DOC FDCF BLDG G WATER HEATER REPLACEMENT

RFB 947100-01

1550 L St Fort Dodge, IA 50501

SHEET INDEX

CERTIFICATIONS

MECHANICAL ENGINEER

BRIAN A. STEFFENS 22014 — LICENSED PROFESSIONAL ENGINEER — IOWA

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.

SIGNATURE — DATE: 5/27/2025

PRINTED OR TYPED NAME: **Brian A. Steffens**

LICENSE NUMBER: **22014**

MY LICENSE RENEWAL DATE IS DECEMBER 31, **2025**

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OWNER:
Iowa Department of Administrative Services
109 Southeast 13th Street
Des Moines, Iowa 50319

OWNER PROJECT NUMBER: 9471.00

CONSTRUCTION MANAGER:
McGough Construction
217 East 2nd Street, Suite 120
Des Moines, IA 50309

CONSTRUCTION MANAGER PROJECT NUMBER: 101368.009

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ARCHITECTURE + ENGINEERING
4126 Westown Pkwy, Suite 100 | West Des Moines, IA 50266
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IOWA DEPARTMENT OF ADMINISTRATIVE SERVICES
1550 L St Fort Dodge, IA 50501

BIDDING
05/27/2025
PROJECT NO: 2250005900

G000

GENERAL PLUMBING ABBREVIATIONS

SYMBOLS

&	AND
@	AT
#	NUMBER or POUND

A

A/E	ARCHITECT/ENGINEER
AFF	ABOVE FINISHED FLOOR

B

BAS	BUILDING AUTOMATION SYSTEM
BFF	BELOW FINISHED FLOOR
BFP	BACKFLOW PREVENTER
BLDG	BUILDING
BMS	BUILDING MANAGEMENT SYSTEM
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNITS PER HOUR

C

C	COMPRESSOR (AIR)
CAP	CAPACITY
CCR	CONCENTRIC REDUCER
CCW	COUNTER CLOCKWISE
CFM	CUBIC FEET PER MINUTE
CFH	CUBIC FEET PER HOUR
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
CIRC	CIRCULATING
CISP	CAST IRON SOIL PIPE
CL	CENTER LINE
CLG	CEILING
CLR	CLEAR(ANCE)
CLW	CLOCKWISE
COND	CONDENSATE
CONSTR	CONSTRUCTION
CONT	CONTINUATION
CONTR	CONTRACTOR
CONV	CONVECTOR
COORD	COORDINATE
CP	CONDENSATE PUMP OR CIRC PUMP
CTRL	CONTROL
CU	COPPER
CU FT	CUBIC FEET
CU IN	CUBIC INCH
CWP	CONDENSER WATER PUMP

D

°/DEG	DEGREE
°C	DEGREES CELSIUS
°F	DEGREES FAHRENHEIT
DDC	DIRECT DIGITAL CONTROLS
DEMO	DEMOLITION
DIA	DIAMETER
DIAG	DIAGRAM
DIP	DUCTILE IRON PIPE
DN	DOWN
DR	DRAIN
DV	DRAIN VALVE
DWG	DRAWING
DWV	DRAIN WASTE & VENT

E

ECCR	ECCENTRIC REDUCER
ELEV	ELEVATION
ELEC	ELECTRICAL
EQ	EQUAL
EQUIP	EQUIPMENT
EQUIV	EQUIVALENT
EWT	ENTERING WATER TEMPERATURE
EX	EXISTING

F

FCO	FLOOR CLEANOUT
FD	FLOOR DRAIN OR FIRE DAMPER
FDC	FIRE DEPARTMENT CONNECTION
FS	FLOOR SINK OR FLOW SWITCH
FTHD	FOOT HEAD OR PRESSURE DROP
FWP	FIRE WATER PUMP

G

G	GAS
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GWH	GAS FIRED WATER HEATER

H

H	HUMIDISTAT
H&CW	HOT AND COLD WATER
HB	HOSE BIBB
HORIZ	HORIZONTAL
HP	HORSEPOWER
HTG	HEATING
HTR	HEATER

I

ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IN	INCHES
IN WC	INCHES (WATER COLUMN)
INS	INSULATION
INSTR	INSTRUMENT
IP	IRON PIPE
IPS	IRON PIPE SIZE
ISO	ISOMETRIC

