROUGH THE ENERGY MANAGEMENT SYSTEM. SET POINTS ON THE SYSTEM CHILLED WATER SUPPLY AND RETURN TEMPERATURE SHALL STAGE ON/OFF THE CHILLERS.

THE INLET CHILLED WATER VALVE SHALL BE OPEN PRIOR TO THE PUMP OPERATING AND CLOSED AFTER THE VALVE IS INTERLOCKED WITH THE CHILLER OPERATION SEQUENCE.

UPON PROOF OF PUMP/CHILLER FLOW STATUS, THE CHILLER SHALL BE ENABLED. THE CHILLER SHALL OPERATE UNDER ITS OWN FACTORY-MOUNTED CONTROLS TO PROVIDE 44 DEG F LEAVING WATER TEMPERATURE (ADJ.) ON CHILLER SHUTDOWN, THE ASSOCIATED CHILLED WATER PUMP SHALL CONTINUE TO OPERATE FOR 5 MINUTES BEFORE SHUTTING DOWN. THE CHILLER SETPOINTS SHALL BE ADJUSTABLE FROM THE AJS.

DURING UNOCCUPIED TIMES, THE CHILLERS AND PUMPS SHALL REMAIN OFF. IF THE CHILLED WATER SYSTEM IS ENABLED IT SHOULD OPERATE FOR A MINIMUM OF 30 MINUTES.

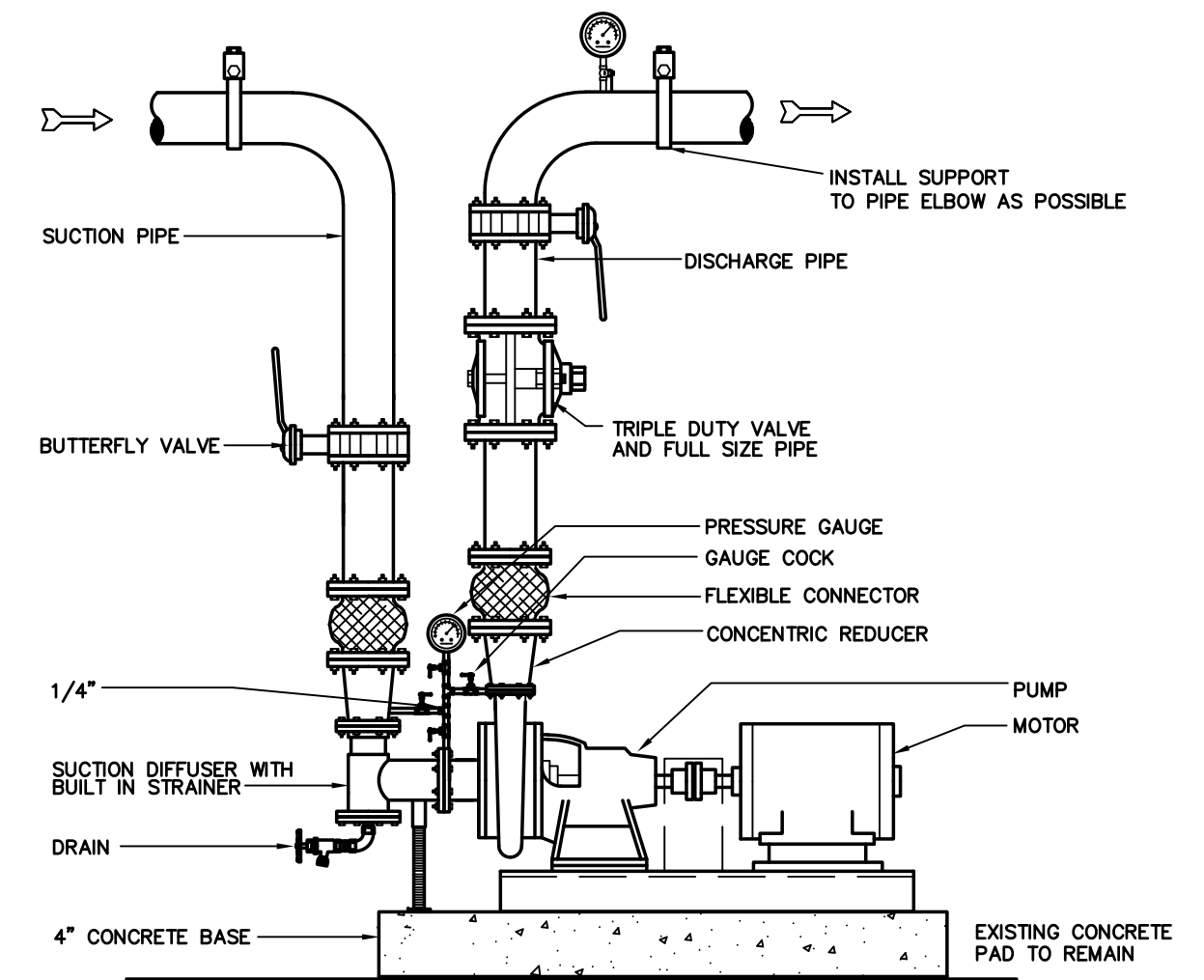
THE FACTORY PROVIDED CHILLER CONTROLLER WILL LOAD/UNLOAD OR STAGE COMPRESSORS AS NEEDED TO MAINTAIN 44°F (ADJUSTABLE) CHILLED WATER SUPPLY TEMPERATURE. CHILLERS SHALL BE STAGED USING THE FOLLOWING LEAD-LAG SEQUENCE:

OPTION UPON START-UP, THE LEAD CHILLER SHALL OPERATE FOR AT LEAST 15 MINUTES PRIOR TO THE LAG CHILLER STARTING. THE DIRECT DIGITAL CONTROLLER SHALL MONITOR THE COMMON AND UNIT CHILLED WATER SUPPLY TEMPERATURE. SHOULD THE TEMPERATURE EXCEED THE LAG CHILLER START SET POINT OF 47°F (ADJUSTABLE) CONTINUOUSLY FOR A PERIOD OF 15 MINUTES AND THE LEAD CHILLER IS LOADED 100%, THE LAG CHILLER SHALL BE CALLED TO OPERATE.

