ARVERNE EAST GEOTHERMAL AMBIENT LOOP

ISSUED FOR NYSERDA DRAFT FINAL REPORT
MAY 2023

DRAWING INDEX

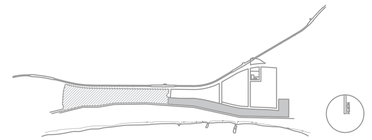
GENERAL

T–001	COVER SHEET

GEOTHERMAL

GT–001	ABBREVIATIONS AND SYMBOLS
GT–100	OVERALL GEOTHERMAL PLAN
GT–110	OVERALL GEOTHERMAL PLAN PHASE 3
GT–111	BUILDING D GEOTHERMAL PLANS – BELOW GRADE
GT–112	BUILDING D GEOTHERMAL PLANS – BELOW GRADE ENLARGED
GT–113	BUILDING D GEOTHERMAL PLANS – ABOVE GRADE
GT–114	BOREFIELD 3 OVERALL PLAN
GT–115	BOREFIELD 3 ENLARGED PLANS I
GT–116	BOREFIELD 3 ENLARGED PLANS II
GT–120	OVERALL GEOTHERMAL PLAN PHASE 4
GT–130	OVERALL GEOTHERMAL PLAN PHASE 5
GT–140	OVERALL GEOTHERMAL PLAN PHASE 6
GT–150	OVERALL GEOTHERMAL PLAN PHASE 7
GT–160	OVERALL GEOTHERMAL PLAN PHASE 8
GT–170	OVERALL GEOTHERMAL PLAN PHASE 9
GT–180	OVERALL GEOTHERMAL PLAN PHASE 10
GT–200	GEOTHERMAL DETAILS I
GT–201	GEOTHERMAL DETAILS II
GT–300	SCHEMATIC FLOW DIAGRAM
GT–301	SCHEMATIC FLOW DIAGRAM PHASES 3 AND 3A
GT–302	SCHEMATIC FLOW DIAGRAM PHASES 4 AND 4A
GT–303	SCHEMATIC FLOW DIAGRAM PHASE 5
GT–304	SCHEMATIC FLOW DIAGRAM PHASES 6 AND 6A
GT–305	SCHEMATIC FLOW DIAGRAM PHASES 7 AND 7A
GT–306	SCHEMATIC FLOW DIAGRAM PHASE 8
GT–307	SCHEMATIC FLOW DIAGRAM PHASES 9 AND 9A
GT–308	SCHEMATIC FLOW DIAGRAM PHASE 10
GT–400	SCHEDULES I
GT–401	SCHEDULES II
GT–800	NETWORK DIAGRAM
GT–801	CONTROL DIAGRAMS I
GT–802	CONTROL DIAGRAMS II
GT–802	CONTROL DIAGRAMS III

LOCATION MAP



PLOT PLAN (NOT TO SCALE)

WARNING
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COVER SHEET

PROJECT NO. 266417–277920
FILE NAME: T001OOSY.DWG
SHEET NO.
T-001

GENERAL ABBREVIATIONS

A

ACC	AIR COOLED CONDENSER
ACU	AIR CONDITIONER UNIT (W/DX OR CHILL. WTR COILS)
AFF	ABOVE FINISHED FLOOR
AG	ABOVE GRADE
AHU	AIR HANDLING UNIT
ALT	ALTITUDE
AP	ACCESS PANEL
AD	ACCESS DOOR
ATC	AUTOMATIC TEMPERATURE CONTROL
AUTO	AUTOMATIC
AUX	AUXILIARY
AVG	AVERAGE
AV	AUTOMATIC AIR RELEASE VENT

B

B TO B	BACK TO BACK
BHP	BRAKE HORSEPOWER
BOT	BOTTOM
BTU	BRITISH THERMAL UNIT
BBD	BACK DRAFT SELF ACTING DAMPER
BBH	BASE BOARD HEATER

C

C TO C	CENTER TO CENTER
CCW	COUNTER CLOCKWISE
CENT	CENTRIFUGAL
CFM	CUBIC FEET PER MINUTE
CGP	CHILLED WTR GLYCOL PUMP
CHIL	CHILLER (WTR OR AIR COOLED)
CL	CENTER LINE
CLG	CEILING
CLR	CLEAR
COL	COLUMN
CTR	CENTER
CV	VALVE FLOW COEFFICIENT
CW	CLOCKWISE

D

D	TO DRAIN (NEAREST)
DG	DOOR GRILLE
DB	DRY BULB
DIA	DIAMETER
DISCH	DISCHARGE
DN	DOWN
DWG	DRAWING
DX	DIRECT EXPANSION COIL

E

EUH	ELECTRIC UNIT HEATER
EA	EACH
EAF	EXHAUST AIR FAN
ENT	ENTERING
ELEC	ELECTRICAL
ELEV	ELEVATION
EMERG	EMERGENCY
EXH	EXHAUST
EXP	EXPANSION/COMPRESSION TANK

F

F	FAHRENHEIT
FBV	FLOW BALANCE & SHUTOFF VALVE
FC	FLEX CONNECTION
FD	FIRE DAMPER
FG	FLOOR GRILLE
FLR	FLOOR
FLG	FLANGE
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FPM	FEET PER MINUTE
FD	FIRE DAMPER
FS	FLOW SENSOR
FTR	FIN-TUBE RADIATION

G

GPM	GALLONS PER MINUTE

H

H-O-A	HAND-OFF-AUTO
HP	HORSEPOWER
H&V	HEATING AND VENTILATING
HVAC	HEATING, VENTILATING AND AIR CONDITIONING
HZ	HERTZ
HTS	HEAT TRANSFER STATION

I

ID	INSIDE DIAMETER
INS	INSULATE,INSULATION
INSTR	INSTRUMENT(ATION)

L

LAT	LEAVING AIR TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
LVG	LEAVING

M

M	MOTOR
MBH	THOUSAND BTU PER HOUR
MATL	MATERIAL
MAX	MAXIMUM
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MTD	MOUNTED

N

NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NOM	NOMINAL
NPT	AMERICAN NATIONAL TAPER PIPE THREAD
NTS	NOT TO SCALE

O

OA	OUTSIDE AIR
OC	ON CENTER
OD	OUTSIDE DIAMETER
OPP	OPPOSITE

P

PSI	POUNDS PER SQUARE IN
PSIA	PSI ABSOLUTE
PSIG	PSI GUAGE

R

RA	RETURN AIR
RAF	RETURN AIR FAN
REG	REGISTER
RH	RELATIVE HUMIDITY
RPM	REVOLUTIONS PER MINUTE
RED	REDUCER

S

SA	SUPPLY AIR
SAF	SUPPLY AIR FAN
SCH	SCHEDULE
SP	STATIC PRESSURE
SPEC	SPECIFICATION
SS	STAINLESS STEEL

T

TAF	TRANSFER AIR FAN
TD	TEMPERATURE DIFFERENCE
TEMP	TEMPERATURE
TOS	TOP OF STEEL
TXV	THERMAL EXPANSION VALVE

U

U	HEAT TRANSFER COEFFICIENT
UH	UNIT HEATER
UL	UNDERWRITERS LABORATORY

V

V	VOLTS
VAV	VARIABLE AIR VOLUME
VEL	VELOCITY

W

W/	WITH
W/O	WITHOUT
WB	WET BULB
WG	WALL GRILLE

SYMBOLS

VALVES

- BALL VALVE
- BUTTERFLY VALVE
- FLOW BALANCING VALVE
- TRIPLE DUTY VALVE
- 2-WAY VALVE (OPEN AND CLOSE)
- 3-WAY VALVE (OPEN AND CLOSE)
- 2-WAY MODULATING VALVE
- 3-WAY MODULATING VALVE
- AUTOMATIC AIR RELEASE VENT (AV)
- FLEXIBLE CONNECTION
- RELIEF VALVE

SYMBOLS

PIPE FITTINGS

- CAP
- BOTTOM CONNECTION
- TOP CONNECTION
- ELBOW UP
- ELBOW DOWN
- REDUCER-CONCENTRIC
- REDUCER-ECCENTRIC STRAIGHT INVERT
- REDUCER-ECCENTRIC STRAIGHT CROWN
- TEE
- TEE UP
- TEE DOWN
- UNION-SCREWED
- UNION-FLANGED

SPECIALTIES

- PRESSURE GAGE AND COCK (P)
- STRAINER
- THERMOMETER
- PRESS. DIFF. W/ INDICATOR LIGHT & REMOTE ALARM @ ATC (PDI)
- TEMPERATURE SENSOR (T)
- FLOW SENSOR (FS)
- SECONDARY LOOP PUMP
- HEAT EXCHANGER
- AMBIENT LOOP PUMP (PRIMARY LOOP)
- HEAT TRANSFER STATION (HTS)
- CONNECTION TO EXISTING

PIPE MATERIAL CODES

CU	COPPER
GS	GALVANIZED STEEL
HDPE	HIGH DENSITY POLYETHELYNE
PVC	POLYVINYL CHLORIDE
STL	BLACK STEEL

FLOW STREAM CODE

ALS/R	GEOTHERMAL SUPPLY/RETURN
CWS/R	CONDENSER WATER SUPPLY/RETURN

GENERAL NOTES:

1. EQUIPMENT DIMENSIONS, LOCATIONS, AND PIPING SYSTEM LAYOUTS ARE BASED ON EQUIPMENT SELECTED BY THE ENGINEER. IF THE CONTRACTOR PROPOSES TO FURNISH EQUIPMENT THAT REQUIRES AN ARRANGEMENT OR SPACE DIFFERING FROM THAT INDICATED ON THE DRAWINGS OR SPECIFICATIONS, THE CONTRACTOR SHALL PREPARE AND SUBMIT TO THE ENGINEER FOR APPROVAL DETAILED ARCHITECTURAL, STRUCTURAL, MECHANICAL, PLUMBING, INSTRUMENTATION, HVAC AND ELECTRICAL DRAWINGS AND EQUIPMENT LISTS SHOWING ALL NECESSARY CHANGES AND EMBODYING EQUIPMENT THEY PROPOSE TO FURNISH. THIS INFORMATION SHALL INCLUDE BUT NOT BE LIMITED TO PLANS, SEIONNS, DETAILS, AND SCHEMATICS OF ALL APPURTANCES REQUIRED. SUCH CHANGES IF APPROVED BY THE ENGINEER SHALL BE AT NO EXTRA COST TO THE OWNER. THE CONTRACTOR SHALL ASSUME THE COST OF, AND THE RESPONSIBILITY FOR SATISFACTORILY ACCOMPLISHING ALL OF NECESSARY CHANGES CORRESPONDING TO THE DIMENSIONS AND CHARACTERISTICS OF THE EQUIPMENT SUBMITTED AND APPROVED BY THE ENGINEER. REFER TO SPECIFICATIONS FOR FURTHER DETAILS.
2. SIZES OF EQUIPMENT PADS INDICATED ON THE DRAWINGS ARE APPROXIMATE. EXACT DIMENSIONS SHALL BE DETERMINED BY THE CONTRACTOR FOR THE EQUIPMENT FURNISHED.
3. DIELECTRIC COUPLINGS, FLANGES, OR UNIONS SHALL BE INSTALLED AT ALL CONNECTIONS OF COPPER PIPE TO OTHER TYPES OF MECHANICAL PIPING.
4. PIPING DRAWINGS DO NOT SHOW ALL DRAINS, VENTS, OFFSETS AND FITTINGS REQUIRED FOR THE COMPLETE SYSTEM. PIPING IS SHOWN APPROXIMATELY TO SCALE HOWEVER NOT EVERY FITTING AND OFFSET IS SHOWN. SOME VALVES AND APPURTANCES MAY BE OMITTED FOR CLARITY.
5. UNLESS OTHERWISE SHOWN ON THE DRAWING ALL FLOOR SLAB AND WALL PENETRATIONS SHALL BE AS SHOWN ON THE WALL PENETRATION DETAILS. ABOVE GROUND EXTERIOR WALL AND ROOF PENETRATIONS SHALL BE SHOWN ON ARCHITECTURAL DRAWINGS.
6. THIS DRAWING SET IS BASED ON PRELIMINARY SCHEMATIC PLANS FOR FUTURE PHASES. GEOTHERMAL SYSTEM DESIGN MUST BE REVISITED AS DETAILED DESIGNS OF FUTURE PHASES ARE COMPLETED.

NOTE: THIS IS A GENERAL LIST OF SYMBOLS AND ABBREVIATIONS.NOT ALL ITEMS SHOWN HERE APPEAR ON THE CONTRACT DRAWINGS.

FIELD INSTRUMENT LEGEND

DIAGRAMS
- X / X — INSTRUMENT TYPE / DIVISION FURNISHED BY

PLANS
- (X) ELEMENT/TRANSMITTER (SENSOR)
- [X] SWITCH

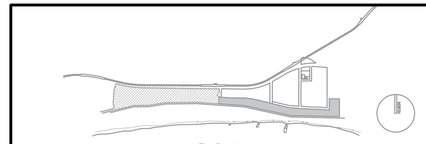
BS	BREAKGLASS SWITCH
CS	CURRENT SWITCH
DPS	DIFFERENTIAL PRESSURE SWITCH
EE	ENTHALPY ELEMENT (SENSOR)
ET	ENTHALPY TRANSMITTER
FS	FLOW SWITCH
GE	GAS ELEMENT
GT	GAS TRANSMITTER
LE	LEVEL ELEMENT
LT	LEVEL TRANSMITTER
ME	MOISTURE ELEMENT (HUMIDITY)
MS	MOISTURE SENSOR (HUMIDITY)
MT	MOISTURE TRANSMITTER)
OS	OCCUPANCY SWITCH
PI	PRESSURE INDICATOR (GAUGE)
SD	SMOKE DETECTOR
TE	TEMPERATURE ELEMENT
T	THERMOSTAT
TC	TEMPERATURE CONTROLLER
TI	TEMPERATURE INSTRUMENT (THERMOMETER)
TS	TEMPERATURE SWITCH
TT	TEMPERATURE TRANSMITTER

- (M) ELECTRIC MOTOR
- (A) MODULATING ACTUATOR WITH END SWITCH
- [A] TWO POSITION ACUTATOR WITH END SWITCH
- PARALLEL BLADE DAMPER
- OPPOSED BLADE DAMPER

PANEL LEGEND

- DIAL
- G PB — INDICATOR LAMP: G GREEN, R RED, A AMBER, PB INTEGRAL PUSHBUTTON
- R PB — INDICATOR LAMP W/ PUSH BUTTON FUNCTIONALITY
- HS HOA — HAND SWITCH; HOA HAND OFF AUTO, OA OFF AUTO, PB PUSH BUTTON

I/O LEGEND
- ANALOG INPUT
- ANALOG OUTPUT
- DIGITAL INPUT
- DIGITAL OUTPUT



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. ORourke
APPROVED BY: –
DATE: MAY 2023

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ZBF GEOTHERMAL

ARVERNE EAST GEOTHERMAL AMBIENT LOOP

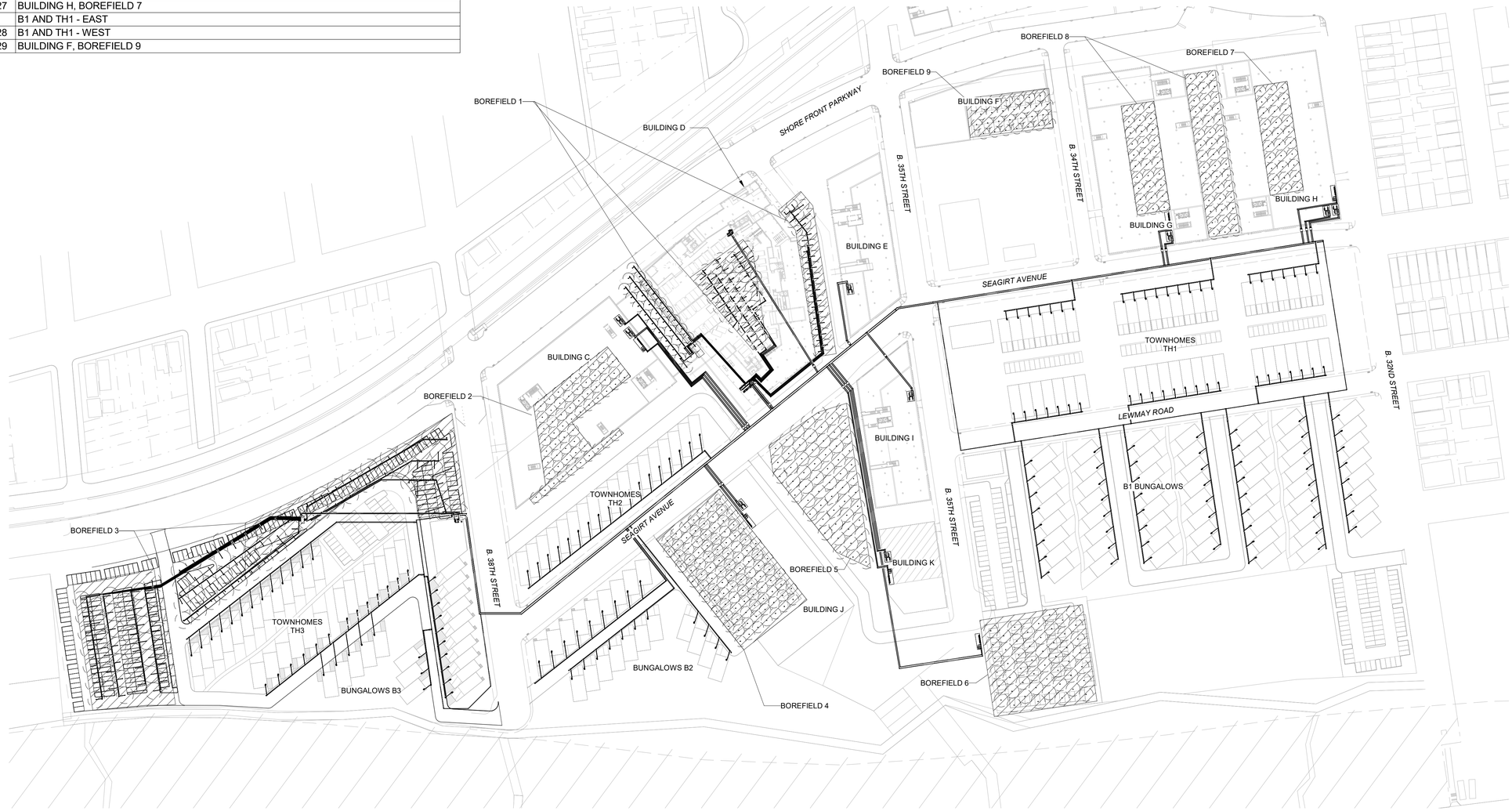
ABBREVIATIONS AND SYMBOLS

PROJECT NO. 266417-277920
FILE NAME: GT-001

SHEET NO.
GT-001

ISSUED FOR NYSERDA DRAFT FINAL REPORT

PHASE SCHEDULE		
PHASE	CLOSING DATE	CONSTRUCTION
3	DECEMBER 2023	BUILDING D, PARKING LOT 1, SEAGIRT AVENUE WEST, BOREFIELD 1, BOREFIELD 3
3A	APRIL 2024	38TH STREET (PENDING FUNDING)
4	DECEMBER 2024	BUILDING E, 35TH STREET, PARKNG LOT 3, BOREFIELD 5, BOREFIELD 6
4A	DECEMBER 2025	BUILDING K
5	DECEMBER 2025	BUILDING C, BOREFIELD 2
6	JUNE 2026	B2, B3, TH2, TH3
6A	DECEMBER 2026	BUILDING J, PARKING LOT 2, BOREFIELD 4
7	DECEMBER 2026	BUILDING G, 34TH STREET, SEAGIRT EAST, BOREFIELD 8
7A	JUNE 2027	BUILDING I
8	DECEMBER 2027	BUILDING H, BOREFIELD 7
9	JUNE 2028	B1 AND TH1 - EAST
9A	DECEMBER 2028	B1 AND TH1 - WEST
10	DECEMBER 2029	BUILDING F, BOREFIELD 9



NOTES:

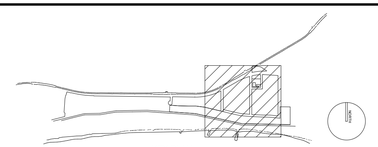
1. ALL PIPING ROUTED MIN. 4'-0" BELOW FINISHED GRADE. FINAL INVERTS TO BE COORDINATED WITH SITE GRADING PLAN.