J

JS	JANITOR'S SINK

K

K	KELVIN
KW	KILOWATT
KWH	KILOWATT HOUR

L

LAT	LEAVING AIR TEMPERATURE
LAV	LAVATORY
LB(S)	POUND(S)
LWT	LEAVING WATER TEMPERATURE

M

MAINT	MAINTENANCE
MAX	MAXIMUM
MBH	BRITISH THERMAL UNIT (1000/HR)
MC	MECHANICAL CONTRACTOR
MCC	MOTOR CONTROL CENTER
MCA	MINIMUM CIRCUIT AMPS
MECH	MECHANICAL
MFR	MANUFACTURER
MIN	MINIMUM OR MINUTE
MISC	MISCELLANEOUS
MOD	MOTOR OPERATED DAMPER
MOV	MOTOR OPERATED VALVE
MPT	MALE PIPE THREAD

N

NA	NOT APPLICABLE
NC	NORMALLY CLOSED OR NOISE CRITERIA
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NOM	NOMINAL
NPLV	NON STANDARD PART LOAD VALUE
NPT	NATIONAL PIPE THREAD
NTS	NOT TO SCALE

O

OD	OUTER DIAMETER
OFCI	OWNER FURNISHED CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED OWNER INSTALLED

P

PG	PRESSURE GAUGE OR PROPYLENE GLYCOL
PH	PHASE
PLBG	PLUMBING
PRV	PRESSURE RELIEF VALVE OR PRESSURE REGULATING VALVE
PSIA	POUNDS PER SQUARE INCH ABSOLUTE
PSIG	POUNDS PER SQUARE INCH GAUGE

R

RD	ROOF DRAIN
RECIRC	RECIRCULATE(ING)
REFR	REFRIGERATION
REQD	REQUIRED
RPM	REVOLUTIONS PER MINUTE
RPZ	REDUCED PRESSURE ZONE

S

SCH	SCHEDULE
SCHM	SCHEMATIC
SF	SQUARE FEET
SHT	SHEET
SK	SINK
SP	SUMP PUMP OR STATIC PRESSURE
SPEC	SPECIFICATION(S)
SQ IN	SQUARE INCH
SS	STAINLESS STEEL
STBY	STANDBY
STD	STANDARD
STL	STEEL
SUCT	SUCTION
SV	SAFETY VALVE
SYS	SYSTEM
SRV	SAFETY RELIEF VALVE

T

T	THERMOSTAT
TCC	TEMPERATURE CONTROL CONTRACTOR
TEMP	TEMPERATURE OR TEMPORARY
THRU	THROUGH
TOP	TOP OF PIPE
TP	TOTAL PRESSURE
TYP	TYPICAL

U

UL	UNDERWRITERS LABORATORIES
UNO	UNLESS NOTED OTHERWISE
UR	URINAL
UTIL	UTILITY

V

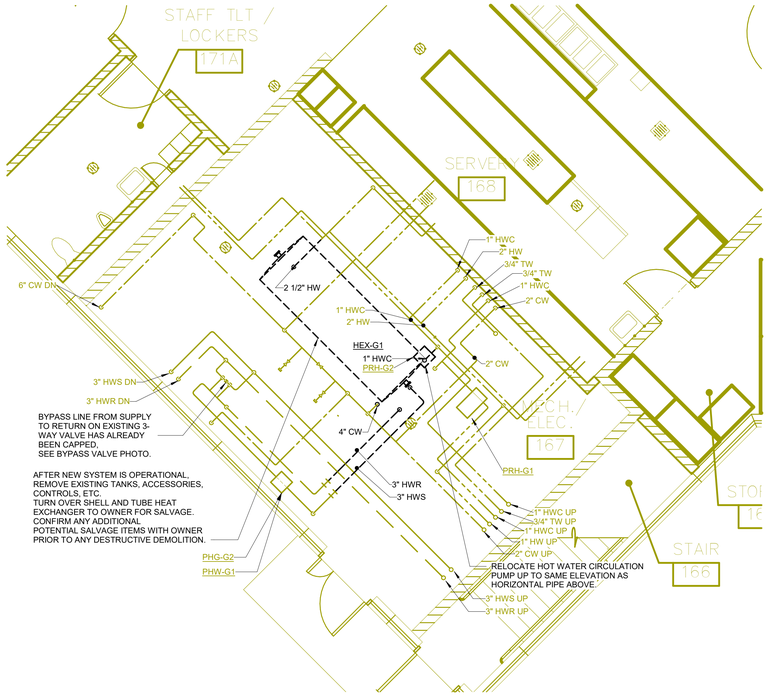
VAV	VARIABLE AIR VOLUME
VEL	VELOCITY
VERT	VERTICAL
VFD	VARIABLE FREQUENCY DRIVE

W

W/	WITH
W/O	WITHOUT
WC	WATER CLOSET
WH	WATER HEATER OR WALL HYDRANT
WHA	WATER HAMMER ARRESTOR
WPD	WATER PRESSURE DROP
WT	WEIGHT
WTR	WATER