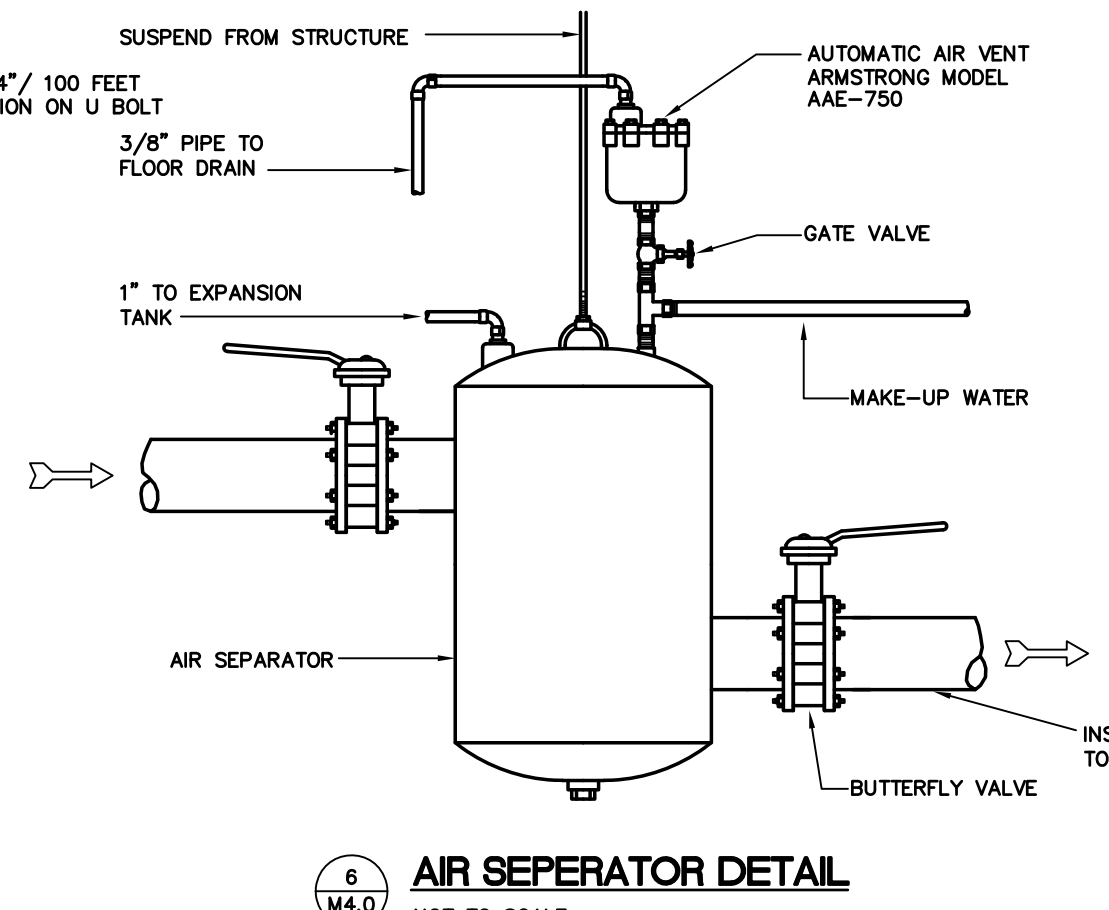
THE DDC CONTROLLER WILL CONTINUOUSLY MEASURE THE LOAD ON EACH CHILLER. ONCE THE TOTAL LOAD IN THE BUILDING DECREASES AND STAYS BELOW 45 TONS FOR A PERIOD OF 30 MINUTES (ADJUSTABLE), CHILLER CH-2 SHALL BE SHUT-DOWN.

THE CHILLERS SHALL ALTERNATE THE LEAD/LAG SEQUENCE WEEKLY OR AS OTHERWISE PROGRAMMED BY THE OWNER'S BUILDING ENGINEER.

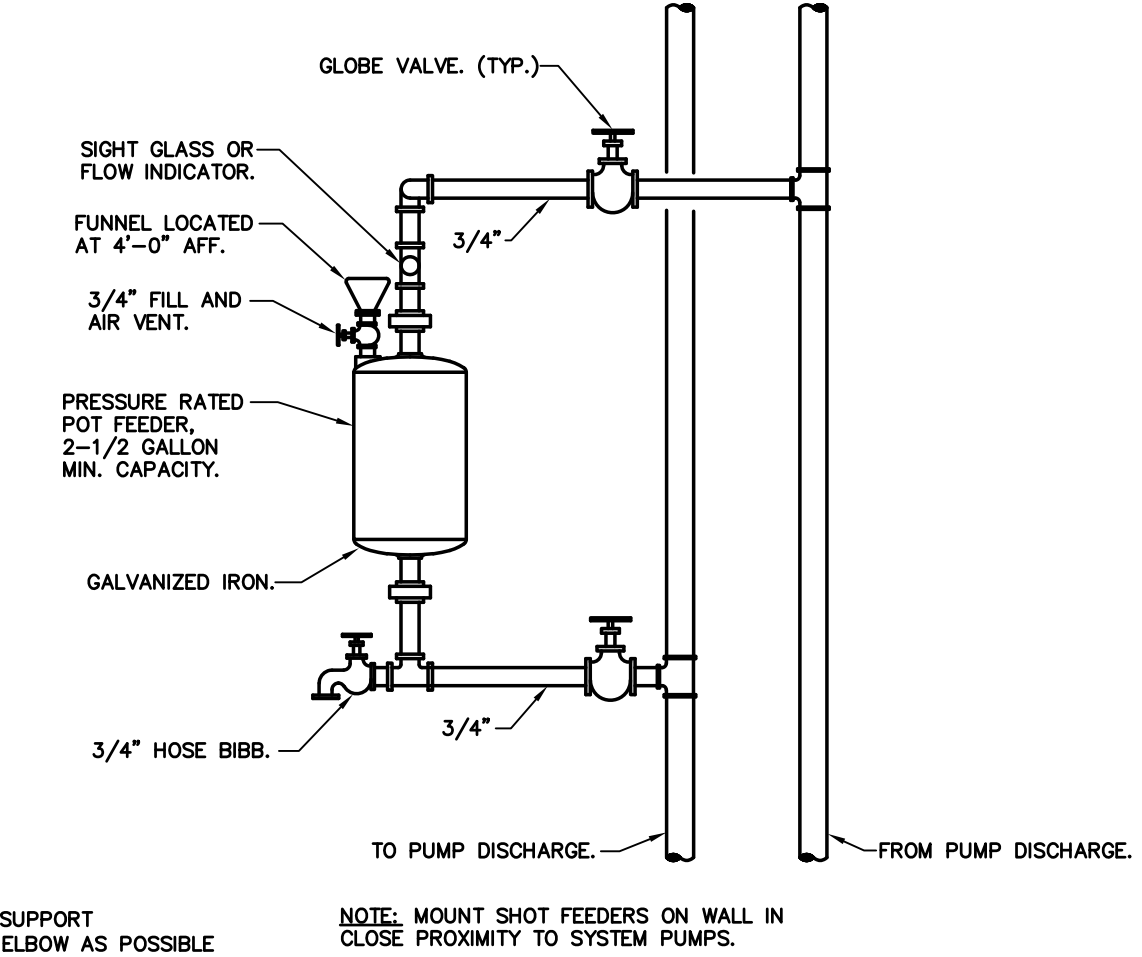
5 CHILLER PLANT SEQUENCE REVISED
NOT TO SCALE



7 HOT WATER END SUCTION PUMP DETAIL
NOT TO SCALE



6 AIR SEPERATOR DETAIL
NOT TO SCALE



2 CHEMICAL SHOT FEEDER DETAIL
NOT TO SCALE

SEAL

MATTHEW J. CAMDEN
LICENSE
No. 79284
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

MATTHEW J. CAMDEN
FL#79284

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BRADENTON, FLORIDA
ENGR. BUSINESS #8908
941-751-6485

ENGINEERING SOUTH

DATE

REV. DESCRIPTION

M50 DESOTO SHERIFF'S OFFICE
CHILLER PLANT
600 US 301
BRADENTON, FLORIDA 34211

DRAWING TITLE
MECHANICAL DETAIL

FILE: DESOTO CENT. CHILL
JOB NO.: WA#16-2023.08
DATE: 05-02-2023
PLOT SIZE: 1:1
DRAWN BY: AZ
CHECKED BY: MC
SHEET No.: M4.0

1. SCOPE
Furnish all necessary demolition, labor, materials, and equipment and perform all work called for on the Drawings and specified herein for a complete replacement air cooled chiller system with functioning mechanical, general building, and electrical systems and all utility connections as required. Review and consultation with the Project Manager is required prior to any work being performed and completed.
Manatee County and City of Bradenton requirements take precedence on all work and equipment. Refer to item 5 of the specification for references and item 25 for price breakdown of subcontractors and schedule. Refer to sheet M1.0 for the requirements of chiller warranty and additional separate warranty. Provide all personnel clearances with the Manatee County Sheriffs office.

2. RELATED WORK SPECIFIED ELSEWHERE
All Bidding Documents, including Contract Conditions, Instructions to Bidders, Supplements, and Addendums are part of this specification. Should any questions or conflicts arise, request written clarification from the Engineer and Project Manager or abide the interpretation of the Engineer and Project Manager.