ARVERNE EAST GEOTHERMAL SITE PLAN - ALL PHASES

1" = 100'-0"

0 50' 100' 200'

SCALE: 1" = 100'-0"



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OVERALL GEOTHERMAL PLAN

PROJECT NO.
FILE NAME:

SHEET NO.
GT-100

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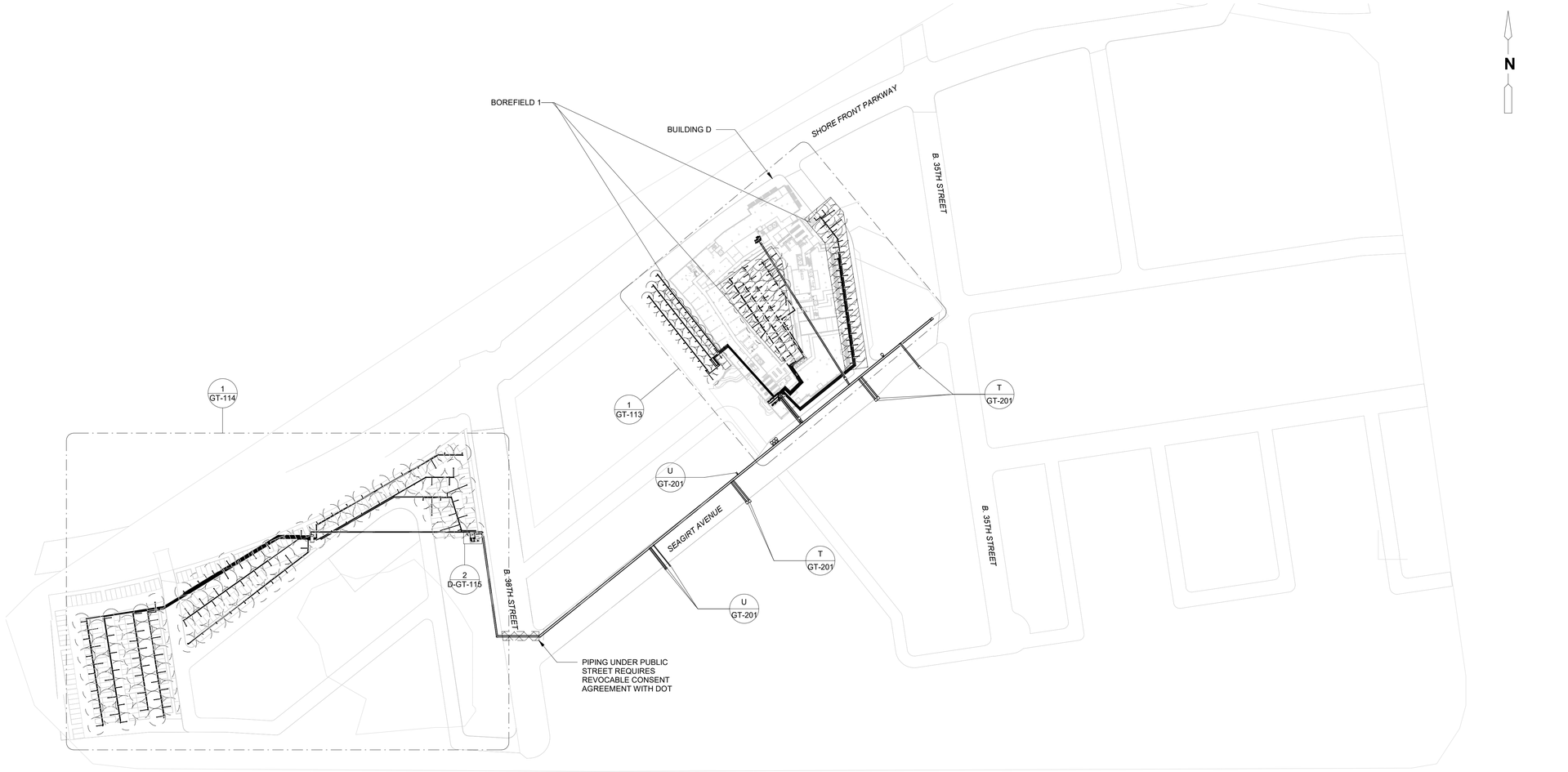
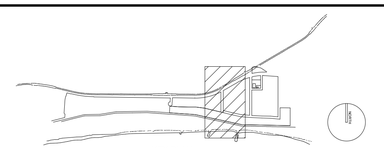


ARVERNE EAST GEOTHERMAL SITE PLAN - PHASE 3

1" = 100'-0"



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ARVERNE EAST GEOTHERMAL AMBIENT LOOP

OVERALL GEOTHERMAL PLAN
PHASE 3

PROJECT NO.
FILE NAME:

SHEET NO.
GT-110

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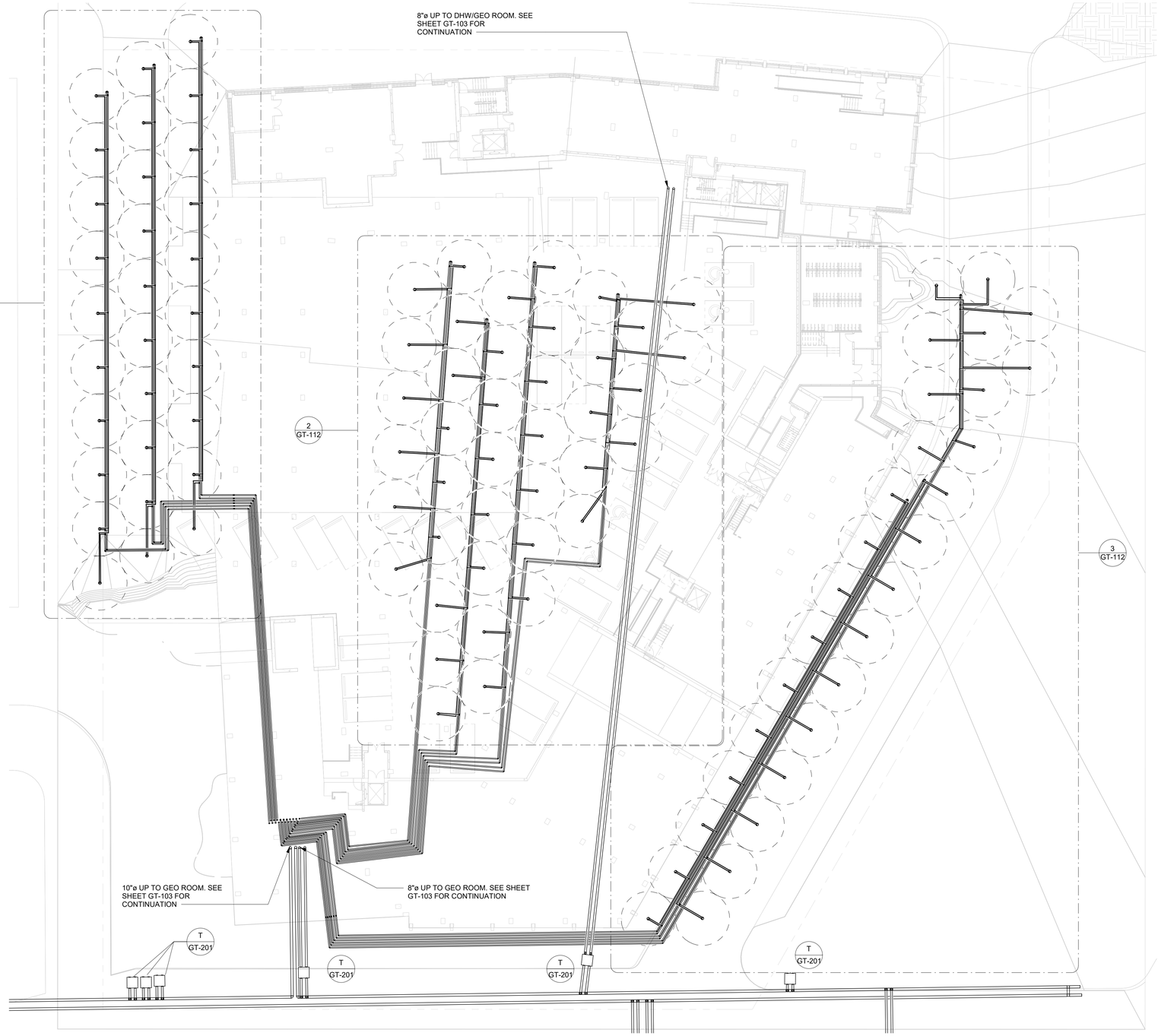
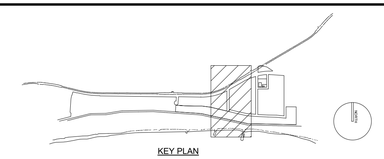


BUILDING D GEOTHERMAL PLAN - BELOW GRADE OVERALL

1" = 20'-0"

0 10' 20' 40'

SCALE: 1" = 20'-0"



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BUILDING D GEOTHERMAL PLANS
BELOW GRADE
PHASE 3

PROJECT NO.
FILE NAME:

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GT-111

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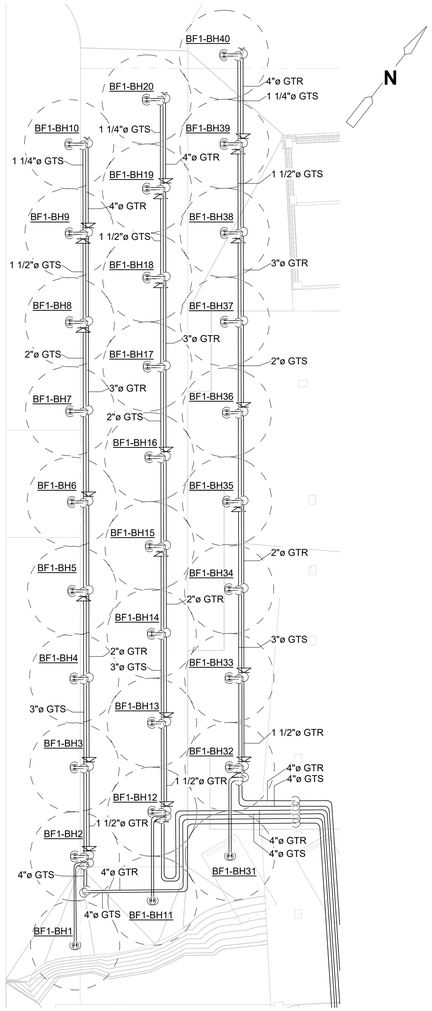


1 BUILDING D GEOTHERMAL PLAN - BELOW GRADE WEST

GT-111 1/16" = 1'-0"

2 BUILDING D GEOTHERMAL PLAN - BELOW GRADE CENTRAL

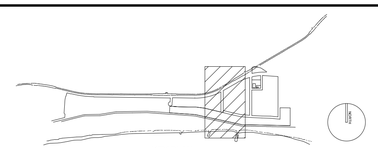
GT-111 1/16" = 1'-0"

3 BUILDING D GEOTHERMAL PLAN - BELOW GRADE EAST

GT-111 1/16" = 1'-0"

0 8' 16' 32'

SCALE: 1/16" = 1'-0"



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ARVERNE EAST GEOTHERMAL AMBIENT LOOP

BUILDING D GEOTHERMAL PLANS
BELOW GRADE ENLARGED
PHASE 3

PROJECT NO.
FILE NAME:

SHEET NO.
GT-112

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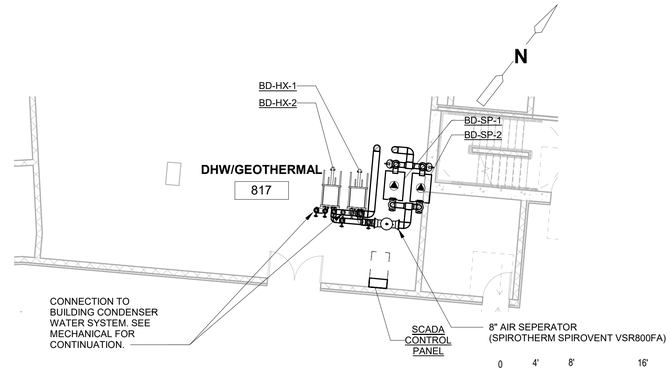
1 BUILDING D GEOTHERMAL PLAN - ABOVE GRADE

D-GT-110 1/32" = 1'-0"

0 16' 32' 64'

SCALE: 1/32" = 1'-0"

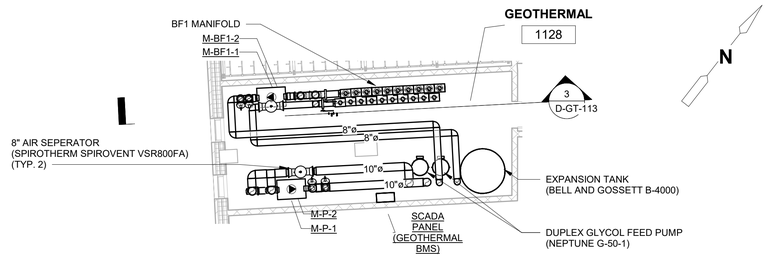


2 BUILDING D DHW/GEOTHERMAL ENLARGED PLAN

1/8" = 1'-0"

0 4' 8' 16'

SCALE: 1/8" = 1'-0"

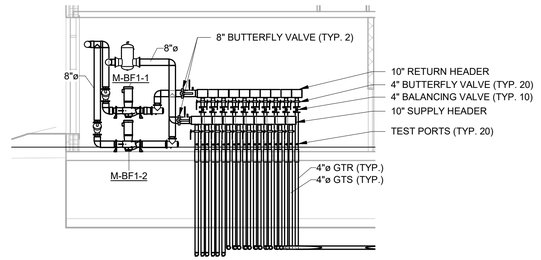


3 BUILDING D GEOTHERMAL ROOM ENLARGED PLAN

1/8" = 1'-0"

0 4' 8' 16'

SCALE: 1/8" = 1'-0"

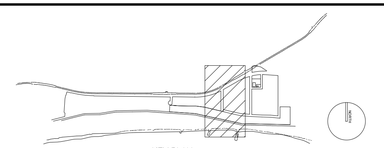


4 BUILDING D MANIFOLD SECTION

1/8" = 1'-0"

0 4' 8' 16'

SCALE: 1/8" = 1'-0"



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ARVERNE EAST GEOTHERMAL AMBIENT LOOP

BUILDING D GEOTHERMAL PLANS
ABOVE GRADE
PHASE 3

PROJECT NO.
FILE NAME:

SHEET NO.
GT-113

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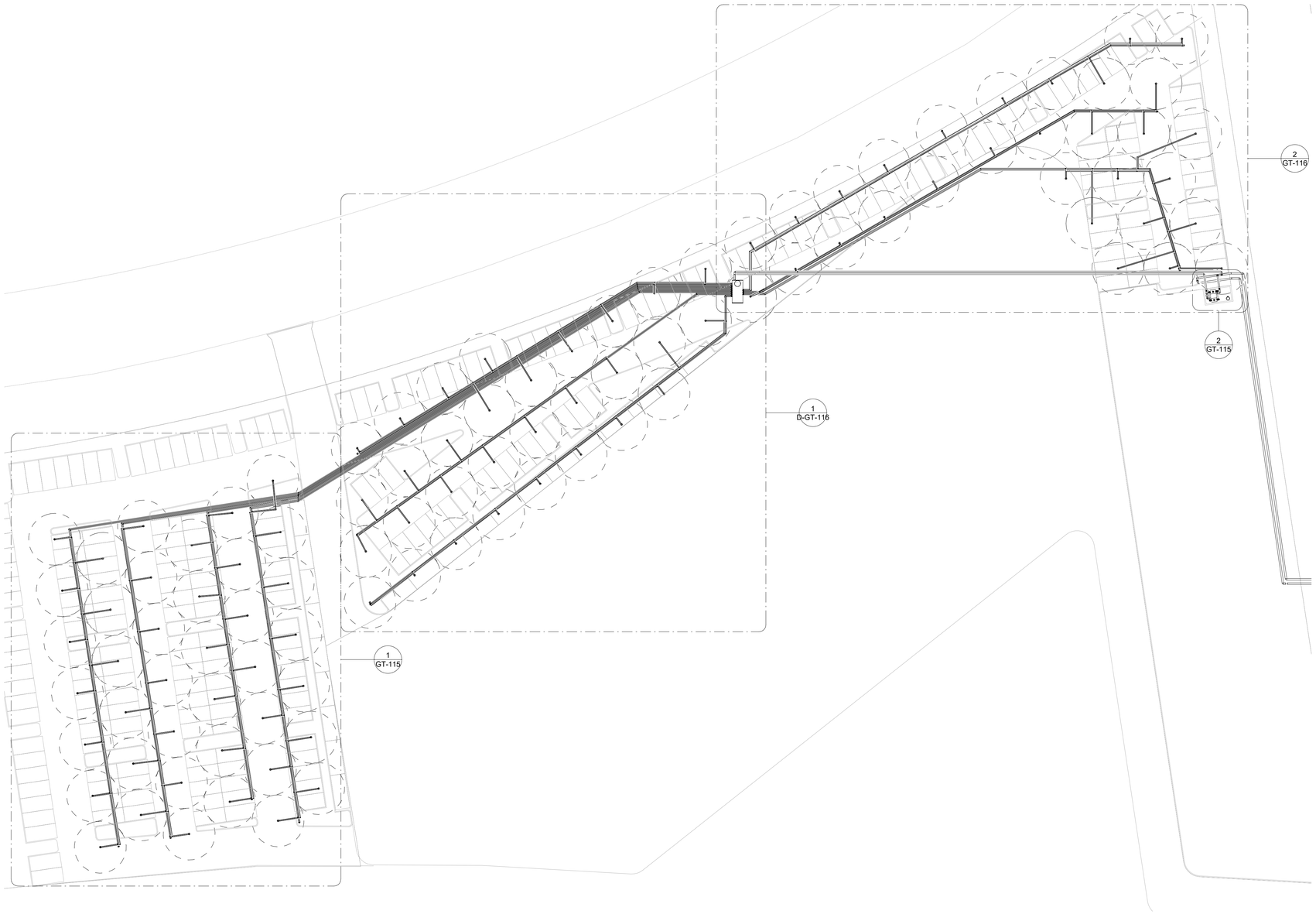
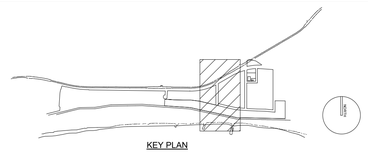


1 BOREFIELD 3 OVERALL PLAN
GT-110 1/32" = 1'-0"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DATE: MAY 2023

CDM Smith
CDM Smith NY Inc
14 Wall Street, Suite 1702
New York, NY 10005
Tel: (212) 785-9123

ZBF GEOTHERMAL

ARVERNE EAST GEOTHERMAL AMBIENT LOOP

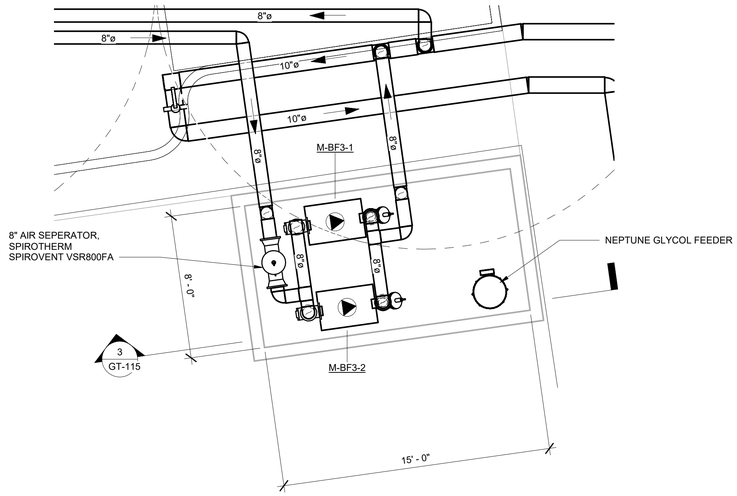
BOREFIELD 3 OVERALL PLAN
PHASE 3

PROJECT NO.
FILE NAME:
SHEET NO.
GT-114

ISSUED FOR NYSERDA DRAFT FINAL REPORT

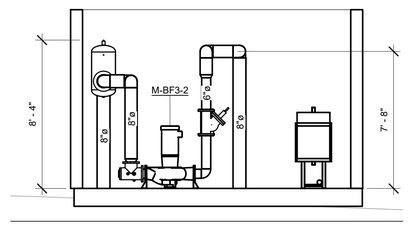
1 BOREFIELD 3 PLAN - WEST
GT-114 1/16" = 1'-0"

0 8' 16' 32'
SCALE: 1/16" = 1'-0"



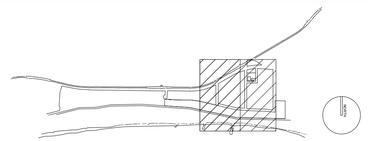
2 BOREFIELD 3 PUMP HOUSING STRUCTURE
1/4" = 1'-0"

0 2' 4' 8'
SCALE: 1/4" = 1'-0"



3 BOREFIELD 3 PUMP HOUSING SECTION
1/4" = 1'-0"

0 2' 4' 8'
SCALE: 1/4" = 1'-0"


KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: Approver
DATE: MAY 2023

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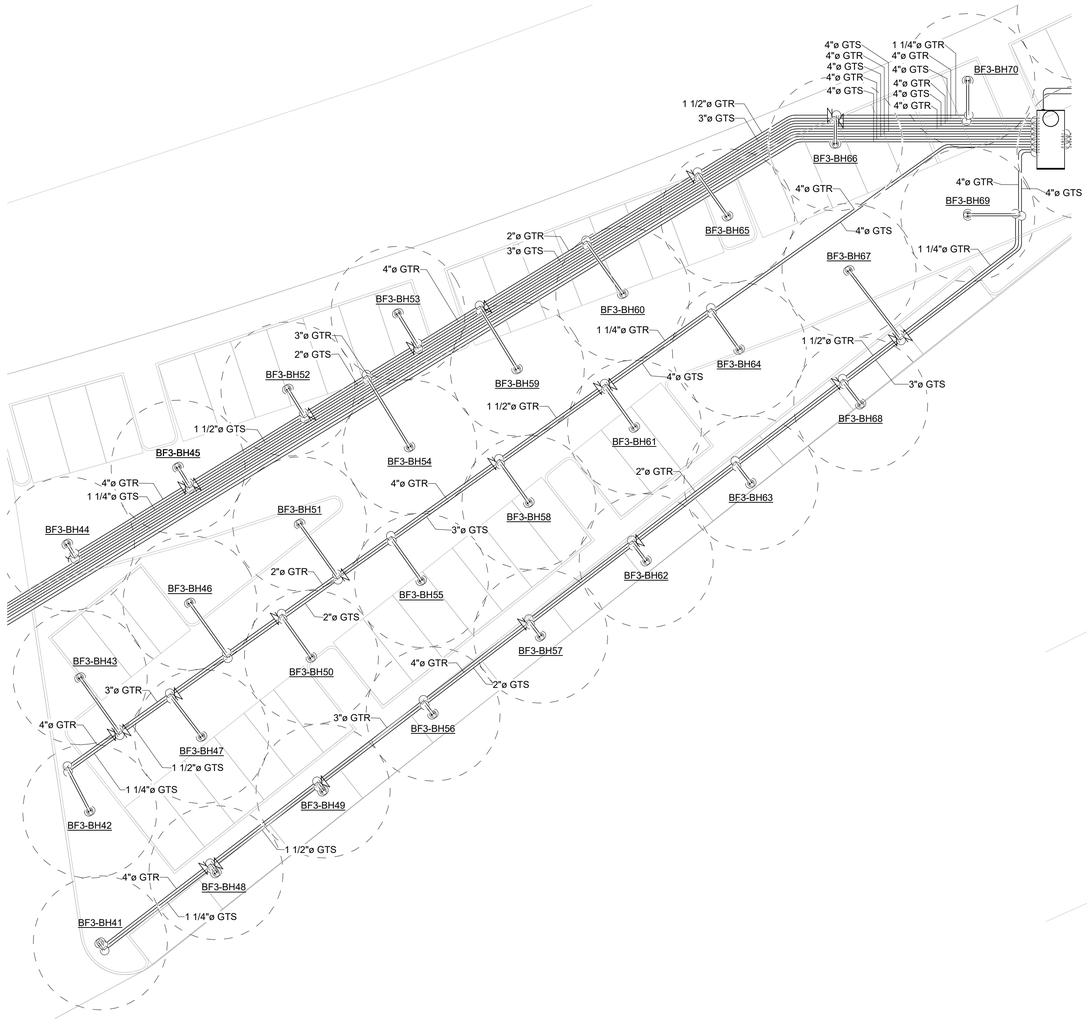
ZBF GEOTHERMAL

ARVERNE EAST GEOTHERMAL AMBIENT LOOP

BOREFIELD 3 ENLARGED PLANS I
PHASE 3

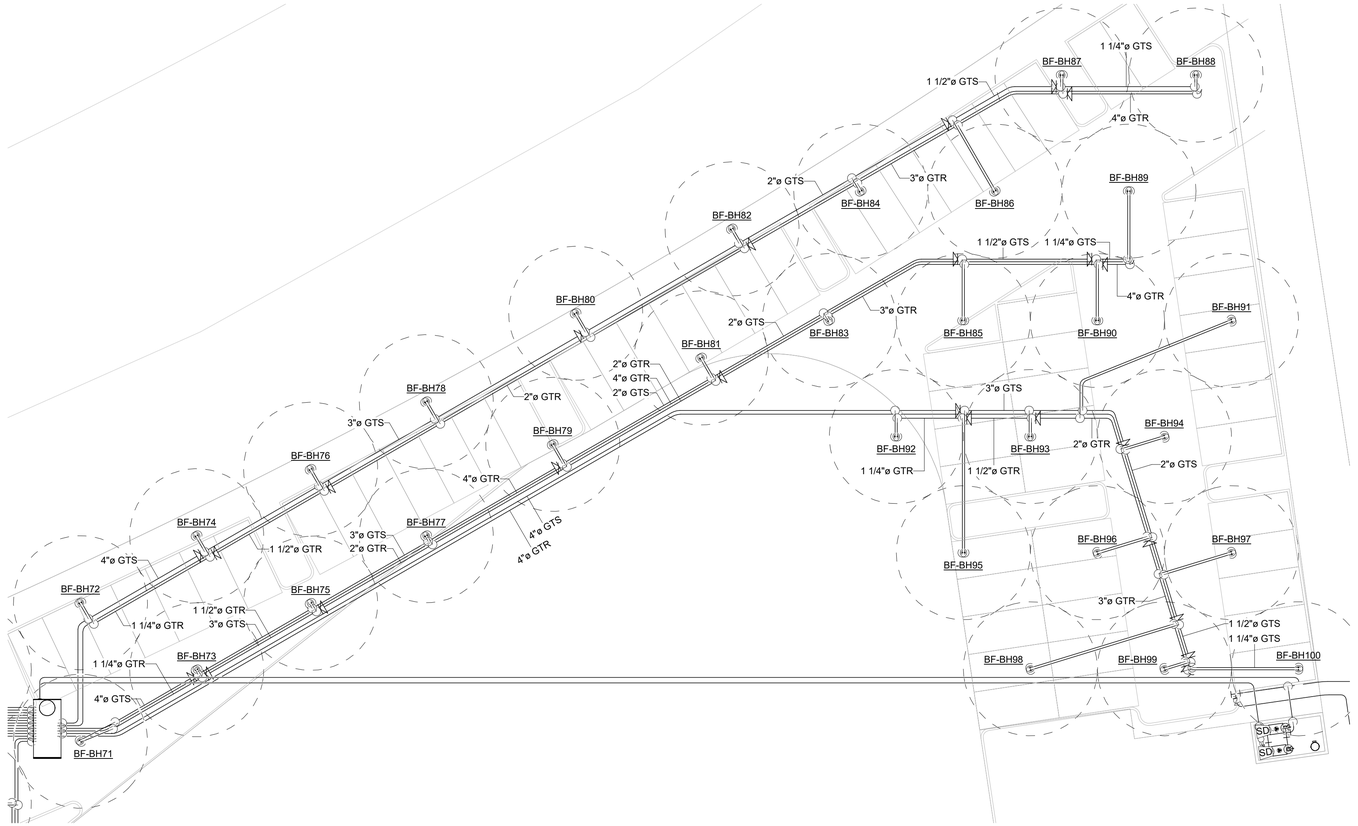
PROJECT NO.
FILE NAME:
SHEET NO.
GT-115

ISSUED FOR NYSERDA DRAFT FINAL REPORT



BOREFIELD 3 PLAN - CENTRAL

1/16" = 1'-0"

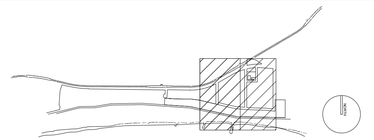


BOREFIELD 3 PLAN - EAST

1/16" = 1'-0"

0 8' 16' 32'

SCALE: 1/16" = 1'-0"



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: Approver
DATE: MAY 2023

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ZBF GEOTHERMAL

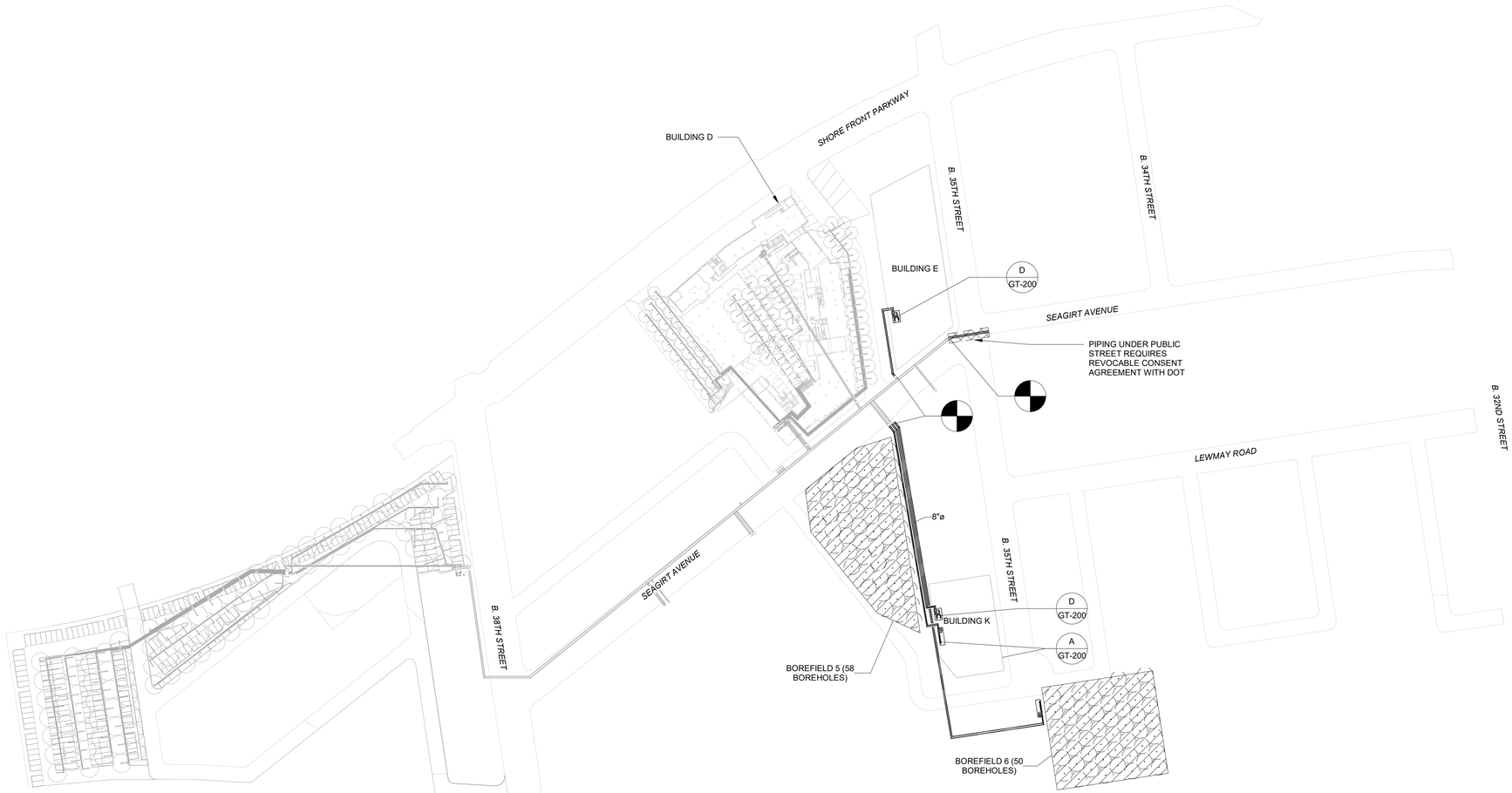
ARVERNE EAST GEOTHERMAL AMBIENT LOOP

BOREFIELD 3 ENLARGED PLANS II
PHASE 3

PROJECT NO.
FILE NAME:

SHEET NO.
GT-116

ISSUED FOR NYSERDA DRAFT FINAL REPORT

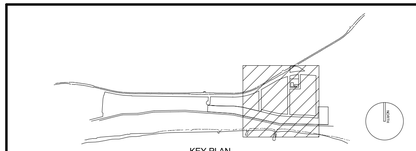


ARVERNE EAST GEOTHERMAL SITE PLAN - PHASE 4

1" = 100'-0"

0 50' 100' 200'

SCALE: 1" = 100'-0"