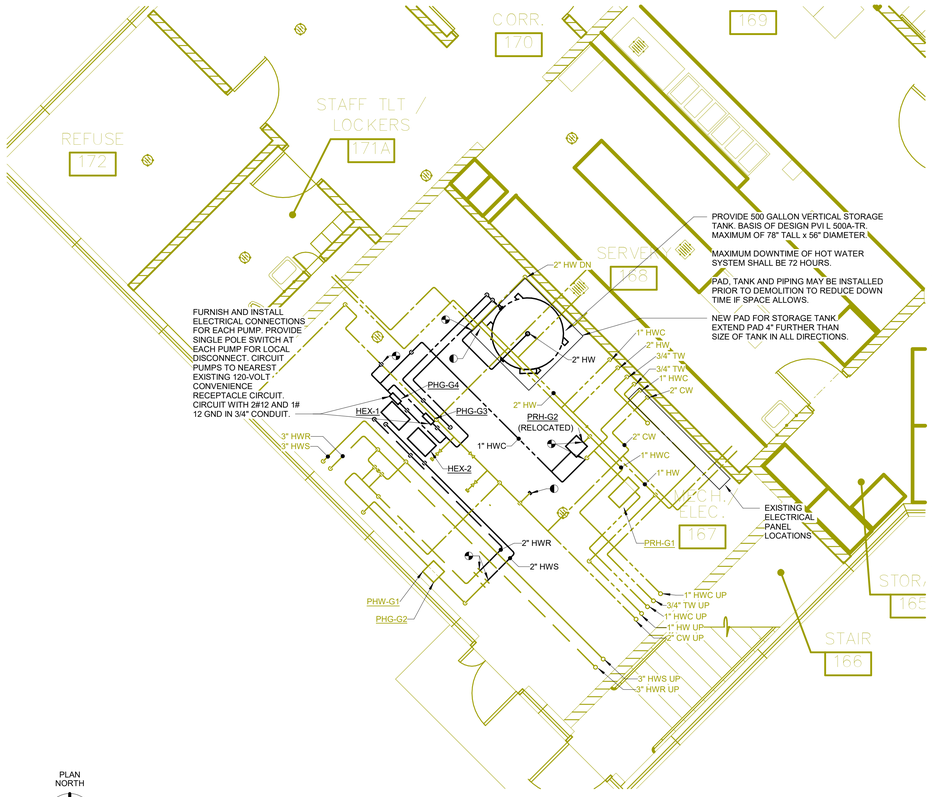
PLUMBING SYMBOLS LIST

	CAP EXISTING PIPE
	NEW CONNECTION INTO EXISTING PIPE
2" CW	PIPE SIZE AND SYSTEM TAG (DIAMETER)
1/4" / 12"	PIPE SLOPE TAG
	EXISTING TO REMAIN
	TO BE DEMOLISHED
CW	DOMESTIC COLD WATER
TW	TEMPERED WATER
HW	DOMESTIC HOT WATER
HWC	DOMESTIC HOT WATER-CIRCULATING
FPD	FIRE PROTECTION DRY
FPO	FIRE PROTECTION OTHER
FPPA	FIRE PROTECTION PRE-ACTION
FPW	FIRE PROTECTION WET
HWR	HEATING WATER RETURN
HWS	HEATING WATER RETUN
	STRAINER
	STRAINER WITH BLOWDOWN
	BALL VALVE
	CHECK VALVE
	GENERIC VALVE (REFER TO SPECIFICATIONS)
P	PRESSURE SENSOR
T	TEMPERATURE SENSOR
	UNION



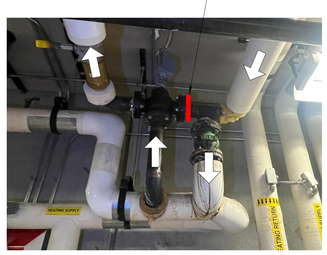
PLAN NORTH
TRUE NORTH

E3 FIRST FLOOR PLUMBING DEMOLITION PLAN
1/4" = 1'-0"