3. CODES AND STANDARDS
The following Codes and Standards are in effect or latest approved by the local jurisdiction for the project:
Florida Mechanical Code
Florida Plumbing Code
Florida Fire Prevention Code
Florida Building Code
National Electrical Code
Florida Energy Code
NFPA Pamphlets
Florida Trench Act
City of Bradenton Codes and Ordinances
FEMA 412,413,414 Seismic booklets

Should any changes be required to the Drawings or Specifications to comply with these codes, request written clarification from the Engineer and Project Manager or abide by the interpretation of the Engineer and Project Manager. The current edition of each code shall be the one in effect for the project as adopted by the authority having jurisdiction.

All commissioning requirements shall be in accordance with the Florida Energy Code for lighting, hvac and plumbing. Refer to exceptions in the hvac sections for minimum square footage and tonnage/ btuh where commissioning is not required. A written report with equipment name/ model and electrical data and operational readings is required to be submitted to the Engineer for review of the commissioning similar to a test and balance report for a chiller unit and pump by the licensed respective, (hvac) contractor for transmittal to the Code official.
In the case of electrical, the licensed electrical contractor shall provide a typed written report to the Project Manager for review and transmittal to the Code official.

4. PERMITS, LICENSES, FEES, AND INSPECTIONS
Obtain, pay for, and maintain all necessary Permits, Licenses, and Certificates of inspections, pay for all installation charges, plant investment fees that are required by the Local utility company servicing the project.

5. QUALIFICATION OF CONTRACTOR/SUBCONTRACTOR
The Contractor shall be thoroughly experienced in the installation of the HVAC, plumbing, fire protection, electrical, and general building systems shown on the Drawings and specified herein. All work performed by the Contractor shall be of the highest quality. The Contractor shall be responsible for his Subcontractors to see that the systems are installed in accordance with the Drawings and Specifications. A contractor shall provide four references of projects and contacts on air cooled chiller replacements of the 100 tons and larger. No proof of references shall be construed as disqualification of bid.

6. WORK METHODS AND CONDITIONS
The Contractor shall be responsible for working conditions on the project, and shall see that no unsafe working conditions or methods are used. The Engineer shall not be responsible for unsafe working conditions or methods used on the project. The Engineer is also not responsible for hazardous materials testing, inspection and remediation of any perceived or actual denoted hazardous material on the job site. It is the responsibility of the Owner to provide proof to the Contractor if any such substance is not on site.

7. ACCESS TO EQUIPMENT
Provide for easy removal of coils, hx, compressors, condensers, fan shafts, fan wheels, drives, belts, pumps, valves, electrical equipment and other parts requiring periodic replacement or maintenance. Arrange for access to all motors, and controls. Provide all access panels in equipment, ducts, walls, ceilings, and floors for same. (ADA) The Americans Disability Act applies to access to all controls, fixtures, and light switches Refer to Florida Building Code for locations of all items.

8. COORDINATION
The Drawings show the general arrangement of the work, piping, equipment, and appurtenances. Follow the Drawings as closely as possible but make necessary offsets, transitions, and fittings that may be required to avoid conflicts. Work shall occur at times beyond the normal Monday-Friday day time schedules; pricing shall include, nights, week-ends, and holiday work to perform change-outs so as not to shutdown the operation of public facilities.

9. GUARANTEE
Guarantee all work against any defects in equipment, labor, material, or workmanship for a period of 3 years after the final date of acceptance. The guarantee does not include maintenance of equipment. Refer chiller warranty as separate warranty.

10. EQUIPMENT SUBMITTALS AND SHOP DRAWINGS
Submit four copies of each of the following submittals to the Engineer for approval:
Piping, valves, insulation, and hangers
Chiller, pumps, chiller heat exchanger, hydronic specialties
Panel Boards, circuit breakers, receptacles, light switches, wire, conduit, pull boxes
Controls, control valves, wiring, conduit, and panels
Testing and Balancing Booklets
Automatic Temperature Controls
Concrete testing, and compaction testing, and steel material lists
Commissioning reports
Refer to each specification sheet for each discipline's requirements (Electrical, and Mechanical)

11. OPERATION AND MAINTENANCE MANUALS
Provide three copies of the Operations and Maintenance Manuals consisting of three ring binders, plastic pressed base. Provide Manufacturers literature for each piece of equipment including installation instructions, operating instructions, maintenance instructions, replacement parts list, as-built drawings, lubrication schedule, name and address, and phone number of nearest service agency.

12. SEISMIC BRACING
All equipment, piping, ductwork, interior and exterior electrical, and appurtenances shall be adequately braced to withstand the lateral forces from the seismic event or weather wind occurrence of a magnitude indicated in the Florida Building Code for the project location. As a minimum this shall include anchoring of all equipment to the walls or pads and double diagonal bracing of every fourth duct, conduit, and pipe hanger.

13. TEMPORARY SERVICES
The Contractor will provide temporary power, water, sewer, utility services and demolition hauling services. If the Contractor interrupts a service, the owner shall be notified and repairs or temporary service arrangements will commence within an eight-hour period. Scheduling of service outages will be notified to owners. Notification will be at least in written form within 24 hours of the outage, with verbal notification 4 hours prior to the service outage of each affected owner.
The use of the Owner's utilities, heating and cooling system, and restrooms is not prohibited unless arrangements have been made, prior to contract signing. An on-site trailer with telephone, and portable restroom, and drinking water, and the demolition container shall be part of the contractor's contract. Waste hauling for excess materials shall be by the contractor. Security of the site will be coordinated with the Owner.

14. MATERIALS AND EQUIPMENT
All materials shall be new and of the highest quality of their respective kinds. The Contractor at no cost to the owner shall replace any material or equipment that is unsound, unfit, or damaged.

15. EXISTING CONDITIONS

The Contractor shall visit the site prior to bidding to verify existing conditions. Resolve any questions prior to bidding. Refer to all documentation provided by the Project Manager during the pre-bid walk-through for clarifications.

16. WORKMANSHIP AND COMPLETION OF INSTALLATION
The Contractor shall be skilled in the trades performed and shall be responsible for a complete and proper installation of all work required for the project. If the contractor damages a portion of the existing facility, he will correct at no expense to the Owner all damages to the original condition including painting and landscape. The Contractor shall also correct at no expense to the Owner all errors in installation and repair all leaks in piping and equipment. The Contractor shall follow the approved manufacturer's recommendations and instructions where details of specific installation instructions are not provided.

Close all pipe, duct and conduit openings with caps or plugs during installation. Protect and store on-site in a secure area all materials, fixtures, and equipment against dirt, water, chemical, vandalism, theft, and mechanical damage. Thoroughly clean all surfaces in areas of work upon completion, and deliver in perfect, unblemished condition the project. Store all equipment as required by the manufacturer's instructions including the covering and strapping in a container if needed.
The Contractor shall receive all materials including the unloading of materials to a mutually agreed location with the Owner on-site.
Install all safety devices, request inspection, and obtain approval of the authority having jurisdiction, before placing systems in operation
Demolition includes the following work: disconnect, demolish and remove the work specified, and as indicated. Where pipe, ductwork, insulation, or equipment to remain is damaged or disturbed, remove damaged portions and install new products of equal capacity and quality. Equipment removed by the contractor shall be the contractor's responsibility for clean up, hauling and salvage.
All backfill shall be screened, clean, and removed of rocks, and waste material. Elevations shall match existing.