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: -
DATE: MAY 2023

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ZBF GEOTHERMAL

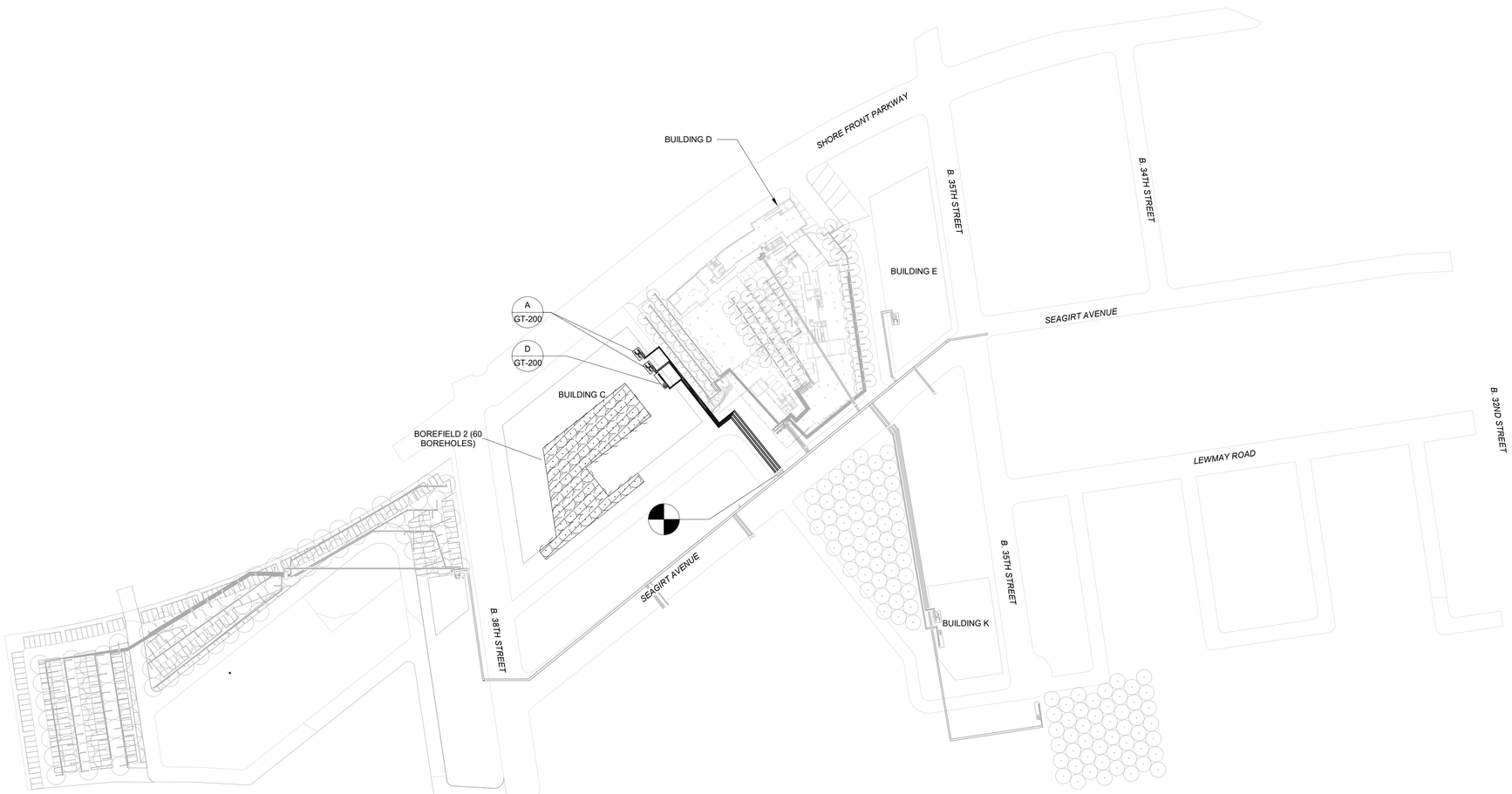
ARVERNE EAST GEOTHERMAL AMBIENT LOOP

OVERALL GEOTHERMAL PLAN
PHASE 4

PROJECT NO.
FILE NAME:

SHEET NO.
GT-120

ISSUED FOR NYSERDA DRAFT FINAL REPORT

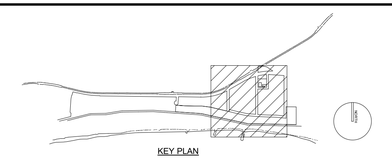


ARVERNE EAST GEOTHERMAL SITE PLAN - PHASE 5

1" = 100'-0"

0 50' 100' 200'

SCALE: 1" = 100'-0"



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: -
DATE: MAY 2023

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ZBF GEOTHERMAL

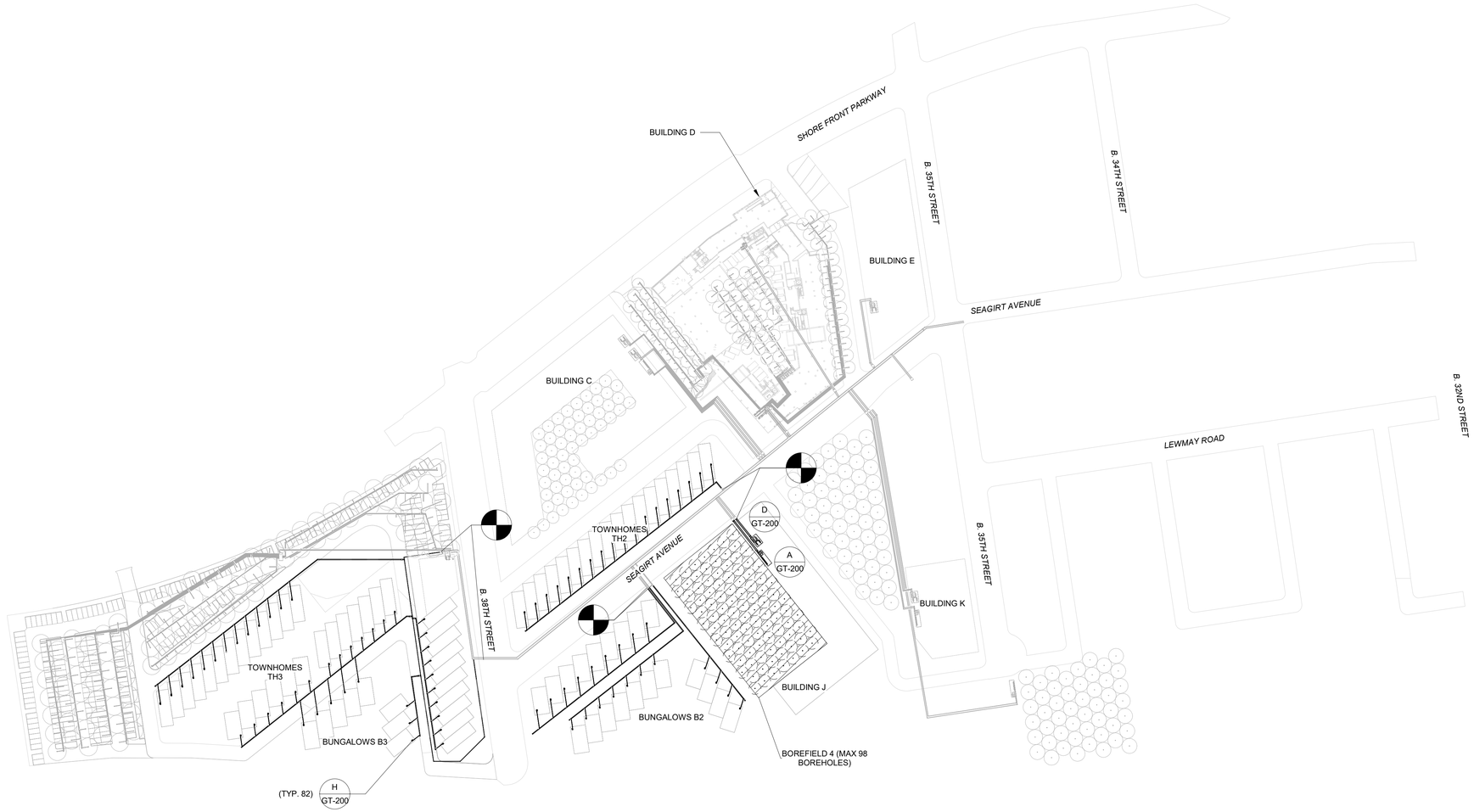
ARVERNE EAST GEOTHERMAL AMBIENT LOOP

OVERALL GEOTHERMAL PLAN
PHASE 5

PROJECT NO.
FILE NAME:

SHEET NO.
GT-130

ISSUED FOR NYSERDA DRAFT FINAL REPORT

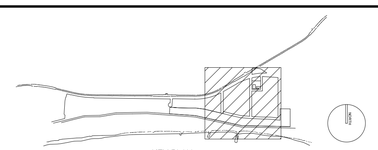


ARVERNE EAST GEOTHERMAL SITE PLAN - PHASE 6

1" = 100'-0"

0 50' 100' 200'

SCALE: 1" = 100'-0"



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: -
DATE: MAY 2023

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ZBF GEOTHERMAL

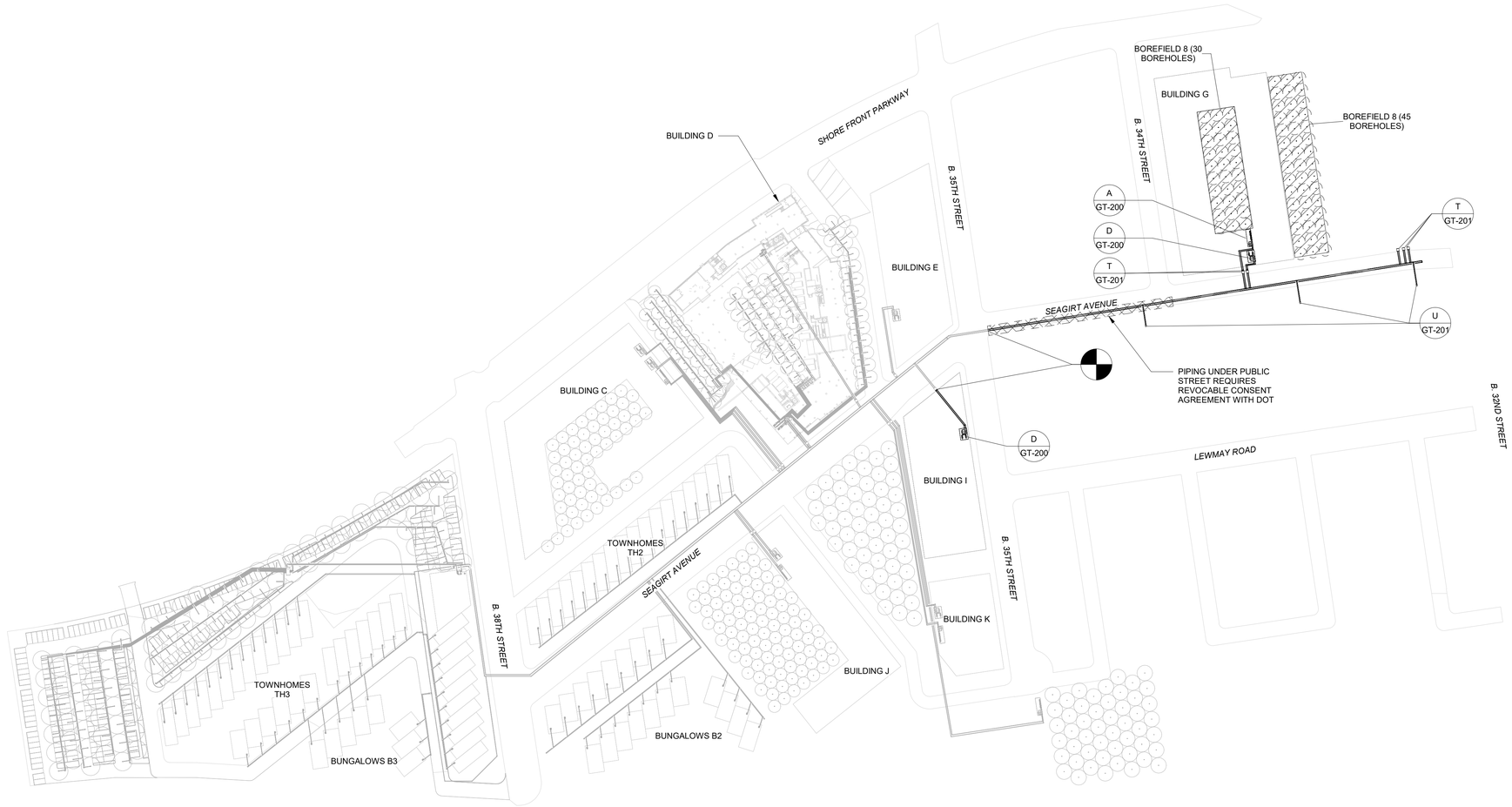
ARVERNE EAST GEOTHERMAL AMBIENT LOOP

OVERALL GEOTHERMAL PLAN
PHASE 6

PROJECT NO.
FILE NAME:

SHEET NO.
GT-140

ISSUED FOR NYSERDA DRAFT FINAL REPORT

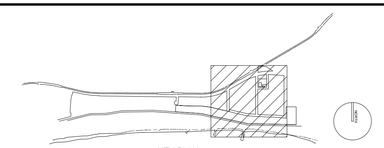


ARVERNE EAST GEOTHERMAL SITE PLAN - PHASE 7

1" = 100'-0"

0 50' 100' 200'

SCALE: 1" = 100'-0"



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: -
DATE: MAY 2023

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ZBF GEOTHERMAL

ARVERNE EAST GEOTHERMAL AMBIENT LOOP

OVERALL GEOTHERMAL PLAN
PHASE 7

PROJECT NO.
FILE NAME:

SHEET NO.
GT-150

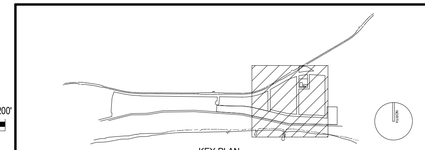
ISSUED FOR NYSERDA DRAFT FINAL REPORT

ARVERNE EAST GEOTHERMAL SITE PLAN - PHASE 8

1" = 100'-0"

0 50' 100' 200'

SCALE: 1" = 100'-0"



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: -
DATE: MAY 2023

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ZBF GEOTHERMAL

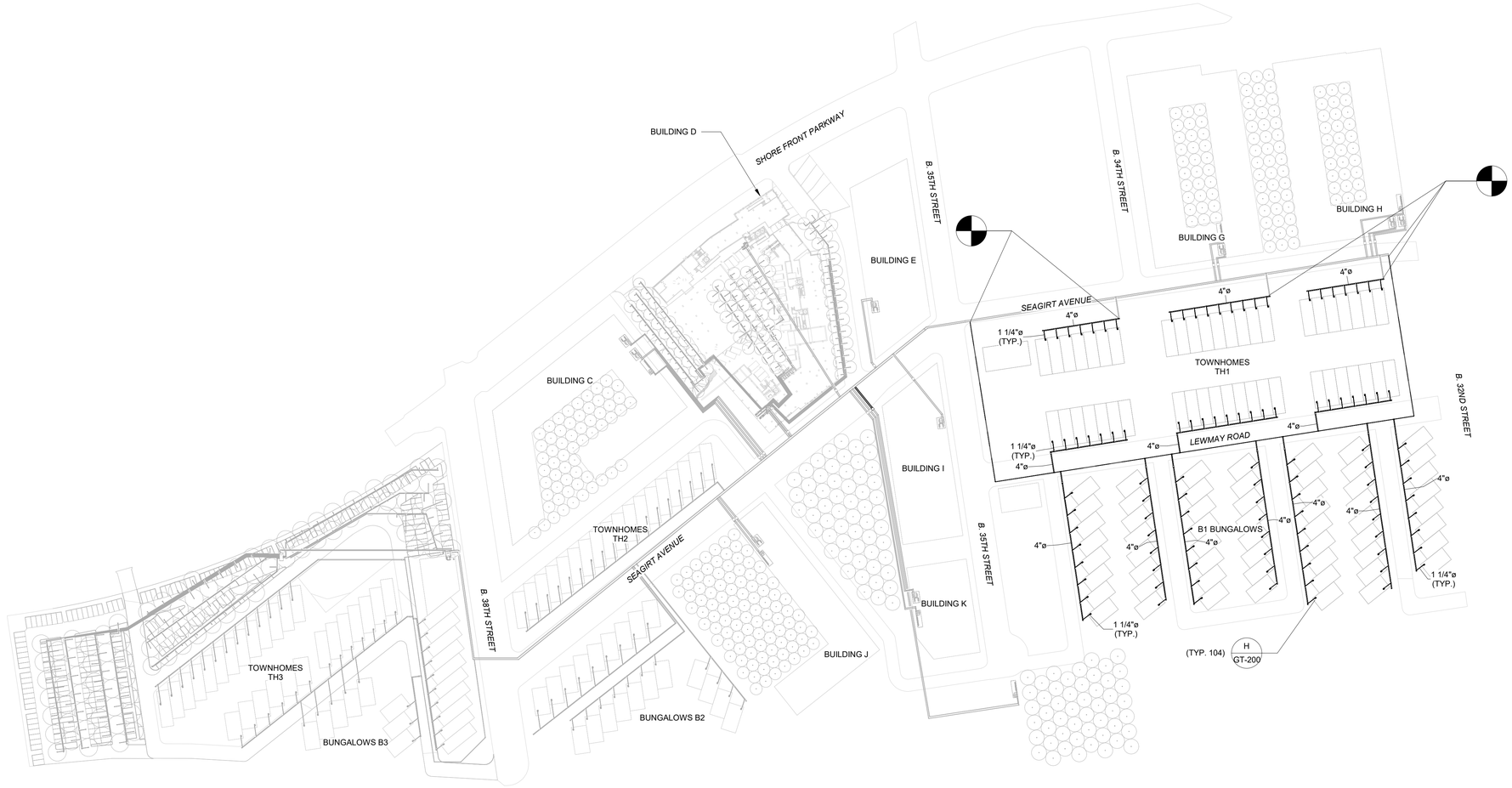
ARVERNE EAST GEOTHERMAL AMBIENT LOOP

OVERALL GEOTHERMAL PLAN
PHASE 8

PROJECT NO.
FILE NAME:

SHEET NO.
GT-160

ISSUED FOR NYSERDA DRAFT FINAL REPORT

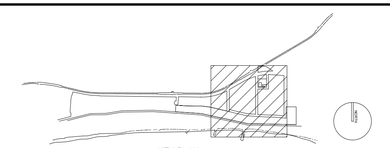


ARVERNE EAST GEOTHERMAL SITE PLAN - PHASE 9

1" = 100'-0"

0 50' 100' 200'

SCALE: 1" = 100'-0"



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: -
DATE: MAY 2023

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Tel: (212) 785-9123

ZBF GEOTHERMAL

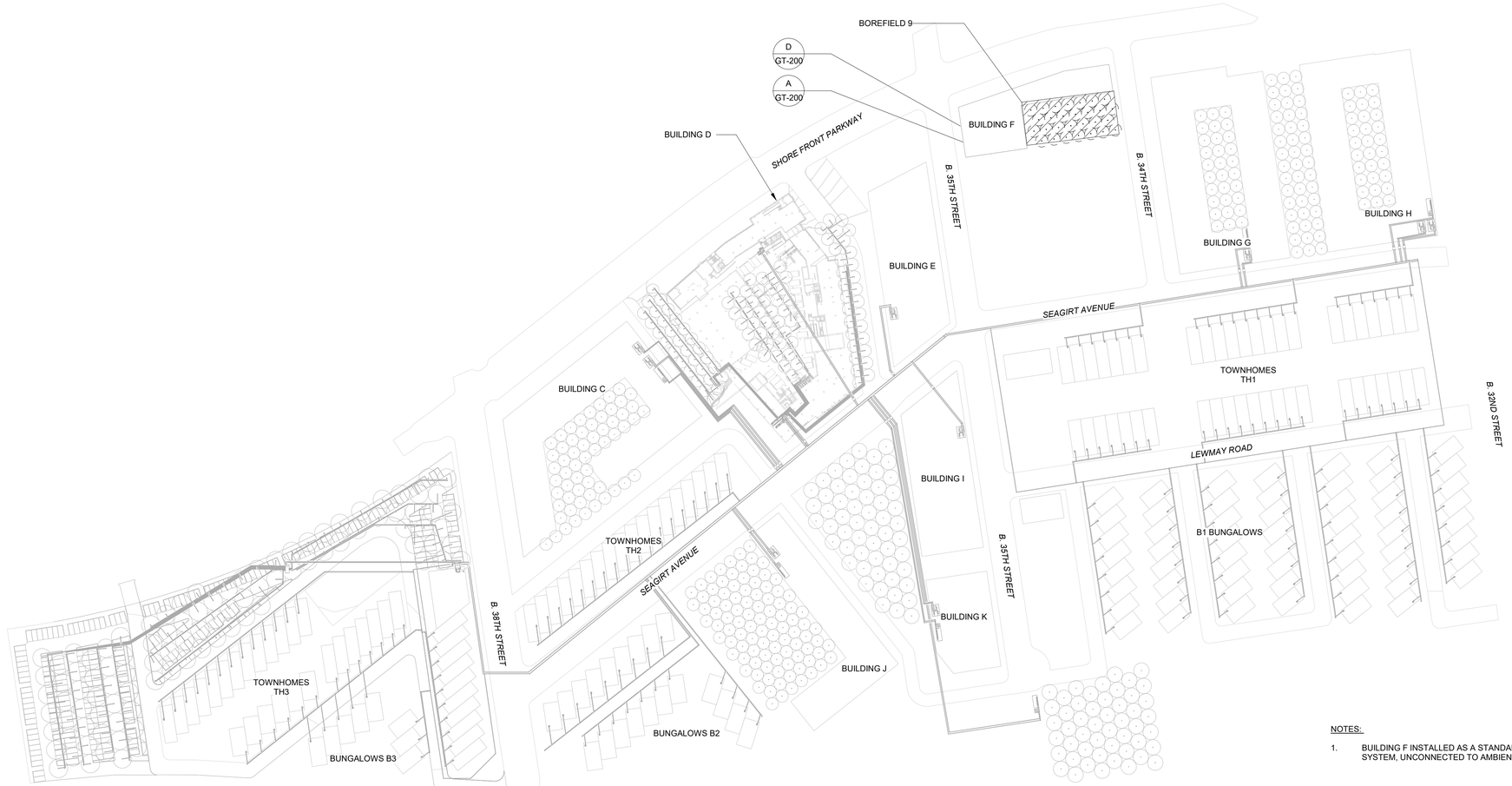
ARVERNE EAST GEOTHERMAL AMBIENT LOOP

OVERALL GEOTHERMAL PLAN
PHASE 9

PROJECT NO.
FILE NAME:

SHEET NO.
GT-170

ISSUED FOR NYSERDA DRAFT FINAL REPORT



NOTES:

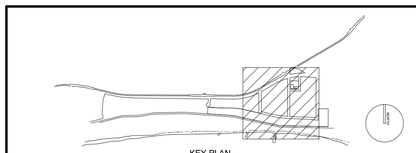
1. BUILDING F INSTALLED AS A STANDALONE GEOTHERMAL SYSTEM, UNCONNECTED TO AMBIENT LOOP.

ARVERNE EAST GEOTHERMAL SITE PLAN - PHASE 10

1" = 100'-0"

0 50' 100' 200'

SCALE: 1" = 100'-0"



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: -
DATE: MAY 2023

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Tel: (212) 785-9123

ZBF GEOTHERMAL

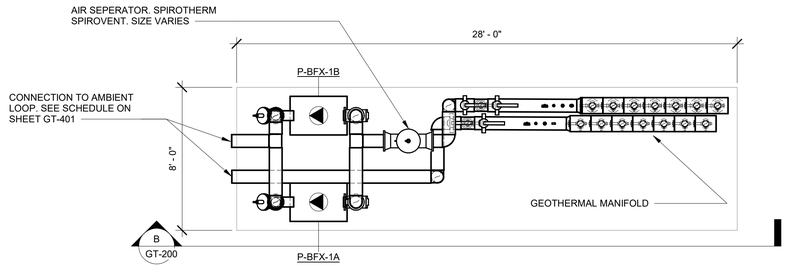
ARVERNE EAST GEOTHERMAL AMBIENT LOOP

OVERALL GEOTHERMAL PLAN
PHASE 10

PROJECT NO.
FILE NAME:

SHEET NO.
GT-180

ISSUED FOR NYSERDA DRAFT FINAL REPORT



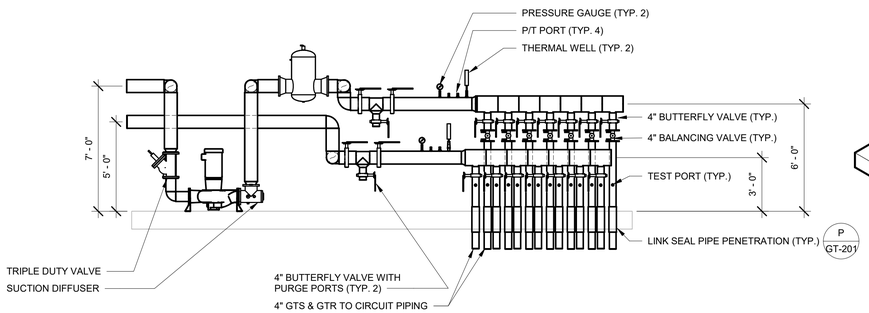
NOTES:

1. SEE SCHEDULES ON SHEET GT-400 FOR PUMP SIZES.
2. MANIFOLD LENGTH VARIES BY CIRCUIT QUANTITY. ASSUME AN ADDITIONAL 14" OF LENGTH PER CIRCUIT ADDED.

TYPICAL MANIFOLD PLAN

A DETAIL 1/4" = 1'-0"

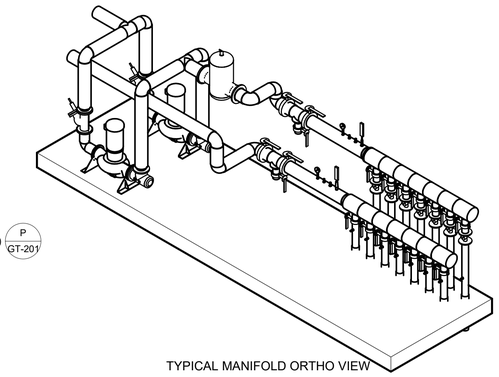
SCALE: 1/4" = 1'-0" (0, 2', 4', 8')



TYPICAL MANIFOLD SECTION

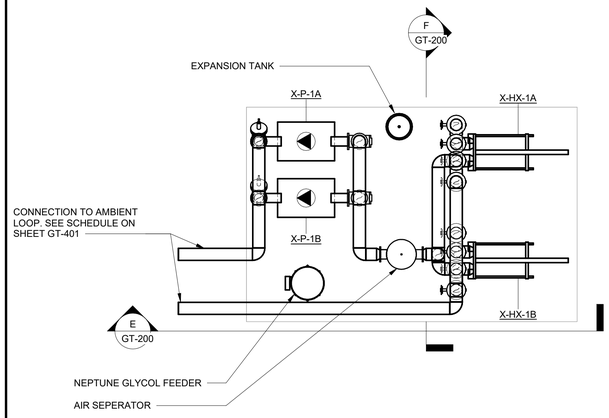
B DETAIL 1/4" = 1'-0"

SCALE: 1/4" = 1'-0" (0, 2', 4', 8')



TYPICAL MANIFOLD ORTHO VIEW

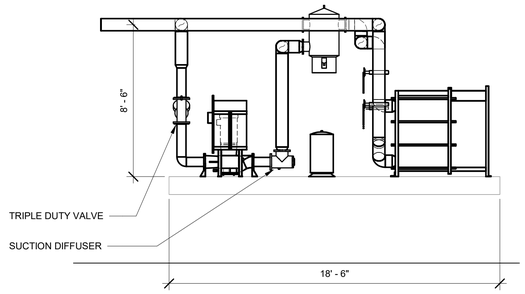
C DETAIL



HEAT TRANSFER STATION PLAN - BUILDINGS C, E, G, H, I, J, K

D DETAIL 1/4" = 1'-0"

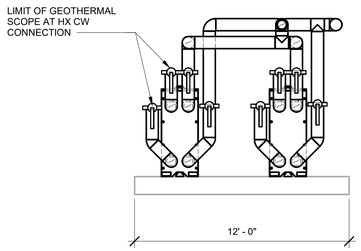
SCALE: 1/4" = 1'-0" (0, 2', 4', 8')



HEAT TRANSFER STATION SECTION 1 - BUILDINGS C, E, G, H, I, J, K

E DETAIL 1/4" = 1'-0"

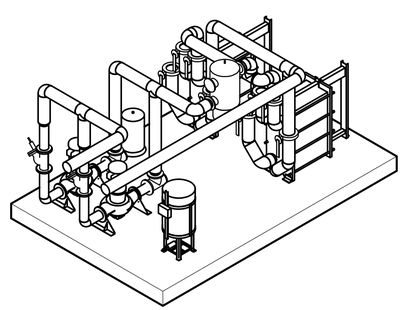
SCALE: 1/4" = 1'-0" (0, 2', 4', 8')



HEAT TRANSFER STATION SECTION 2 - BUILDINGS C, E, G, H, I, J, K1

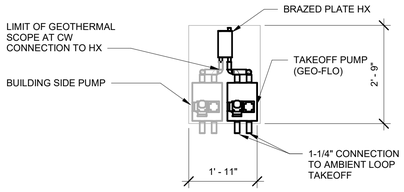
F DETAIL 1/4" = 1'-0"

SCALE: 1/4" = 1'-0" (0, 2', 4', 8')



HEAT TRANSFER STATION ORTHO VIEW - BUILDINGS C, E, G, H, I, J, K

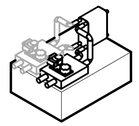
G DETAIL



HEAT TRANSFER STATION PLAN - TOWNHOMES AND BUNGALOWS

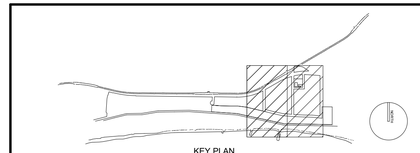
H DETAIL 1/2" = 1'-0"

SCALE: 1/2" = 1'-0" (0, 1', 2', 4')



HEAT TRANSFER STATION ORTHO VIEW - TOWNHOMES AND BUNGALOWS

I DETAIL



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY:
DATE: MAY 2023

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14 Wall Street, Suite 1702
New York, NY 10005
Tel: (212) 785-9123

ZBF GEOTHERMAL

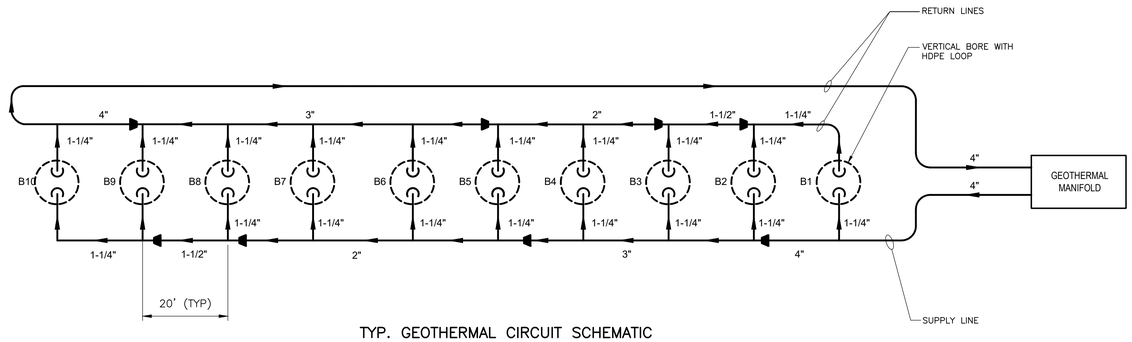
ARVERNE EAST GEOTHERMAL AMBIENT LOOP

GEOTHERMAL DETAILS I

PROJECT NO.
FILE NAME:

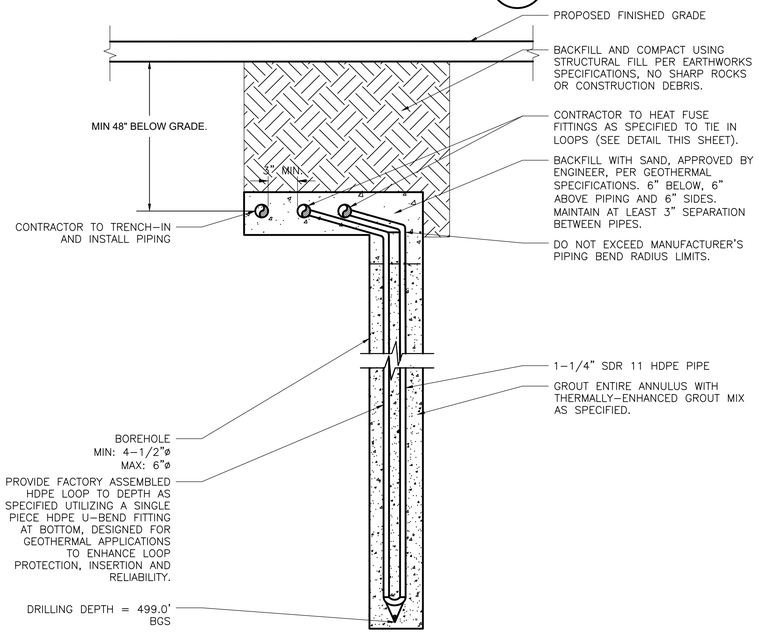
SHEET NO.
GT-200

ISSUED FOR NYSERDA DRAFT FINAL REPORT



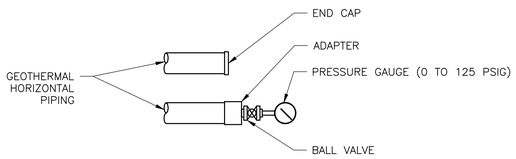
TYP. GEOTHERMAL CIRCUIT SCHEMATIC

DETAIL L
NTS



GEOTHERMAL BOREHOLE DETAIL

DETAIL O
NTS

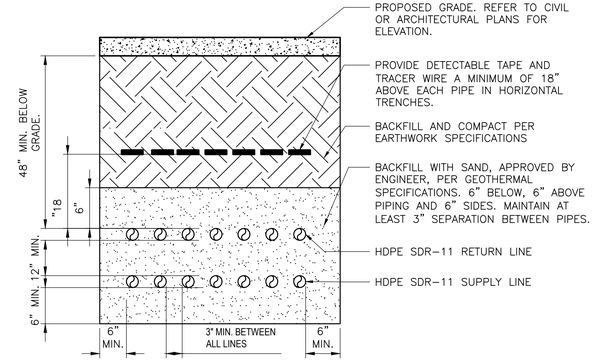


NOTES:

1. END CAP AND PRESSURE GAUGE ASSEMBLY TO BE LEFT ON AND HOLD PRESSURE UNTIL SEGMENT IS TIED INTO HORIZONTAL CIRCUIT PIPING OR ASSOCIATED MANIFOLD.

PRESSURE TEST DETAIL – HORIZONTAL PIPING

DETAIL S
NTS

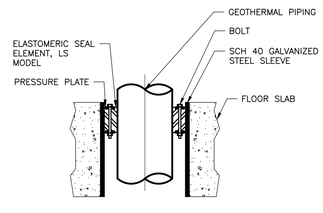


NOTES:

1. WHERE DEPTH OF TRENCH EQUALS OR EXCEEDS 4'-0", THE CONTRACTOR MUST PROVIDE SHEETING AND BRACING. AS AN ALTERNATIVE, THE TRENCH WALLS MUST BE CUT BACK TO A 1:1 SLOPE, OR THE NATURAL ANGLE OF REPOSE FOR THE SOIL, WHICHEVER IS SHALLOWER.