PLAN NORTH
TRUE NORTH

E6 FIRST FLOOR NEW WORK PLAN
1/4" = 1'-0"



3 BYPASS VALVE PHOTO
NOT TO SCALE

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FIRST FLOOR PLUMBING PLAN

P101

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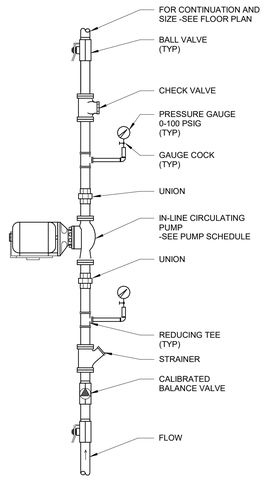
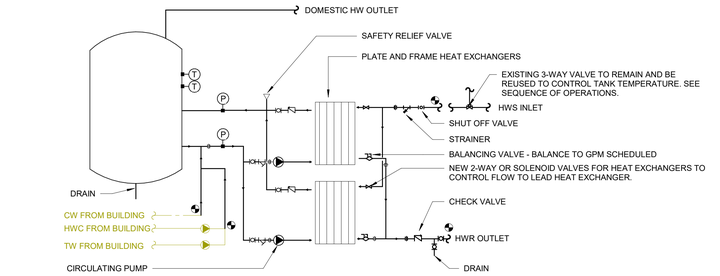


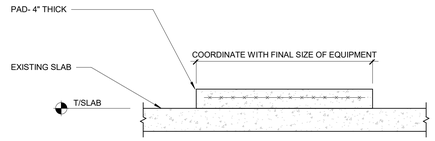
1 CIRCULATING PUMP DETAIL

NOT TO SCALE



F2 DOMESTIC WATER HEAT EXCHANGER AND TANK DETAIL

NOT TO SCALE



F3 TYPICAL HOUSEKEEPING PAD

NOT TO SCALE

MINIMUM COMPRESSIVE STRENGTH: 4000 PSI AT 28 DAYS
INSTALL DOWEL RODS TO CONNECT CONCRETE BASE TO CONCRETE FLOOR.

HEAT EXCHANGER - PLATE AND FRAME SCHEDULE

NOTES:
1. PROVIDE SECOND HEAT EXCHANGER AS AN ADD ALTERNATE PRICING. IF ALTERNATE IS NOT TAKEN, PIPING TEES AND VALVES SHALL BE INSTALLED AND CAPPED FOR SECOND HEAT EXCHANGER AND CONTROLS CAPABLE OF ADDING SECOND HEAT EXCHANGER IN THE FUTURE.

	HOT SIDE				COLD SIDE					
MARK	GPM	MAX PD (PSI)	EWT (°F)	LWT (°F)	GPH	MAX PD (PSI)	EWT (°F)	LWT (°F)	DESIGN BASIS	REMARKS
HEX-1	133	10.00	185	162	1800	1.00	40	140	DANFOSS PHE-NSF-61	SUBSTITUTIONS ALLOWED WITH ENGINEER'S PRE-APPROVAL
HEX-2	133	10.00	185	162	1800	1.00	40	140	DANFOSS PHE-NSF-61	SEE NOTE 1

PLUMBING PUMP SCHEDULE - WATTAGE

NOTES:
1) SET PUMP TO CONSTANT SPEED. ON/OFF CONTROL TO BE PROVIDED THROUGH BAS SYSTEM.
2) PROVIDE PUMP UNDER ADD ALTERNATE PRICING.

						MOTOR DATA				
MARK	SYSTEM SERVED	TYPE	GPM	HEAD (FT)	SHUTOFF HEAD (FT)	WATTS	VOLTS	PHASE	DESIGN BASIS	REMARKS
PHG-G3	COLD WATER	INLINE	30	6	10.00	9	120	1	GRUNDFOS MAGNA3 32-60 FN	1
PHG-G4	COLD WATER	INLINE	30	6	10.00	9	120	1	GRUNDFOS MAGNA3 32-60 FN	1,2

CONTROLS

EXISTING SEQUENCE OF OPERATIONS THROUGH DDC SYSTEM TO BE MODIFIED. UPDATE GRAPHICS TO REPRESENT NEW SYSTEM LAYOUT WITH PLATE & FRAME HEAT EXCHANGERS, SEPARATE STORAGE TANK AND ON/OFF VALVES ON HEAT EXCHANGERS.