The Owner, Engineer, and Project Manager have full power to condemn or reject any work, materials, and equipment not in accordance with the specifications, and drawings or not in compliance with the manufacturer's installation instructions which are approved by the Owner, Engineer, and Project Manager. Work that has been rejected shall be removed and replaced to the satisfaction of the Owner, Engineer, and Project Manager. All decisions made by the Owner, Engineer, and Project Manager shall be stated in writing, and made binding upon the parties thereto.

17. FINAL ADJUSTMENT
Check equipment for proper operation and complete final adjustments prior to final inspection. After the final acceptance make all necessary adjustments to obtain satisfactory operation of the systems in operation.

18. ACCEPTANCE TESTS
Upon completion of final adjustments, demonstrate to Owner, and the Project Manager and Engineer the operation of each system on simulated operation cycles.

19. OWNER OCCUPANCY
The Owner shall occupy the site and existing buildings during the entire construction period. The contractor and subcontractors shall cooperate and coordinate all work with the Owner, and Project Manager during construction operations to minimize conflicts and facilitate Owner usage. Perform the work as to not interfere with the Owner's operations.

20. MISCELLANEOUS PROVISIONS
Minor materials and work not specifically mentioned herein but necessary for the Proper completion of the specified work shall be furnished and installed at no additional cost to the Owner.
Should deteriorated materials of major nature be uncovered in the course of work, it should be brought to the attention of the Owner, Engineer, and Project Manager prior to the initiating any repairs. Repairs by the Contractor shall be made as approved in the scope and pricing by the Owner, Engineer, and Project Manager.
No allowances for contract completion times shall be made for these repairs. Should the equipment or material be beyond repair, an adjustment will be considered at the convenience to the Owner, and Project Manager.

21.EXISTING WORK/ CLEAN UP
Where existing work is changed, removed, or where new work adjoins, connects or abuts to existing work, the existing work shall be altered as necessary and connected in a substantial and workmanship like manner. All new work and replacement, reinstalled work, and repairs shall match the adjacent and/or similar work. Protection of existing areas shall be taken. Clean up by the contractor shall be done and reviewed by the Owner, Engineer, and Project Manager for acceptance. The Owner, Engineer, and Project Manager has full rights to reject any and all work performed including clean up.

22. NO SMOKING / NO INTERACTION
There shall be no smoking by the Contractors and subcontractors allowed on the facility and associated areas at any time unless specifically arranged. There shall be no interaction with the employees of the Owner, and the contractors.

23. OSHA
All work shall comply with the US Department Of Labor – Occupational Safety and Health Administration, entitles OSHA Standards. National Consensus Standards, and Established Federal Standards.

24. SUBSTANTIAL COMPLETION
The contractor shall submit application of payment showing 100 percent completion based upon work claimed substantially complete. If 100 percent is not shown, a list of outstanding items is required. Submit all warranties, lien releases, workmanship bonds, and final certifications.
Submit all record drawings, operations and maintenance drawings, Building Department signed certificates of occupancy. Deliver all spare parts, tools, and extra stock to the Owner. Complete start-up testing and training of maintenance personnel. Complete final clean up.
Provide Contractor's affidavit of debts and claims, lien releases, and the Surety Company's consent to final payment to the Owner. Submit evidence of final, continuing insurance coverage compliance with the Owner and Project Manager's requirements.
Provide maintenance instructions, commissioning on all equipment, arrange for each installer to provide this service with the factory representative. Provide a written list of all personnel who received training.

25. CONTRACTOR'S BID LIST
The contractor shall provide a list of all subcontractors used with each major trade for the site security used on the project. Provide a work schedule and order delivery schedule. All site meetings shall be scheduled based upon actual work on site. Equipment delivery and setting shall be scheduled 7 working days in advance.

26. EXCAVATION AND BACKFILLING
The Contractor shall do all required excavation for underground piping/conduit and shall repair or pay for any damage to streets, alleys, sidewalks, floors, walls and landscaping. Trench grades to slope uniformly. Backfilling and concrete and structural repair shall be completed. Backfilling shall be a minimum of 95% compaction. Asphalt repairs and patches shall be made in paved areas. The contractor shall be responsible for all dewatering processes for the proper excavation of the areas. All dewatering of areas shall be the responsibility of the excavation or installing contractor. All back boring as an option to excavation can be used if areas are cleared by the Project Manager and Engineer. The Contractor shall contract B11 call before your dig on site.

27. PIPE/CONDUIT HANGERS
Type adjustable clevis with threaded rod. Roller type shall be used for expansion of piping or conduit.
Shields semi-circular sheet metal, 18 gage under insulation. Materials, steel for all piping except copper, copper plated steel for copper piping. All piping shall be cross-braced for seismic support.

28. PIPE /CONDUIT SLEEVES
Material shall be schedule 40 steel welded.
Wall sleeves flush on both sides of wall.
Floor Sleeves shall be flush on bottom side of floor, ½" above floor on topside.
Caulking 3M-fire barrier foam or caulk, UL Labeled for rating of penetration.
Finish plates, chrome plated for all exposed pipe/ conduit penetrations.

29. VALVES
Gate, Stockham, Model B-107 or B-109, solid wedge, 125 psig, bronze body, rising stem, soldered or threaded ends.
Ball, Apollo, chrome plated ball, screwed or soldered ends, 150 psig, bronze body, swing

away design, full port, Teflon seats, lock handle.
Globe, Stockham B-29, 150 psig, bronze body, rising stem, union bonnet, plug disk, removable seat, threaded or soldered ends.
Eccentric Plug, Dezurik, Series 400, semi-steel plug and body, lever operated with adjustable memory stop. Or Milken.
Check, Stockham, Model B-310 or B-320, 125 psig, bronze body, swing type, compression disk, soldered or threaded ends.
Butterfly, Dezurik or Lunkenheimer, Model 632 semi-steel body and disk, resilient seat, lug type, lever operated, memory stop, 125 psig.
PRV, B&G, Taco, spring operated, adjustable pressure setting, integral strainer.
Control: Johnson, Penn, Delta, Belimo, Fischer, Fisher

30. MOTORS
Manufacturers: Reliance, General Electric, Baldor open drip proof or TEFC, suitable for continuous or intermittent operation unless specified. NEMA Design B minimum, Class F insulation for Variable speed drive motors. Nema 3R minimum installations for exterior use. Service Factor: Minimum of 1.15 at 40 degrees C, full load and at project altitude.
Conformance: NEC, AIEE, NEMA
Features: Ball bearings, shaft end connection boxes, cast iron yoke, integral supporting feet, grease lubricated bearings, accessible grease inlet and outlet plug and inner bearing dust caps.
Voltage: Motors ½ HP and larger shall be the voltage and phase shown on the plans. Motors smaller than ½ HP shall be 120 volts, single phase, 60 cycle.
Speed: 1750 RPM unless noted otherwise. All variable speed motors shall be provided with controllers with contacts for adjustable set points for remote control.
Efficiency: Meet or exceed ASHRAE Energy Standards, latest edition.
Voltage Motors shall be designed to operate satisfactorily at voltages +/- 10 % of the designated voltage.
Sheave: adjustable slide rails.
Motor Mount: adjustable slide rails.
Belts: matched set rated at 150% of maximum load.
Guards: around belts with holes for Tachometer placement.

31. HANGERS AND SUPPORTS
Support the vertical lines and conduit at the base with a suitable hanger or a pedestal. Install inserts in concrete structures for hanging of pipe or conduit. Hang piping or conduit from lower cord of steel beams or joists in steel frame buildings and vertical pipe supports. Drilling into concrete structures for means of hanging pipe, equipment, or conduit will be allowed only if the Structural Engineer approves. Install hangers so as not to interfere with expansion and contraction of the piping. Space hanger installations in accordance with MSS SP-69 and the Florida Building Code. The Chiller support structure shall be designed by a Florida Licensed Engineer for use on the existing vertical supports and tied down for 180 mph Category IV building. Manufacturer's approved vibration pads shall be used in between the support and chiller mounts.

32. INSTALLATION OF PIPING OR CONDUIT
Support all piping from the structure.
Make minor modifications to the Drawings to coordinate with other work.
Install all piping or conduit in a neat, workmanlike manner.
Verify that all piping, conduit, boxes, devices, valves, etc. will fit in the designated space.
Request clarification if pipe sizes do not interfere with other work, door or window.
Run piping or conduit concealed in all unfinished areas unless noted otherwise.
Run piping or conduit exposed in all unfinished areas unless noted otherwise.
Run piping or conduit vertically within walls where shown near walls for clarity.
Do not run horizontal pipes and conduit in walls or partitions.
Install exposed risers and runouts as close to the wall or ceiling as practical.
Piping and conduit shall not interfere with other work, door or window.
In general, run piping and conduit parallel or perpendicular with building lines.
Run horizontal lines horizontal or with uniform pitch as indicated.
Run vertical lines exactly plumb.
Cut piping and conduit accurately on the site.
Anchor all piping and conduit securely at the site.
Install piping without strain forcing or cold springing.
Make all changes in direction with factory-fabricated fittings (except underground).
Install no underground fittings for pressurized systems and other systems.
Replace all defective pipe, and fittings for pressurized systems.
Handle piping, and conduit carefully to prevent bending and damage.
Clean all pieces before installation.
Furnish all temporary connections that are required.
Patch all holes in walls, ceilings, and floors required for installation of work under this Division.

33. INSULATION – PIPE
Manufacturers: Armstrong, Johns Manville, Owens Corning, CSG
Insulation Requirements: The following systems shall be insulated as specified:

Refrigerant or gas piping exposed with 2" fiberglass with PVC Cover
Refrigerant suction interior piping with ¾" armaflex insulation
Chilled water piping with 2" cellular glass with aluminum exterior jacket for lines less than 5', 2 ½" thick for chilled water piping above 4'.
Chiller heat exchanger and pumps- 2" thick minimum cellular glass with aluminum cover.
Use block material.

Install insulation continuous through walls, floors, ceiling, and roofs.
Seal vapor barriers on all systems carrying fluids below 70 degrees F.
Do not use staples on vapor jackets.
Follow manufacturer's installation instructions carefully.
Do not exceed the recommended adhesive coverage.
Leave all insulation surfaces clean and ready for painting.
Seal all exposed butt ends of insulation with adhesive.
Seal all transverse and longitudinal joints with pressure sensitive tape.
Use a semicircular shield at all piping hangers and supports.
Cover and insulate all valve extensions.

34. INSULATION – SHEET METAL & EQUIPMENT
Mechanical Insulation Types:
Equipment Insulation: Cellular glass, Flexibleelastomeric cellular type.
Mechanical Insulation Materials:

Cellular Glass Insulation: Inorganic, foamed or cellulated glass, annealed, rigid, hermetically sealed cells, incombustible, ASTM C 921, Type I facing; blocks, ASTM C 552, Type I; boards, ASTM C 552, Type IV; preformed pipe, ASTM C 552, Type II, Class 2 (jacketed); special shapes, ASTM C 552, Type III.

Flexible Elastomeric Cellular Insulation: Flexible expanded closed-cell structure with smooth skin on both sides; tubular materials, ASTM C 534, Type I; sheet materials, ASTM C 534, Type II.

Fire Performance: Type suitable for service.UL 181
Vapor Barrier: Type suitable for service.

Insulation Accessories: Insulating cements, adhesives, jackets, glass cloth and tape, bands, wire, and sealing compounds suitable for service and exposure.

Manufacturers: Armstrong, Johns Manville, Owens Corning, CSG or approved equal
Insulation Requirements: The following systems shall be insulated as specified:
Install insulation continuous through walls, floors, ceiling, and roofs.
Seal vapor barriers on all systems carrying fluids below 70 degrees F.
Do not use staples on vapor jackets.
Follow manufacturer's installation instructions carefully.
Do not exceed the recommended adhesive coverage.
Leave all insulation surfaces clean and ready for painting.
Seal all exposed butt ends of insulation with adhesive.
Seal all transverse and longitudinal joints with pressure sensitive tape.

35. TESTNG, ADJUSTING, AND BALANCING
All work performed under this section shall be performed by competent personnel employed by an independent balancing contractor or the Mechanical contractor. In either case, the personnel shall be certified by NEBB or AABC.
Inspect the installation of various systems. The inspection of the work shall cover the part of the work relating to the proper arrangement and adequate provisions for the testing and balancing of the systems.
Record all pertinent data in a final report and submit three copies to the Engineer for review.

36. IDENTIFICATION

The contractor shall tag each valve, place nameplates riveted to or glued to each piece of equipment. Each tag shall bear it's identification with the Owner receiving a typewritten copy in the operations and maintenance instructions.

37. CHILLED WATER PIPING
Pipe Schedule 40 black steel
Fittings malleable iron, 150 psig
Joints screwed or socket welded for 2' and smaller, butt welded for 2 /12' and larger – Match existing piping. OR Pipe Type L hard drawn copper water tube with silver solder
Fittings wrought copper joints sweat soldered type
Insulate all brine and chilled water piping above grade in the chiller plant in accordance with insulation specifications. Cover with aluminum cover.

38. PIPING SPECIALTIES
Manual Air Vents: Bronze body, nonferrous internal parts. Crane Model 700 manual
Automatic Air Vents: Float principle air vent, bronze body, nonferrous internal Crane Model 700 series bucket type
Compression Tanks: Suitable for working pressure and operating temperature, ASME pressure tested, air control tank fittings, tank drain fittings, gage glass.
Diaphragm-Type Compression Tanks: Suitable for working pressure and operating temperature, pressure tested. (125 – 150 psig, ASME).
Air Separator: Welded black steel. B&G, Taco with strainer
Pump Suction Diffusers: Cast-iron body, threaded connections for working pressure required.
Chemical Feeder: Bypass ball or liquid type chemical feeder, welded steel construction.
Diverting Fittings: Cast iron body.
Y-Pattern and Basket Strainers: Cast iron body, ASTM A 126, Class B. Gauges Marsh Standard 4 ½" dial, 125– 150 psig Thermometers Terice, Adjustable angle , 9' scale . 125 psig- 150 psig blue dye P-T plugs Nordell Model 700 Manual, 125 – 150 psig

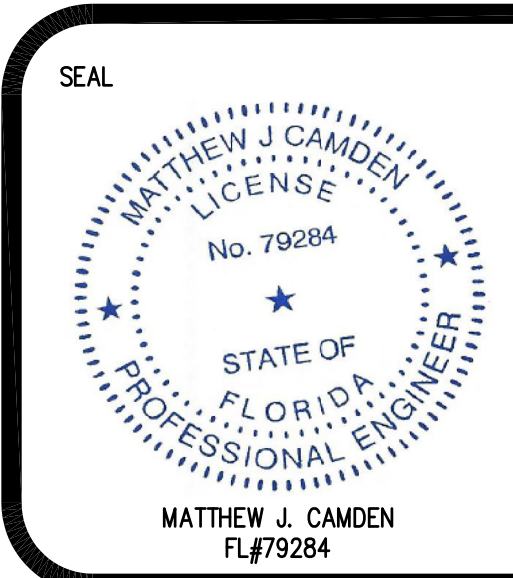
39. TEMPERATURE/ HUMIDITY CONTROLS
Furnish and install a complete and operational automatic control system in accordance with the equipment shown on the plans and specified herein.
Provide and install all necessary wiring, conduit, low voltage transformation, relays, controls, panels, pull boxes, dampers, and motors for the automatic control systems tied to the manufacturer's control equipment in the unit and reprogramming. All exterior wiring shall be in conduit. All control wiring shall be a min.18 gage copper.
Approved Manufacturers: TLC with remote control panels.