ALL NEW CONTROL DEVICES MYST SUPPORT BACNET/IP OR BACNET MS/TP - PREFERENCE IS FOR BACNET/IP

CONTROLLERS MUST BE NIAGARA-COMPATIBLE AND CAPABLE OF NATIVE INTEGRATION WITHOUT REQUIRING PROPRIETARY GATEWAYS.

ALL CONTROL LOGIC MUST BE DEVELOPED USING NIAGARA WORKBENCH OR DELIVERED IN A FORMAT IMPORTABLE TO NIAGARA.

ALL DEVICES MUST BE NON-PROPRIETARY AND OPEN-PROTOCOL.

CONTROLLERS SHALL BE JACE-COMPATIBLE OR EQUIVALENT, WITH NO RESTRICTION ON INTEGRATION INTO A NIAGARA SUPERVISOR.

DEVICES MUST BE LISTED ON THE BTL (BACNET TESTING LABORATORY) LISTING FOR ASSURANCE OF BACNET COMPLIANCE

ALL PROGRAMMING MUST BE DELIVERED IN EDITABLE FORMAT.

CONTRACTOR MUST SUPPLY:
- EDITABLE CONTROL LOGIC FILES
- ALL USER INTERFACE GRAPHICS, PAGES, AND TREND LOGS
- FULL SYSTEM DOCUMENTATION AND AS-BUILT CONTROL DRAWINGS

THE EXISTING PUMPS ON THE HEATING WATER SIDE OF THE SYSTEM SHALL OPERATE CONTINOUSLY. THE EXISTING 3-WAY VALVE SHALL BE USED TO CONTROL TANK TEMPERATURE.

PROVIDE NEW TEMPERATURE SENSOR FOR TANK AND PIPING. CONNECT TO NEW PUMPS TO TURN PUMPS ON AND OFF. PROVIDE ON/OFF STATUS OF PUMPS.

PROVIDE NEW ON/OFF VALVES FOR HEAT EXCHANGERS.

THE LEAD HEAT EXCHANGER AND ASSOCIATED PUMP SHALL BE ENABLED TO OPERATE WHENEVER THE PLANT BOILERS ARE ENABLED TO OPERATE.

THE ON/OFF VALVE FOR THE LEAD EXCHANGER SHALL ALWAYS BE OPEN TO PREVENT DEADHEADING OF THE EXISTING HEATING WATER PUMPS.

THE DOMESTIC WATER TANK TEMPERATURE SETPOINT SHALL BE 135°F (ADJ.). ON A FALL TO 130°F (ADJ.), THE LEAD PUMP SHALL TURN ON AND ASSOCIATED ON/OFF VALVE SHALL OPEN. UPON REACHING SETPOINT, THE VALVE SHALL CLOSE AND THE PUMP TURNED OFF.

IF THE LEAD SYSTEM IS NOT ABLE TO MAINTAIN SETPOINT AFTER 30 MINUTES (ADJ.), THE LAG SYSTEM (PUMPS & ON/OFF VALVE) SHALL TURN ON AND OPERATE TO MAINTAIN TEMPERATURE.

THE LEAD PUMP AND HEAT EXCHANGER SHALL ROTATE UPON ONE OF THE FOLLOWING:

MANUALLY THROUGH A SOFTWARE SWITCH
RUNTIME (ADJ.)
DAILY
WEEKLY
MONTHLY

ALARMS SHALL BE PROVIDED AS FOLLOWS:
HOT WATER PUMPS FAILURE (COMMANDED ON, BUT THE STATUS IS OFF)
RUNNING IN HAND (COMMANDED OFF, BUT THE STATUS IS ON)

THE FOLLOWING TEMPERATURES SHALL BE MONITORED:
HOT WATER SUPPLY
HOT WATER RETURN
TANK TEMPERATURE

EXCESSIVE TEMPERATURE FAILSAFE: IF TANK TEMPERATURE EXCEEDS 145°F (ADJ.), THE SYSTEM SHALL TURN OFF ALL PUMPS AND CLOSE ALL CONTROL VALVES AND ISSUE A HIGH TANK TEMPERATURE ALARM UNTIL RESET BY THE USER.

LOW WATER TEMPERATURE: AN ALARM SHALL BE SENT IF TANK WATER TEMPERATURE IS LOWER THAN 120°F (ADJ.)

EXISTING CONDUIT AND WIRING MAY BE REUSED

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PLUMBING DETAILS AND SCHEDULES

P500

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