40. PUMPS
Manufacturers: B&G, Armstrong
Model, as scheduled
Capacity, as scheduled
Type, Centrifugal, base mounted with motor, all bronze
Fittings: as indicated on detail
Maximum Temperature 225 degrees F
Maximum Pressure, 175 psig
All pumps and motor combinations shall be laser aligned for operational use.
Vibration isolation, end suction diffuser, flexible stainless-steel couplings, Triple duty valve

41. AIR COOLED CHILLER
Manufacturer: Trane, York
Model: as scheduled
Capacity: as scheduled
Type: Electric cooling with controls
Mounting: Existing Concrete Columns / steel frame and vibration isolation.
Provide Microprocessor controlled, multiple or rotary scroll compressor air-cooled, liquid chillers of the scheduled capacities as shown and indicated on the Drawings, including but not limited to:
Chiller package
Charge of refrigerant and oil
Electrical power and control connections
Chilled liquid connections
Manufacturer start-up

42. QUALITY ASSURANCE
Products shall be Designed, Tested, Rated and Certified in accordance with, and Installed in compliance with applicable sections of the following Standards and Codes:
AHRI 550/590 – Water Chilling Packages Using the Vapor Compression Cycle
AHRI 370 – Sound Rating of Large Outdoor Refrigerating and Air-Conditioning Equipment
ANSI/ASHRAE 15 – Safety Code for Mechanical Refrigeration
ANSI/ASHRAE 34 – Number Designation and Safety Classification of Refrigerants
ASHRAE 90.1 – Energy Standard for Buildings Except Low-Rise Residential Buildings
ANSI/NFPA 70 – National Electrical Code (N.E.C.)
ASME Boiler and Pressure Vessel Code, Section VIII, Division 1
OSHA – Occupational Safety and Health Act
Manufactured in facility registered to ISO 9001
Conform to Intertek Testing Services for construction of chillers and provide ETL/cETL Listed Mark
UL 1995 Central Cooling Air Conditioners
ASTM B117 – Standard Method of Salt Spray Testing
ASTM A123, A525 Zinc (hot dip galvanized) coatings for Iron and steel products and sheet steel products
ASTM D1654 Evaluation of Painted or Coated Specimens, Subject to corrosive environments
ANSI 9-1978 – Load ratings and Fatigue Life for Ball Bearings
ISO 9001
Factory Run Test: Chiller shall be pressure-tested, evacuated and fully charged with refrigerant and oil, and shall be factory operational run tested with water flowing through the vessel.
Chiller Manufacturer shall have a factory trained and supported service organization.
Warranty: Manufacturer shall Warrant all equipment and material of its manufacture against defects in workmanship and material for a period of ten years from date of start-up, whichever occurs first. Periodic 6-month maintenance is required with the warranty to be negotiated and paid for by the Owner.

43. DELIVERY AND HANDLING
Unit shall be delivered to job site fully assembled with all interconnecting refrigerant piping and internal wiring ready for field installation and charged with refrigerant and oil by the Manufacturer.
Submittals prior to order shall include drawings, clearances, weights, loadings, electrical data, field connections, installation instructions, Rated capacity, accessories, and wiring diagrams.
Provide protective covering over vulnerable components for unit protection during shipment.
Fit nozzles and open ends with plastic enclosures.
Unit shall be stored and handled per Manufacturer's instructions.



THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY MATTHEW J. CAMDEN, P.E. (FL#79284) ON 05-02-2023 USING AN SHA AUTHENTICATION CODE.

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SEAL	ATP ENGINEERING SOUTH BRADENTON, FLORIDA ENGR. BUSINESS #8908 941-751-6485		ENGINEERING SOUTH	MATTHEW J. CAMDEN FL#79284
DATE				
REV./ DESCRIPTION				

MSO DESOTO SHERIFF'S OFFICE
CHILLER PLANT
600 US 301
BRADENTON, FLORIDA 34211

DRAWING TITLE: MECHANICAL SPECIFICATION	FILE: DESOTO CENT. CHILL
	JOB NO.: WA#16-2023.08
	DATE : 05-02-2023
	PLOT SIZE: 1:1
	DRAWN BY: AZ
CHECKED BY: MC	
SHEET No.:	
M5.0	

44. PRODUCTS

CHILLER MATERIALS AND COMPONENTS

General: Install and commission, as shown on the schedules and plans, factory assembled, charged, and tested air cooled scroll compressor chiller(s) as specified here-in. Chiller shall be designed, selected, and constructed using a refrigerant with Flammability rating of "1", as defined by ANSI/ASHRAE STANDARD 34 Number Designation and Safety Classification of Refrigerants. The contractor shall furnish and install air-cooled water chiller with screw compressors as shown as scheduled on the contract documents. The chillers shall be installed in accordance with this specification and perform at the specified conditions as scheduled., refrigerant, lubrication system, interconnecting wiring, safety and operating controls including capacity controller, control center, motor starting components and special features as specified here-in or required for safe, automatic operation. Unit shall operate in a leaving solution range of 40 to 65 degrees F. Rapid restart, and freeze protection, and vibration isolation.

Cabinet: External structural members shall be constructed of heavy gauge, galvanized steel coated with baked on powder paint which, when subject to ASTM B117, 1000-hour, 5% salt spray test, yields minimum ASTM 1654 rating of "6".

Operating Characteristics: Chiller shall be capable of starting and running at outdoor ambient temperatures from 14F (-10C) to 115F (46C).

Chiller shall be capable of operating with a leaving solution temperature range 40F to 68F (4.4 to 20C) without glycol.

Chiller shall be capable of starting up with 95F (35C) entering fluid temperature to the evaporator. Maximum water temperature that can be circulated with the Chiller not operating is 108F (52C)

Chiller shall provide evaporator freeze protection and low limit control to avoid low evaporator refrigerant temperature trip-outs during critical periods of chiller operation. Whenever this control is in effect, the controller shall indicate that the chiller is in adaptive mode. If the condition exists for more than 30 seconds, a limit warning alarm relay shall energize.

Rapid Restart™ after power restoration. The Chiller shall be capable of starting in 45 seconds.

Service Isolation valves: Discharge (ball type) isolation valves factory installed per refrigerant circuit. Includes a system high-pressure relief valve in compliance with ASHRAE15.

Pressure Transducers and Reade out Capability

Discharge Pressure Transducers: Permits unit to sense and display discharge pressure.

Suction Pressure Transducers: Permits unit to sense and display suction pressure.

High Ambient Control: Allows units to operate when the ambient temperature is above 115F (46C). Includes discharge pressure transducers.

COMPRESSORS

Compressors: Shall be hermetic, scroll-type, direct drive including:

Construct chiller using semi-hermetic, variable speed drive, helical rotary screw compressors.

Provide compressor motor that is suction gas cooled with robust construction and system design protection.

Provide oil lubrication system with oil charging valve and oil filter to ensure adequate lubrication during starting, stopping, and normal operation.

Provide compressor heater to evaporate refrigerant returning to compressor during shut down. Energize heater when compressor is not operating.

Provide compressor with automatic capacity reduction equipment consisting of capacity control via variable speed drive and/or slide valve. Compressor must start unloaded for soft start on motors.

Chiller shall be capable of operation down to 15% load without hot gas bypass

REFRIGERANT CIRCUIT

All chillers shall have 2 refrigeration circuits, each with one or two (manifolded) compressor(s) on each circuit.

Provide for refrigerant circuit:

Liquid line shutoff valve

Suction service valve

Discharge service valve

Filter (replaceable core type)

Liquid line sight glass.

Electronic expansion valve sized for maximum operating pressure

Charging valve

Discharge and oil line check valves

High side pressure relief valve

Integrated oil loss sensor

Full operating charge of R134a and oil.

Provide a fully convertible and compatible next generation low GWP refrigerant chiller.

If the chiller cannot be factory supplied as a fully convertible and compatible next generation low GWP refrigerant chiller, then the contractor shall provide a field retrofit or a refrigerant guarantee.

Full operating charge of R513A and oil.

45. HEAT EXCHANGERS

EVAPORATOR:

The evaporator shall be designed, tested, and stamped in accordance with ASME code for a refrigerant side working pressure of 200 psig. Waterside working pressure shall be 150 psig.

Insulate the evaporator with a minimum of 0.75 inch (K=0.28) UV rated insulation. If the insulation is field installed, the additional money to cover material and installation costs in the field should be included in the bid.

Evaporator heaters shall be factory installed and shall protect chiller down to -4F (-20C). Contractor shall wire separate power to energize heat tape and protect evaporator while chiller is disconnected from the main power.

Provide shell and tube type evaporator, seamless or welded steel construction with cast iron or fabricated steel heads, seamless internally and externally finned copper tubes, roller expanded into tube sheets.

Provide ability to remove evaporator tubes from either end of the heat exchanger. Evaporator shall have cleanable tubes

Provide water drain connection, vent and fittings. Factory installed leaving water temperature control and low temperature cutout sensors.

Water connections shall be grooved pipe.

Proof of flow shall be provided by the equipment manufacturer, mechanically installed and electrically wired, at the factory of origin.

46. FANS

All condenser fan TEAO motors have permanently lubricated ball bearings and external overload protection.

All condenser fans shall have drives to provide variable speed for optimized efficiency.

47. AIR-COOLED CONDENSER:

Construct condenser coils of microchannel all aluminum brazed fin construction. The condenser coils shall have an integral sub-cooling circuit and shall be designed for at least 350 psig working pressure. Leak tested at 1.5 times working pressure. Coils can be cleaned with high pressure water.

Condenser coils shall be transverse design. If coils are not transverse design, provide coil protection for shipping.

Condenser coils shall include baked epoxy coating providing 6000+ hour salt spray resistance per ASTM B117-90 applied to the coil.

48. ENCLOSURES/CHILLER CONSTRUCTION

Chiller panels, base rails and control panels shall be finished with a baked on powder paint. Control panel doors shall have door stays.

Mount starters and Terminal Blocks in a UL 1995 rated weatherproof panel provided with full opening access doors. If a circuit breaker is chosen, it should be a lockable, through-the-door type with an operating handle and clearly visible from outside of chiller

indicating if power is on or off.

The coating or paint system shall withstand 500 hours in a salt-spray fog test in accordance with ASTM B117.

CONTROLS

A color, touch sensitive liquid crystal display (LCD) shall be unit mounted and a minimum of 7" diagonal. Animated graphical representations of chiller subsystem operation shall be used to enhance the user interface.

Display shall consist of a menu driven interface with easy touch screen navigation to organized sub-system reports for compressor, evaporator, and motor information as well as associated diagnostics.

The chiller control panel shall provide password protection of all setpoints

The controller shall have the ability to display all primary sub-system operational parameters on dedicated trending graphs. The operator must be able to create up to 6 additional custom trend graphs, choosing up to 10 unique parameters for each graph to trend log data parameters simultaneously over an adjustable period and frequency polling.

Chilled water temperature control shall be microprocessor-based, proportional and integral controller to show water and refrigerant temperature, refrigerant pressure, and diagnostics. This microprocessor-based controller is to be supplied with each chiller by the chiller manufacturer.

The front of the chiller control panel shall display the following in clear language, without the use of codes, look-up tables, or gauges:

Run time.

Number of starts.

Current chiller operating mode.

Chilled water set point and set point source.

Electrical current limit set point and set point source.

Entering and leaving evaporator water temperatures.

Saturated evaporator and condenser refrigerant temperatures.

Evaporator and condenser refrigerant pressure.

Oil tank pressure.

Differential oil pressure.

Compressor motor current per phase.

Compressor motor percent RLA.

Compressor motor voltage per phase.

Phase reversal/unbalance/single phasing and over/under voltage protection.

Low chilled water temperature protection.

High and low refrigerant pressure protection.

Load limit thermostat to limit compressor loading on high return water temperature.

Condenser fan sequencing to automatically cycle fans in response to load, expansion valve pressure, condenser pressure, and differential pressure to optimize chiller efficiency.

Display diagnostics.

Oil pressure control based off of maintaining system differential pressure.

Compressors: Status (on/off), %RLA, anti-short cycle timer, and automatic compressor lead-lag.

Oil loss indication.

On chiller, mount weatherproof control panel, containing starters, power and control wiring, factory wired with terminal block power connection. Provide primary and secondary fused control power transformer.

The chiller controller shall utilize a microprocessor that will automatically take action to prevent chiller shutdown due to abnormal operating conditions associated with: evaporator refrigerant temperature, high condensing pressure and motor current overload.

Provide the following safety controls with indicating lights or diagnostic readouts.

Low chilled water temperature protection.

High refrigerant pressure.

Low oil flow protection.

Loss of Oil diagnostic

Loss of chilled water flow.

Contact for remote emergency shutdown.

Motor current overload.

Phase reversal/unbalance/single phasing.

Over/under voltage.

Failure of water temperature sensor used by controller.

Compressor status (on or off).

Provide the following operating controls:

A variable method to control capacity in order to maintain leaving chilled water temperature based on PI algorithms. Five minute solid state anti-recycle timer to prevent compressor from short cycling. Compressor minimum stop-to-start time limit shall be 2 minutes. If a greater than 5 minute start-to-start, or greater than 2 minute stop-to-start timer is included, hot gas bypass shall be provided to insure accurate chilled water temperature control in light load applications.

Chilled water pump output relay that closes when the chiller is given a signal to start.

Load limit thermostat to limit compressor loading on high return water temperature to prevent nuisance trip outs.

High ambient unloader pressure controller that unloads compressors to keep head pressure under control and help prevent high pressure nuisance trip outs on days when outside ambient is above design.

Compressor current sensing unloader chiller that unloads compressors to help prevent current overload nuisance trip outs.

Low ambient lookout control with adjustable setpoint.

Condenser fan sequencing which adjusts the speed of all fans automatically in response to ambient, condensing pressure and expansion valve pressure differential thereby optimizing chiller efficiency.

Provide user interface on the front of the panel. If display is on the inside of the panel, then a control display access door shall be provided to allow access to the display without removal of panels. Provide user interface with a minimum of the following features:

Leaving chilled water setpoint adjustment from LCD input

Entering and leaving chilled water temperature output

Percent RLA output for each compressor

Pressure output of condenser

Pressure output of evaporator

Ambient temperature output

Voltage output

Current limit setpoint adjustment from LCD input.

The chiller control panel shall provide leaving chilled water temperature reset based upon return water temperature.

Digital Communications to BAS system shall consist of a BACnet MS/TP interface via a single twisted pair wiring.

POWER CONNECTION AND DISTRIBUTION

Power Panels:

NEMA 3R/12 rain/dust tight, powder painted steel cabinets with hinged, latched, and gasket sealed outer doors. Provide main power connection(s), control power connections, compressor and fan motor start contactors, current overloads, and factory wiring.

Power supply shall enter unit at a single location, be 3 phase of scheduled voltage, and connect to individual terminal blocks per compressor. Separate disconnecting means and/or external branch circuit protection (by Contractor) is required per applicable local or national codes or internal circuit breaker supplied by the manufacturer mounted in chiller panel. Compressor, fused control and fan motor power wiring shall be located in an enclosed panel or routed through liquid tight conduit.

ACCESSORIES AND OPTIONS

Some accessories and options supersede standard product features. Your Johnson Controls representative will be pleased to provide assistance.

Microprocessor controlled, Factory installed Across-the-Line type compressor motor starters as standard.

Low Ambient Control: Permits unit operation to -10F ambient. Standard unit controls to 30F ambient.

Power Supply Connections:

Single Point Power Supply: Single point Terminal Block for field connection and interconnecting wiring to the compressors. Separate external protection must be supplied, by others, in the incoming power wiring, which must comply with the National Electric Code and/or local codes.

Control Power Transformer: Converts unit power voltage to 120-1-60 (500 VA capacity). Factory-mounting includes primary and secondary wiring between the transformer and the control panel.

Condenser Coil Environmental Protection:

Post-Coated Dipped: Dipped-cured coating on condenser coils for seashore and other corrosive applications (with the exception of strong alkalis, oxidizers, and wet bromine, chlorine and fluorine in concentrations greater than 100 ppm).

Protective Chiller Panels (Factory or Field Mounted)

Louvered/Wire Panels: Louvered steel panels on external condenser coils painted as per remainder of unit cabinet. Heavy gauge, welded wire-mesh, coated to resist corrosion, around base of machine to restrict unauthorized access.

Thermal Dispersion Flow Switch (Factory installed and wired in piping extension kit): Normally open, 30bar pressure rating, stainless steel 316L construction, IP67, -4F to 158F ambient rating.

Evaporator options:

Provide 1-1/2" evaporator insulation in lieu of standard ¾ or 1 1/4".

Hot Gas By-Pass: Permits continuous, stable operation at capacities below the minimum step of unloading to as low as 5% capacity (depending on both the unit & operating conditions) by introducing an artificial load on the evaporator. Hot gas by-pass is installed on only one refrigerant circuit.

Vibration Isolation (Field installed) manufacturer supplied:

Enclosures shall be UL 1995 weather proof panel lockable with coating to withstand 500-hour salt spry test in accordance with ASTM B117.

Chiller mounted starter as an option fully prewired panel to all equipment with a single point connection with control transformer, 65KA chiller fault device.

EXECUTION

49. INSTALLATION

General: Rig and Install in full accordance with Manufacturer's requirements, Project drawings, and Contract documents.

Location: Locate chiller as indicated on drawings, including cleaning and service maintenance clearance per Manufacturer instructions. Adjust and level chiller on support structure.

Components: Installing Contractor shall provide and install all auxiliary devices and accessories for fully operational chiller.

Electrical: Coordinate electrical requirements and connections for all power feeds with Electrical Contractor.

Controls: Coordinate all control requirements and connections with Controls Contractor.

Finish: Installing Contractor shall paint damaged and abraded factory finish with touch-up paint matching factory finish.

Factory Service and Start up - Provide all labor, material, equipment to perform start up from a factory trained tech so that the unit passes a manufacturer's OEM warranty and operational checklist. A start up log copy and water balance shall take place as the start up tech is on site.

50. WATER TREATMENT-

Reuse Pot feeder and piping : chilled water system

200psi working pressure

Sampling ports on both chilled water system

Provide and install pipe cleaning nitrite chemicals in both systems prior to final set up. Use a mixture as recommended by the chemical treatment company used by the Owner. Flush system twice with clean water to remove residue.

Provide and install first treatment of corrosion inhibitors, and scale control from Owner's water treatment company.

Contractor shall provide the Owner copies of tests of the chilled water system treatment protection.

All water treatment shall have MSDS sheets supplied to the Owner, and have FDA and USDA approval.

51. CONCRETE

General

Drawings, specifications, and general conditions apply to this section.

Quality Assurance

American Concrete Institute ACI-301

Concrete Reinforcing Steel Institute Manual of Practice

Concrete testing shall be by the contractor if requested by owner. Bid the project with a minimum of two tests.

Products

Forming Materials

Forms for concrete: Plywood, lumber, and metal

Reinforcing Materials

Steel wire ASTM A-82, cold drawn steel

Concrete Materials

Portland cement ASTM C150 Type 1

Aggregate ASTM C33 consisting of crushed stone, and sand free of deleterious material Potable water. Reuse water is not allowed.

Mix

Prepare mix at 3000 psi-28 day compressive strength. Water content to cement ratio .35 maximum

Ready Mix

Ready mix concrete shall comply with the requirements of ASTM C94.

Execution

Forms

Construct forms for shapes required for repairs. Maintain form-work to ACI 347, Class C tolerances.

Concrete Placement

Deposit concrete continuously or in layers of thickness that no concrete will be placed on hardened concrete to cause a weakness.

Follow ACI 304 'Guide for Measuring , Mixing , Transporting , and

Placing Concrete"

Concrete Curing

Protect concrete from premature drying and allow for moist curing.

Concrete Surface Patching

Patch defective areas, and repair and patch openings with cement mortar.

Quality Control

Sampling and testing shall be by the contractor during placement.

Compressive Test ASTM C31

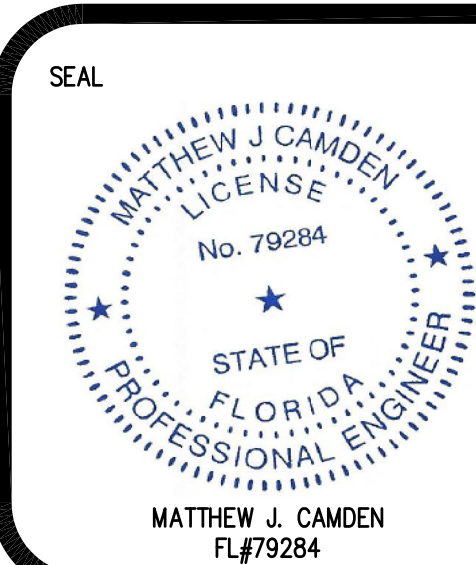
Samples made with ASTM C39 strength test.

Concrete Repair

Remove all loose concrete until sand edge is reached. Clean existing

Reinforcing bars with sand blasting or with hand tools. Carefully saw

Edges ½" deep maximum, Coat all reinforcing with epoxy- cementitious bond coat. From and fill area with concrete. Finish as required tolerances.



THIS ITEM HAS BEEN ELECTRONICALLY SIGNED AND SEALED BY MATTHEW J. CAMDEN, P.E. (FL#79284) ON 05-02-2023 USING AN SHA AUTHENTICATION CODE.

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DRAWING TITLE
MECHANICAL
SPECIFICATION

FILE:	DESOTO CENT. CHILL
JOB NO.:	WA#16-2023.08
DATE :	05-02-2023
PLOT SIZE:	1:1
DRAWN BY:	AZ
CHECKED BY:	MC
SHEET No.:	

M5.1

MSO DESOTO SHERIFF'S OFFICE
CHILLER PLANT

600 US 301

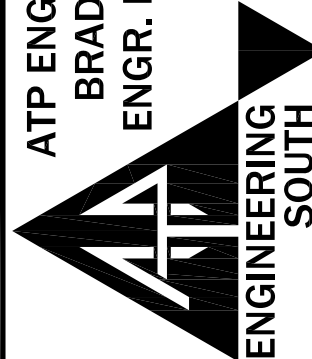
BRADENTON, FLORIDA 34211

REV./ DESCRIPTION

DATE

SCALE

ATP ENGINEERING SOUTH
BRADENTON, FLORIDA
ENGR. BUSINESS #8908
941-751-6485



MATTHEW J. CAMDEN
FL#79284