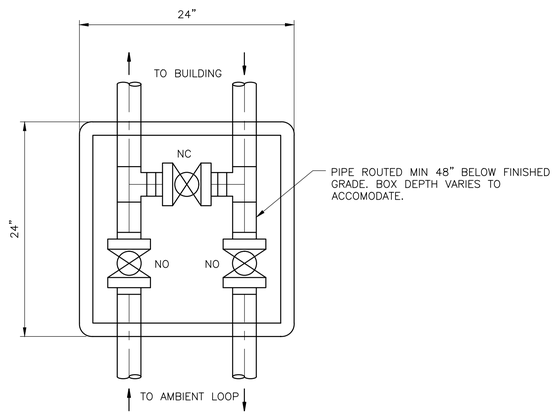
TYP. TRENCH DETAIL

DETAIL M
NTS



LINK SEAL PIPE PENETRATION

DETAIL P
NTS

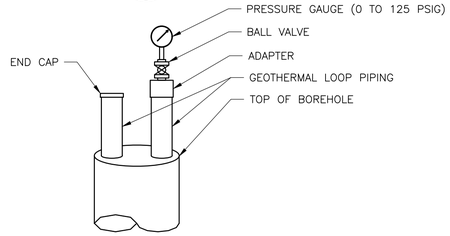


NOTES:

1. CLOSE VALVES AND CAP OPEN PIPE ENDS FOR VALVE BOXES INSTALLED FOR CONNECTION TO FUTURE PHASES.
2. SEE PLANS FOR PIPE AND VALVE SIZES.

BURIED VALVE BOX – BUILDINGS C, D, E, G, H, I, J, K

DETAIL T
NTS

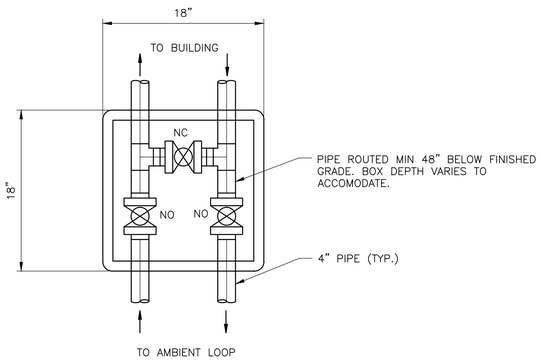


NOTES:

1. END CAP AND PRESSURE GAUGE ASSEMBLY TO BE LEFT ON AND HOLD PRESSURE UNTIL LOOPS ARE TIED INTO HORIZONTAL CIRCUIT PIPING.

PRESSURE TEST DETAIL – BOREHOLE

DETAIL Q
NTS

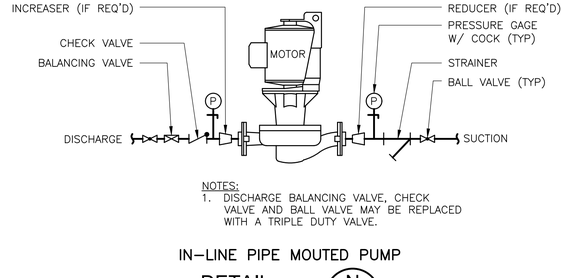


NOTES:

1. CLOSE VALVES AND CAP OPEN PIPE ENDS FOR VALVE BOXES INSTALLED FOR CONNECTION TO FUTURE PHASES.

BURIED VALVE BOX – TOWNHOMES AND BUNGALOWS

DETAIL U
NTS

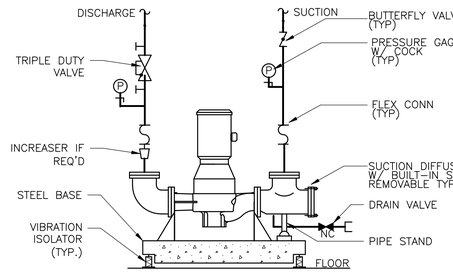


NOTES:

1. DISCHARGE BALANCING VALVE, CHECK VALVE AND BALL VALVE MAY BE REPLACED WITH A TRIPLE DUTY VALVE.

IN-LINE PIPE MOUTED PUMP

DETAIL N
NTS

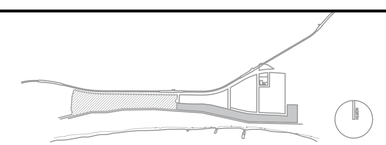


NOTES:

1. VALVES SHALL BE FULL SIZE OF PIPE INDICATED ON PLAN

BASE MOUNTED IN-LINE PUMP INSTALLATION

DETAIL R
NTS



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: –
DATE: MAY 2023

CDM Smith
CDM Smith NY Inc.
14 Wall Street, Suite 1702
New York, NY 10005
Tel: (212) 785-9123

ZBF GEOTHERMAL

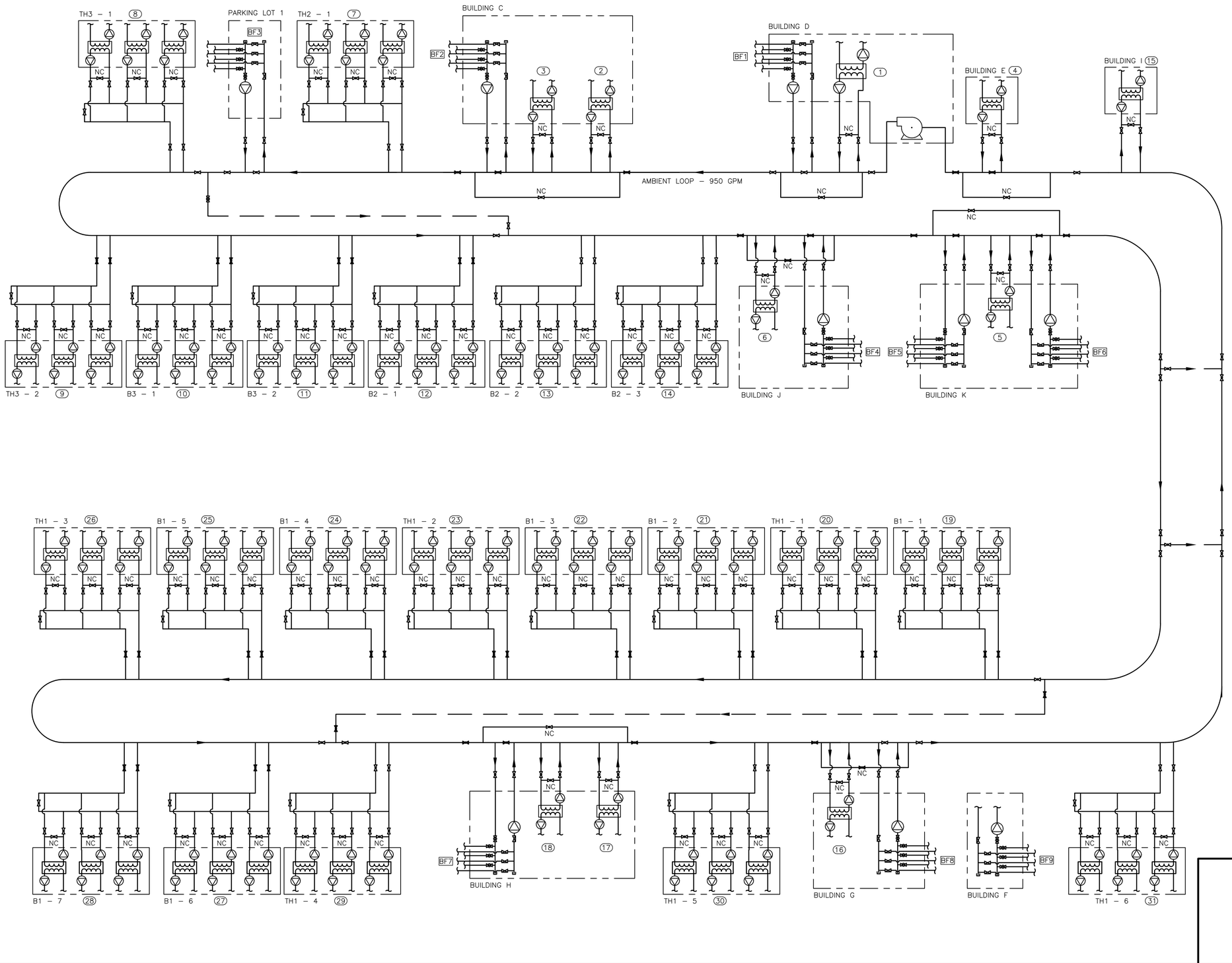
ARVERNE EAST GEOTHERMAL AMBIENT LOOP

GEOTHERMAL DETAILS II

PROJECT NO. 266417-277920
FILE NAME: GT-201

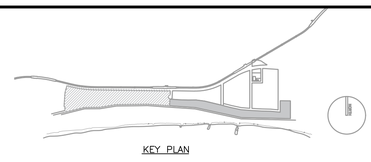
SHEET NO.
GT-201

ISSUED FOR NYSERDA DRAFT FINAL REPORT



NOTES:

1. SEE SHEET GT–401 FOR SCHEDULES OF COMPONENTS.



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: –
DATE: MAY 2023

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ZBF GEOTHERMAL

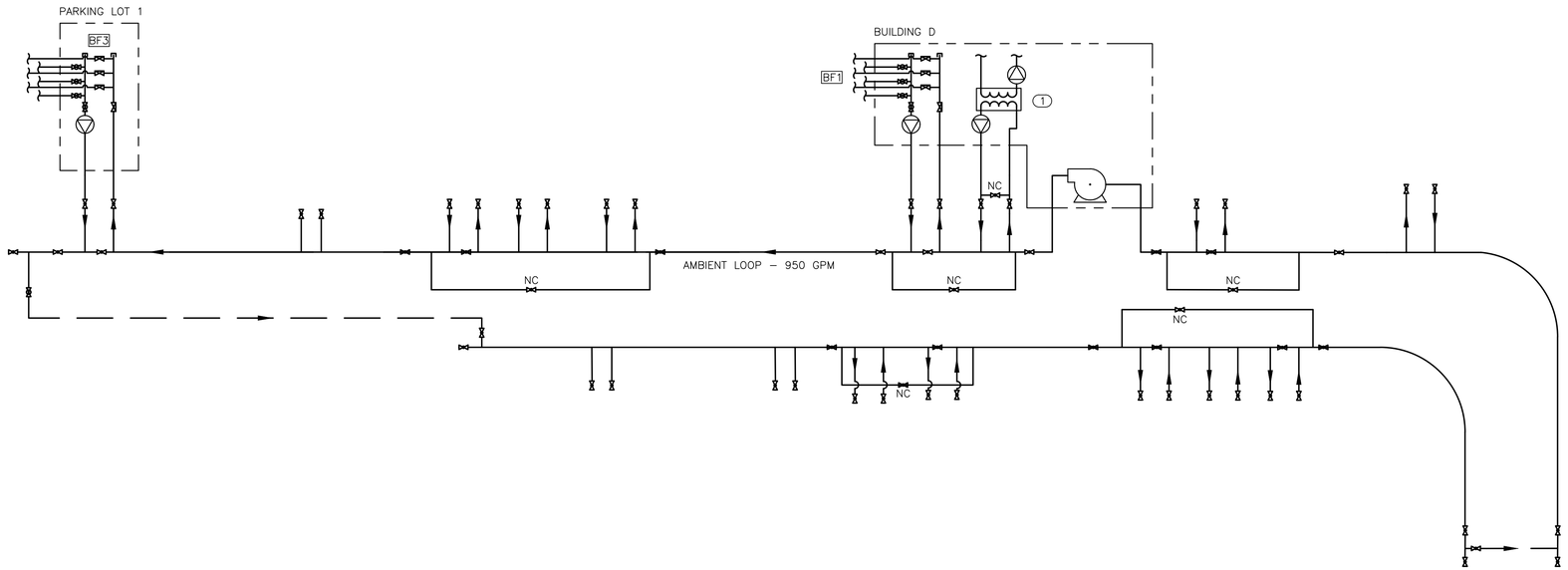
ARVERNE EAST GEOTHERMAL AMBIENT LOOP

SCHEMATIC FLOW DIAGRAM

PROJECT NO. 266417–277920
FILE NAME: GT–300

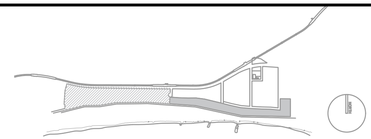
SHEET NO.
GT-300

ISSUED FOR NYSERDA DRAFT FINAL REPORT



NOTES:

1. SEE SHEET GT-401 FOR SCHEDULES OF COMPONENTS.



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: –
DATE: MAY 2023

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ZBF GEOTHERMAL

ARVERNE EAST GEOTHERMAL AMBIENT LOOP

SCHEMATIC FLOW DIAGRAM
PHASES 3 AND 3A

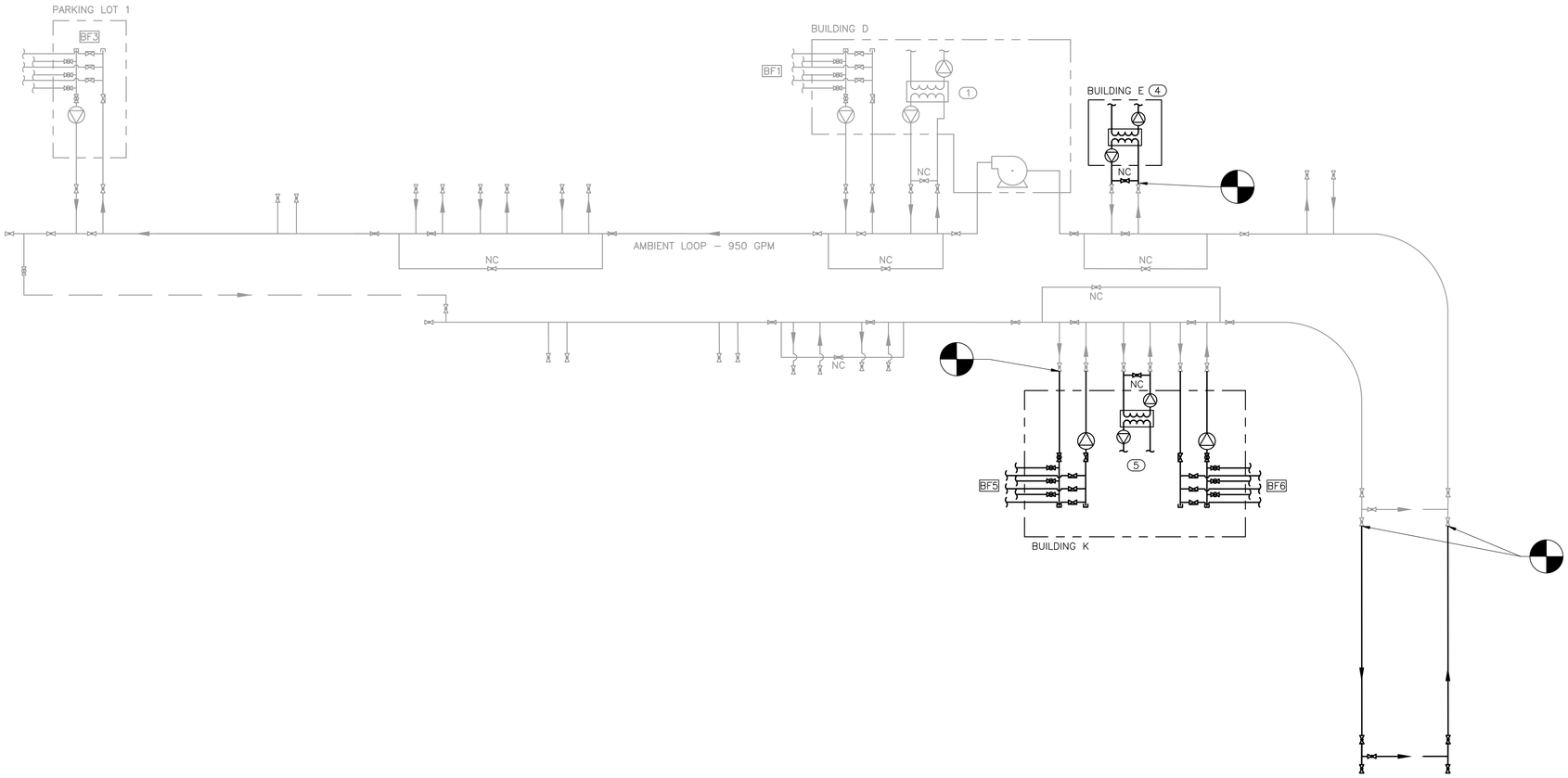
PROJECT NO. 266417-277920
FILE NAME: GT-301

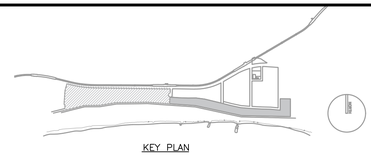
SHEET NO.
GT-301

ISSUED FOR NYSERDA DRAFT FINAL REPORT

NOTES:

1. SEE SHEET GT-401 FOR SCHEDULES OF COMPONENTS.





KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: –
DATE: MAY 2023

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ZBF GEOTHERMAL

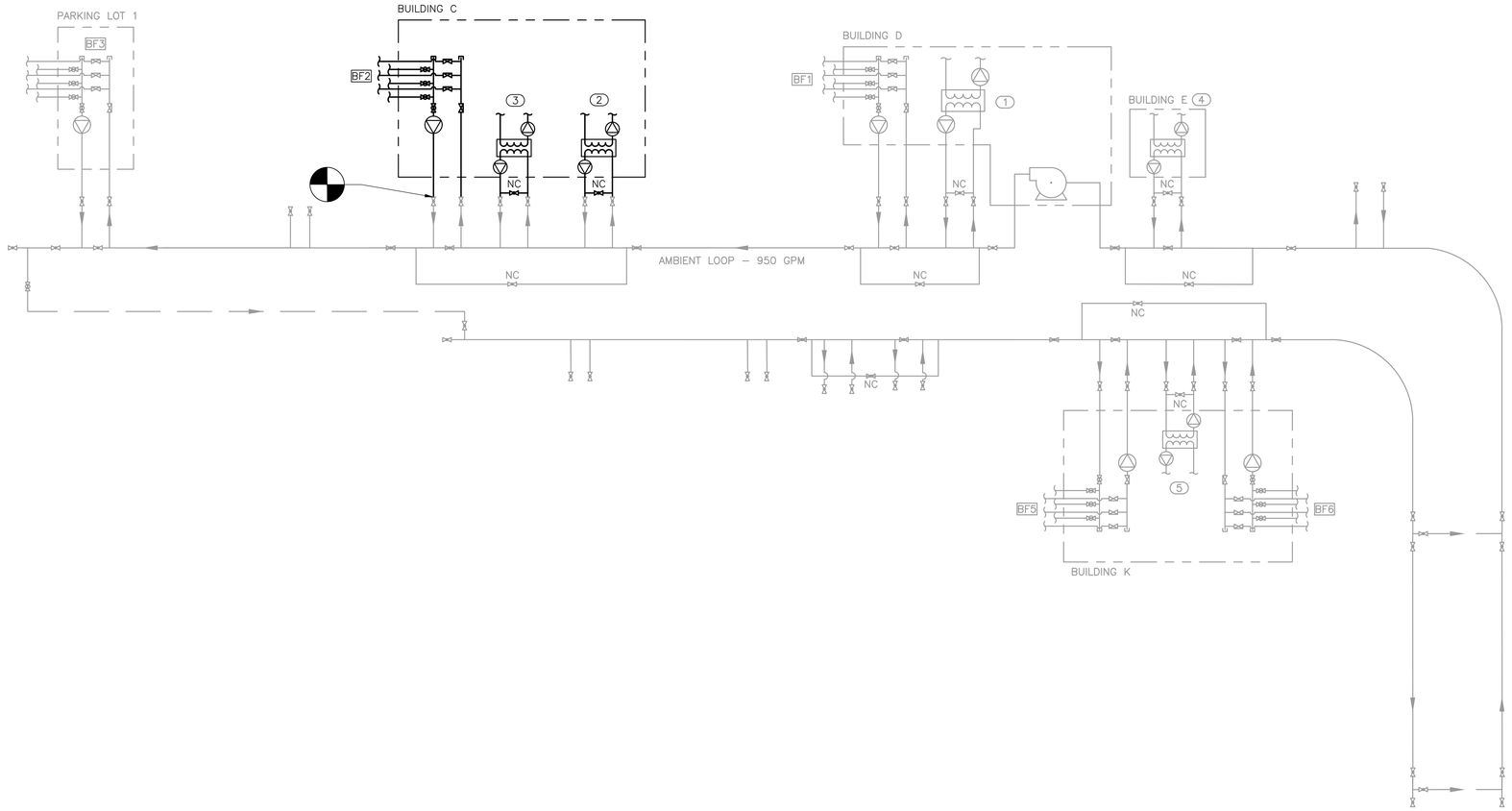
ARVERNE EAST GEOTHERMAL AMBIENT LOOP

SCHEMATIC FLOW DIAGRAM
PHASES 4 AND 4A

PROJECT NO. 266417-277920
FILE NAME: GT-302

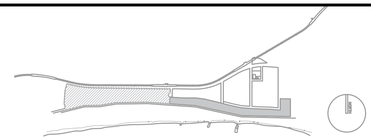
SHEET NO.
GT-302

ISSUED FOR NYSERDA DRAFT FINAL REPORT



NOTES:

1. SEE SHEET GT–401 FOR SCHEDULES OF COMPONENTS.



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: –
DATE: MAY 2023

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ZBF GEOTHERMAL

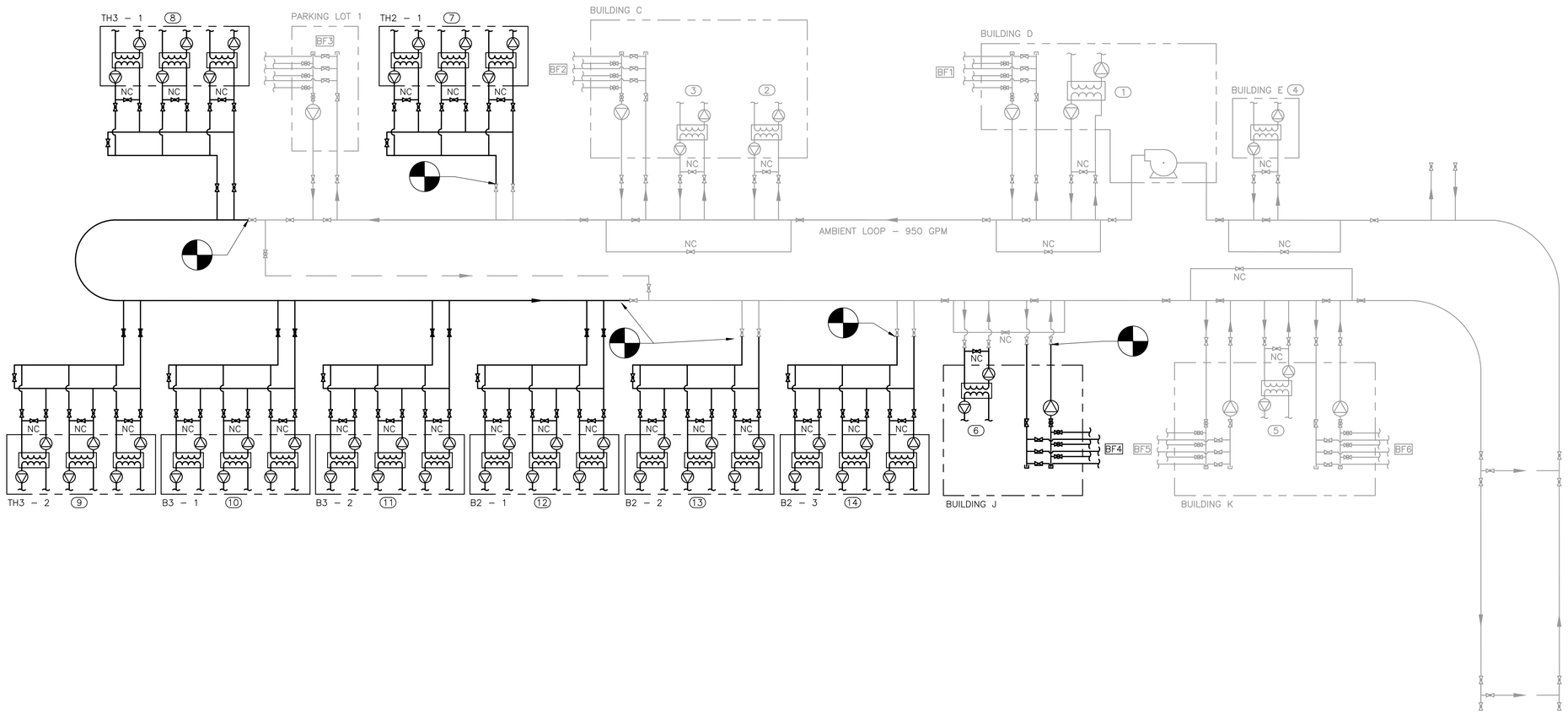
ARVERNE EAST GEOTHERMAL AMBIENT LOOP

SCHEMATIC FLOW DIAGRAM
PHASE 5

PROJECT NO. 266417–277920
FILE NAME: GT–303

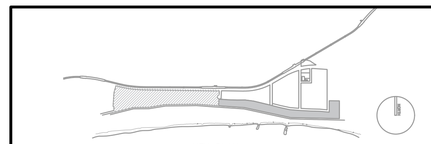
SHEET NO.
GT-303

ISSUED FOR NYSERDA DRAFT FINAL REPORT



NOTES:

1. SEE SHEET GT–401 FOR SCHEDULES OF COMPONENTS.



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: –
DATE: MAY 2023

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ZBF GEOTHERMAL

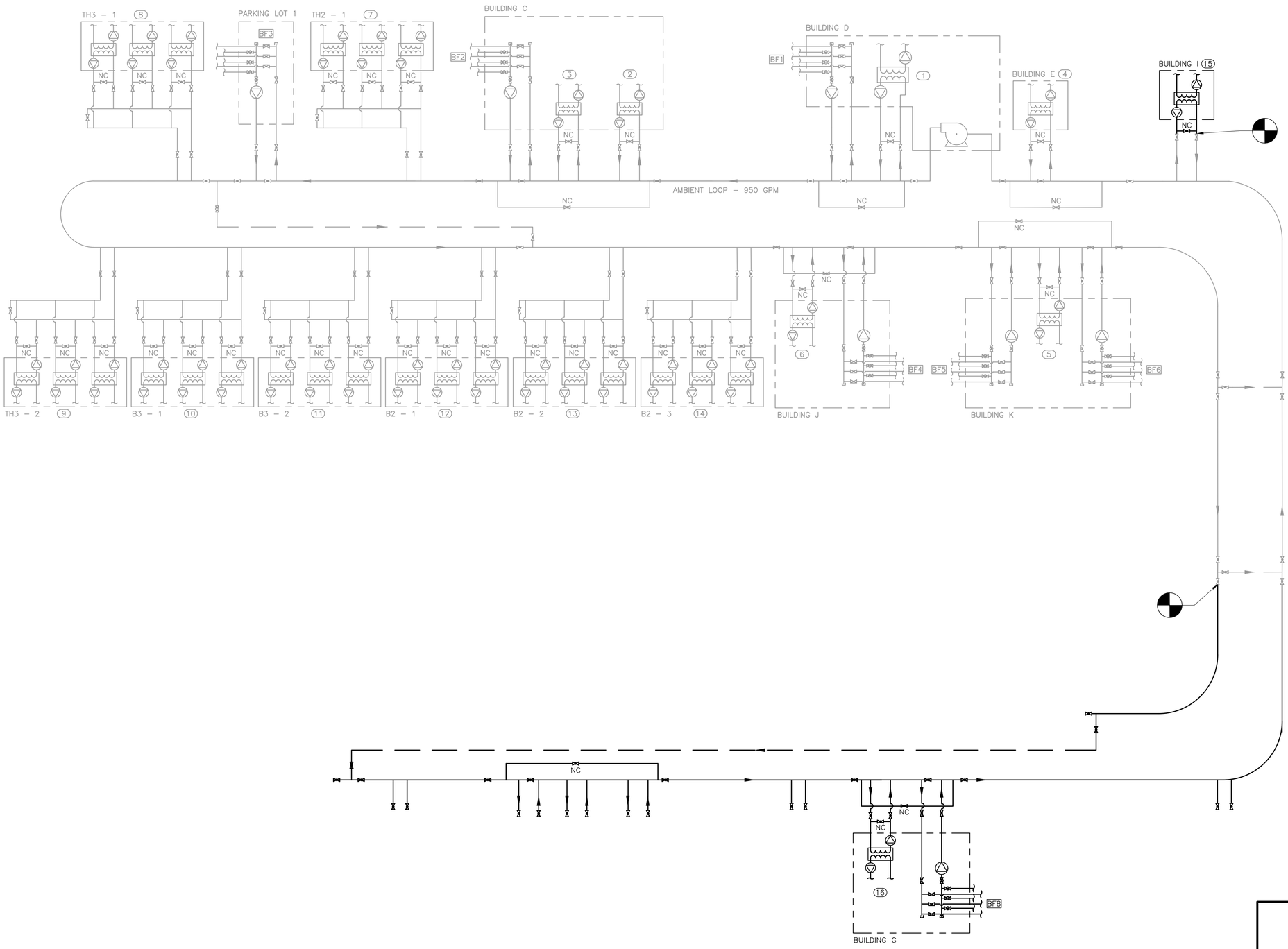
ARVERNE EAST GEOTHERMAL AMBIENT LOOP

SCHEMATIC FLOW DIAGRAM
PHASES 6 AND 6A

PROJECT NO. 266417–277920
FILE NAME: GT–304

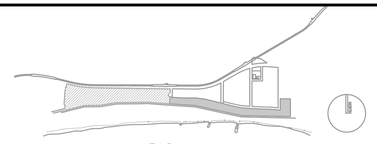
SHEET NO.
GT-304

ISSUED FOR NYSERDA DRAFT FINAL REPORT



NOTES:

1. SEE SHEET GT–401 FOR SCHEDULES OF COMPONENTS.



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: –
DATE: MAY 2023

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ZBF GEOTHERMAL

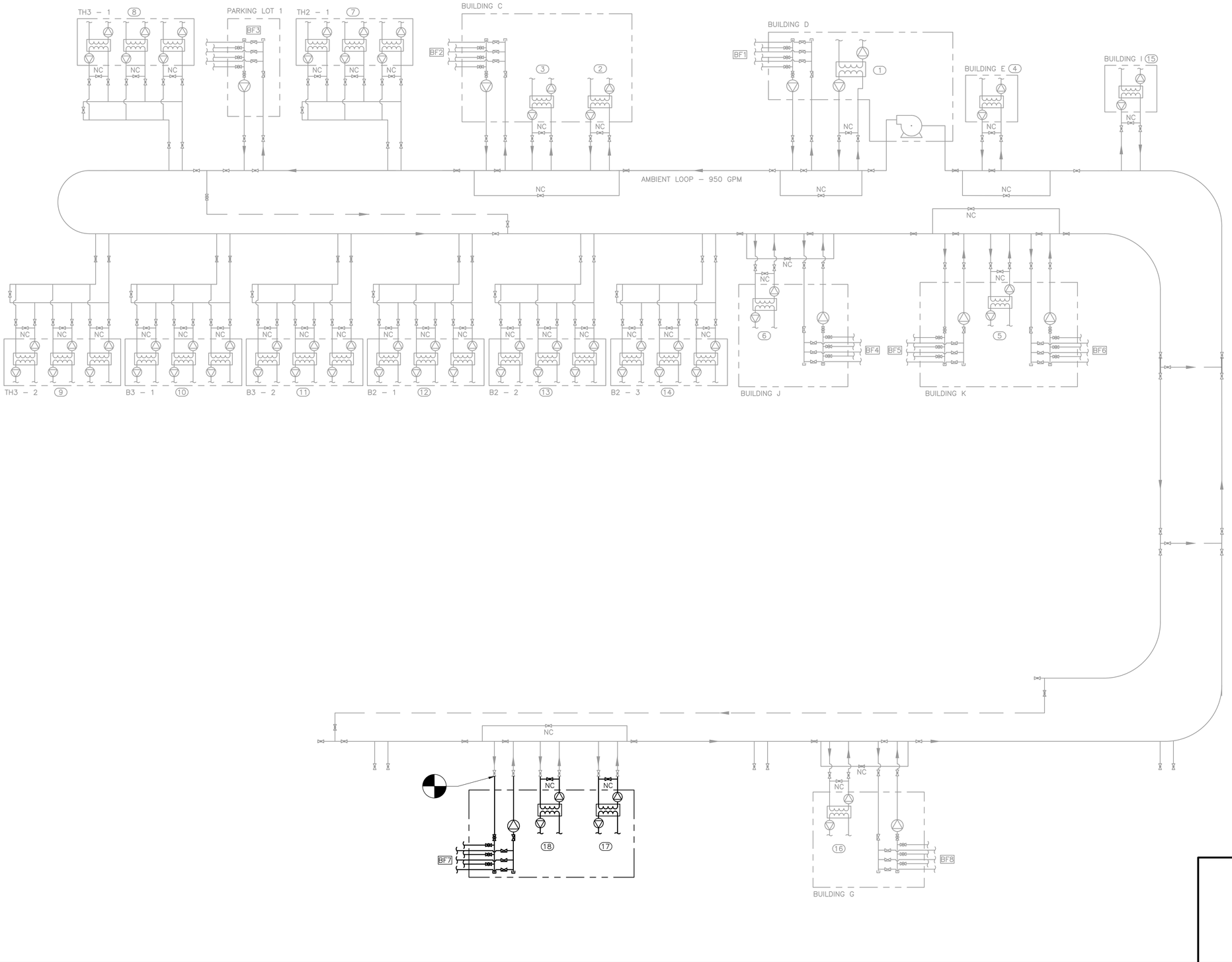
ARVERNE EAST GEOTHERMAL AMBIENT LOOP

SCHEMATIC FLOW DIAGRAM
PHASES 7 AND 7A

PROJECT NO. 266417–277920
FILE NAME: GT–305

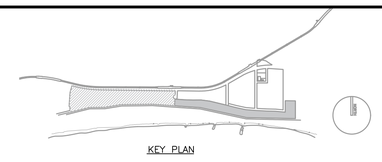
SHEET NO.
GT-305

ISSUED FOR NYSERDA DRAFT FINAL REPORT



NOTES:

1. SEE SHEET GT–401 FOR SCHEDULES OF COMPONENTS.



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: –
DATE: MAY 2023

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ZBF GEOTHERMAL

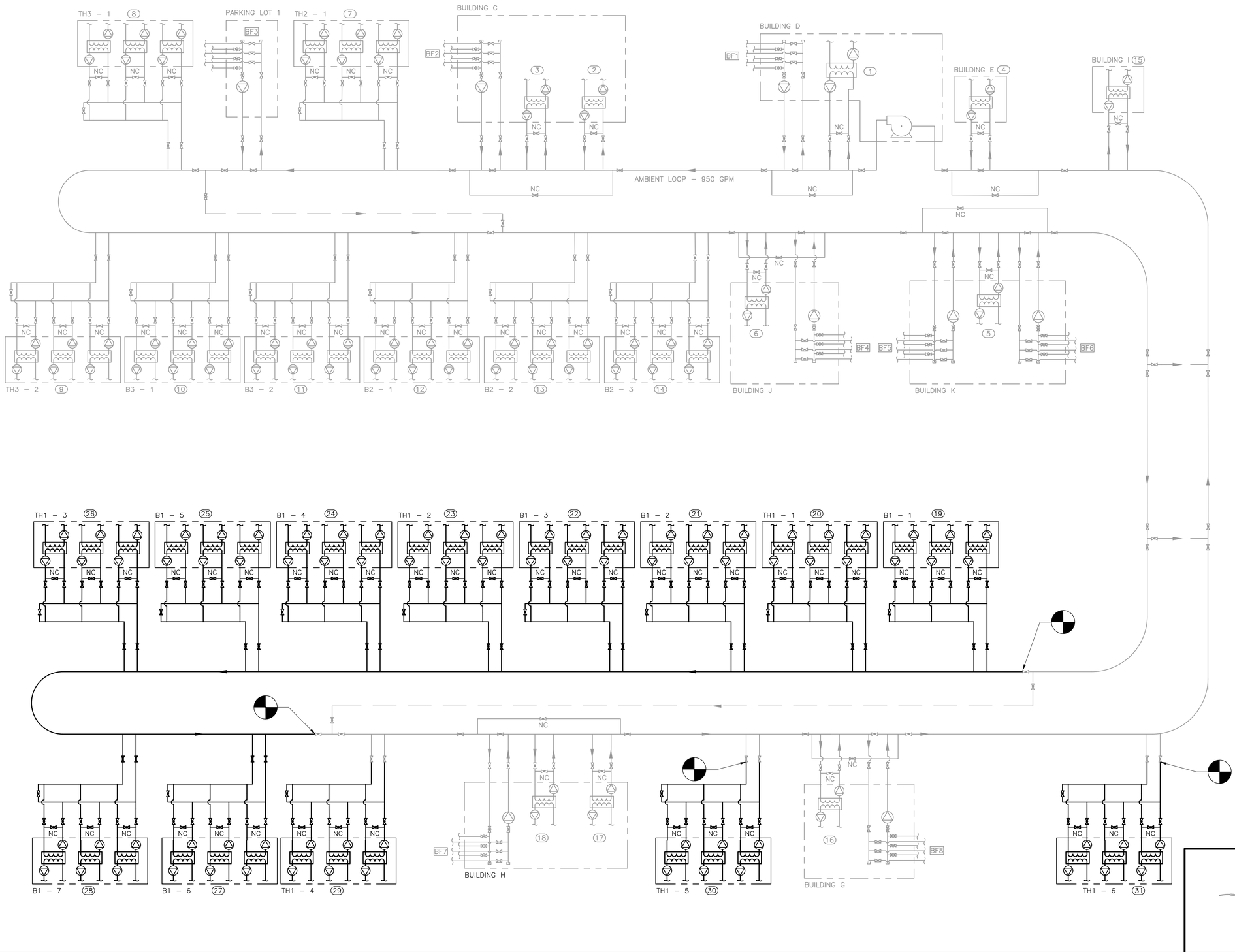
ARVERNE EAST GEOTHERMAL AMBIENT LOOP

SCHEMATIC FLOW DIAGRAM
PHASE 8

PROJECT NO. 266417–277920
FILE NAME: GT–306

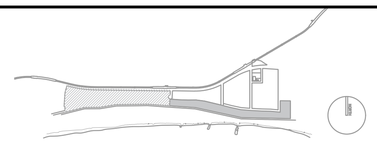
SHEET NO.
GT-306

ISSUED FOR NYSERDA DRAFT FINAL REPORT



NOTES:

1. SEE SHEET GT-401 FOR SCHEDULES OF COMPONENTS.



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: –
DATE: MAY 2023

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Tel: (212) 785-9123

ZBF GEOTHERMAL

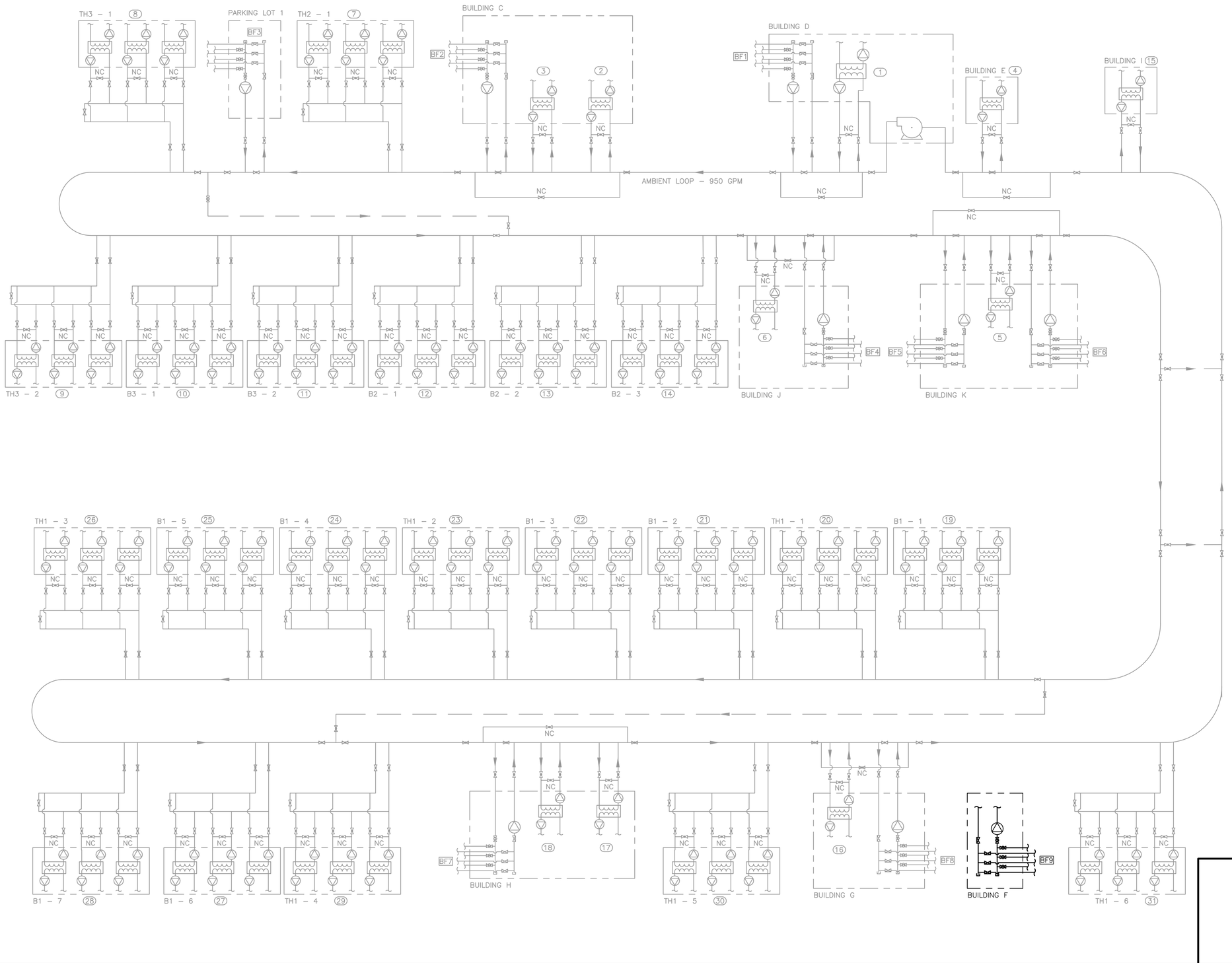
ARVERNE EAST GEOTHERMAL AMBIENT LOOP

SCHEMATIC FLOW DIAGRAM
PHASES 9 AND 9A

PROJECT NO. 266417-277920
FILE NAME: GT-307

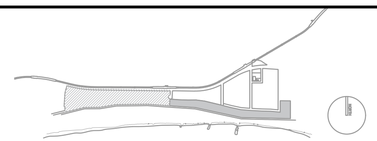
SHEET NO.
GT-307

ISSUED FOR NYSERDA DRAFT FINAL REPORT



NOTES:

1. SEE SHEET GT–401 FOR SCHEDULES OF COMPONENTS.



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: –
DATE: MAY 2023

CDM Smith
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14 Wall Street, Suite 1702
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Tel: (212) 785-9123

ZBF GEOTHERMAL

ARVERNE EAST GEOTHERMAL AMBIENT LOOP

SCHEMATIC FLOW DIAGRAM
PHASE 10

PROJECT NO. 266417–277920
FILE NAME: GT–308

SHEET NO.
GT-308

ISSUED FOR NYSERDA DRAFT FINAL REPORT

PUMP SCHEDULE

TAG	SERVICE	LOCATION	TYPE	COUPLING	FLOW (GPM)	HEAD (FT.)	% PG	RPM	ENCL.	HP	V/PH/HZ	CONFIGURATION	MFR	MODEL	NOTES
M-P-1	AMBIENT LOOP CIRCULATION	BUILDING D	IN-LINE CENTRIFUGAL	SPLIT	950	50	25	1084	ODP	20.0	230/3/60	DUTY	ARMSTRONG	DESIGN ENVELOPE 4300	1,2,3
M-P-2	AMBIENT LOOP CIRCULATION	BUILDING D	IN-LINE CENTRIFUGAL	SPLIT	950	50	25	1084	ODP	20.0	230/3/60	STANDBY	ARMSTRONG	DESIGN ENVELOPE 4300	1,2,3
M-BF1-1	BOREFIELD 1	BUILDING D	IN-LINE CENTRIFUGAL	CLOSE	650	35	25	2060	ODP	10.0	230/3/60	DUTY	ARMSTRONG	DESIGN ENVELOPE 4300	1,2,3
M-BF1-2	BOREFIELD 1	BUILDING D	IN-LINE CENTRIFUGAL	CLOSE	650	35	25	1060	ODP	10.0	230/3/60	STANDBY	ARMSTRONG	DESIGN ENVELOPE 4300	1,2,3
M-BF2-1	BOREFIELD 2	BUILDING C	IN-LINE CENTRIFUGAL	CLOSE	390	35	25	3184	ODP	5.0	230/3/60	DUTY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
M-BF2-2	BOREFIELD 2	BUILDING C	IN-LINE CENTRIFUGAL	CLOSE	390	35	25	3184	ODP	5.0	230/3/60	STANDBY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
M-BF3-1	BOREFIELD 3	BUILDING A3	IN-LINE CENTRIFUGAL	CLOSE	700	35	25	1720	ODP	10.0	230/3/60	DUTY	ARMSTRONG	DESIGN ENVELOPE 4300	1,2,3
M-BF3-2	BOREFIELD 3	BUILDING A3	IN-LINE CENTRIFUGAL	CLOSE	700	35	25	1720	ODP	10.0	230/3/60	STANDBY	ARMSTRONG	DESIGN ENVELOPE 4300	1,2,3
M-BF4-1	BOREFIELD 4	BUILDING J	IN-LINE CENTRIFUGAL	CLOSE	650	35	25	1060	ODP	10.0	230/3/60	DUTY	ARMSTRONG	DESIGN ENVELOPE 4300	1,2,3
M-BF4-2	BOREFIELD 4	BUILDING J	IN-LINE CENTRIFUGAL	CLOSE	650	35	25	1060	ODP	10.0	230/3/60	STANDBY	ARMSTRONG	DESIGN ENVELOPE 4300	1,2,3
M-BF5-1	BOREFIELD 5	BUILDING K	IN-LINE CENTRIFUGAL	CLOSE	260	35	25	2739	ODP	5.0	230/3/60	DUTY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
M-BF5-2	BOREFIELD 5	BUILDING K	IN-LINE CENTRIFUGAL	CLOSE	260	35	25	2739	ODP	5.0	230/3/60	STANDBY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
M-BF6-1	BOREFIELD 6	BUILDING K	IN-LINE CENTRIFUGAL	CLOSE	390	35	25	3184	ODP	5.0	230/3/60	DUTY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
M-BF6-2	BOREFIELD 6	BUILDING K	IN-LINE CENTRIFUGAL	CLOSE	390	35	25	3184	ODP	5.0	230/3/60	STANDBY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
M-BF7-1	BOREFIELD 7	BUILDING H	IN-LINE CENTRIFUGAL	CLOSE	260	35	25	2739	ODP	5.0	230/3/60	DUTY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
M-BF7-2	BOREFIELD 7	BUILDING H	IN-LINE CENTRIFUGAL	CLOSE	260	35	25	2739	ODP	5.0	230/3/60	STANDBY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
M-BF8-1	BOREFIELD 8	BUILDING G	IN-LINE CENTRIFUGAL	CLOSE	480	35	25	1681	ODP	7.5	230/3/60	DUTY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
M-BF8-2	BOREFIELD 8	BUILDING G	IN-LINE CENTRIFUGAL	CLOSE	480	35	25	1681	ODP	7.5	230/3/60	STANDBY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
M-BF9-1	BOREFIELD 9	BUILDING F	IN-LINE CENTRIFUGAL	CLOSE	260	35	25	2739	ODP	5.0	230/3/60	DUTY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
M-BF9-2	BOREFIELD 9	BUILDING F	IN-LINE CENTRIFUGAL	CLOSE	260	35	25	2739	ODP	5.0	230/3/60	STANDBY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
BD-SP-1	BUILDING D HTS	BUILDING D	IN-LINE CENTRIFUGAL	SPLIT	700	25	25	1515	ODP	10.0	230/3/60	DUTY	ARMSTRONG	DESIGN ENVELOPE 4300	1,2,3
BD-SP-2	BUILDING D HTS	BUILDING D	IN-LINE CENTRIFUGAL	SPLIT	700	25	25	1515	ODP	10.0	230/3/60	STANDBY	ARMSTRONG	DESIGN ENVELOPE 4300	1,2,3
BC-SP-1	BUILDING C HTS	BUILDING C	IN-LINE CENTRIFUGAL	CLOSE	480	25	25	1168	ODP	5.0	230/3/60	DUTY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
BC-SP-2	BUILDING C HTS	BUILDING C	IN-LINE CENTRIFUGAL	CLOSE	480	25	25	1168	ODP	5.0	230/3/60	STANDBY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
BE-SP-1	BUILDING E HTS	BUILDING E	IN-LINE CENTRIFUGAL	CLOSE	310	25	25	1148	ODP	5.0	230/3/60	DUTY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
BE-SP-2	BUILDING E HTS	BUILDING E	IN-LINE CENTRIFUGAL	CLOSE	310	25	25	1148	ODP	5.0	230/3/60	STANDBY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
BF-SP-1	BUILDING F HTS	BUILDING F	IN-LINE CENTRIFUGAL	TBD	TBD	25	25	TBD	ODP	TBD	230/3/60	DUTY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
BF-SP-2	BUILDING F HTS	BUILDING F	IN-LINE CENTRIFUGAL	TBD	TBD	25	25	TBD	ODP	TBD	230/3/60	STANDBY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
BG-SP-1	BUILDING G HTS	BUILDING G	IN-LINE CENTRIFUGAL	CLOSE	440	25	25	992	ODP	5.0	230/3/60	DUTY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
BG-SP-2	BUILDING G HTS	BUILDING G	IN-LINE CENTRIFUGAL	CLOSE	440	25	25	992	ODP	5.0	230/3/60	STANDBY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
BH-SP-1	BUILDING H HTS	BUILDING H	IN-LINE CENTRIFUGAL	SPLIT	570	25	25	1036	ODP	7.5	230/3/60	DUTY	ARMSTRONG	DESIGN ENVELOPE 4300	1,2,3
BH-SP-2	BUILDING H HTS	BUILDING H	IN-LINE CENTRIFUGAL	SPLIT	570	25	25	1036	ODP	7.5	230/3/60	STANDBY	ARMSTRONG	DESIGN ENVELOPE 4300	1,2,3
BI-SP-1	BUILDING I HTS	BUILDING I	IN-LINE CENTRIFUGAL	CLOSE	260	25	25	2639	TEFC	3.0	230/3/60	DUTY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
BI-SP-2	BUILDING I HTS	BUILDING I	IN-LINE CENTRIFUGAL	CLOSE	260	25	25	2639	TEFC	3.0	230/3/60	STANDBY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
BJ-SP-1	BUILDING J HTS	BUILDING J	IN-LINE CENTRIFUGAL	TBD	TBD	25	25	TBD	TBD	TBD	230/3/60	DUTY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
BJ-SP-2	BUILDING J HTS	BUILDING J	IN-LINE CENTRIFUGAL	TBD	TBD	25	25	TBD	TBD	TBD	230/3/60	STANDBY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
BK-SP-1	BUILDING K HTS	BUILDING K	IN-LINE CENTRIFUGAL	CLOSE	90	25	25	2572	TEFC	1.5	230/3/60	DUTY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
BK-SP-2	BUILDING K HTS	BUILDING K	IN-LINE CENTRIFUGAL	CLOSE	90	25	25	2572	TEFC	1.5	230/3/60	STANDBY	ARMSTRONG	DESIGN ENVELOPE 4380	1,2,3
P-DC-C1	BUILDING C DRY COOLER (LOAD SIDE)	BUILDING C	IN-LINE CENTRIFUGAL	SPLIT	750	25	25	1547	ODP	10.0	230/3/60	DUTY	ARMSTRONG	DESIGN ENVELOPE 4300	1,2,3
P-DC-C2	BUILDING C DRY COOLER (SOURCE SIDE)	BUILDING C	IN-LINE CENTRIFUGAL	SPLIT	750	25	25	1547	ODP	10.0	230/3/60	DUTY	ARMSTRONG	DESIGN ENVELOPE 4300	1,2,3
P-DC-H1	BUILDING H DRY COOLER (LOAD SIDE)	BUILDING H	IN-LINE CENTRIFUGAL	SPLIT	750	25	25	1547	ODP	10.000000	230/3/60	DUTY	ARMSTRONG	DESIGN ENVELOPE 4300	1,2,3
P-DC-H2	BUILDING H DRY COOLER (SOURCE SIDE)	BUILDING H	IN-LINE CENTRIFUGAL	SPLIT	750	25	25	1547	ODP	10.000000	230/3/60	DUTY	ARMSTRONG	DESIGN ENVELOPE 4300	1,2,3

NOTES:

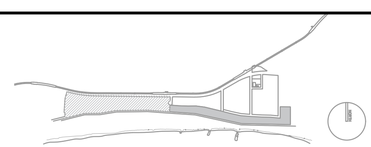
1. INTEGRAL VARIABLE SPEED DRIVE.
2. FURNISH WITH TRIPLE DUTY VALVE AND SUCTION DIFFUSER.
3. PROVIDE INTEGRAL PRESSURE VALVE.

PUMP SCHEDULE - TOWNHOMES AND BUNGALOWS

LOCATION	QTY	TYPE	COUPLING	FLOW (GPM)	HEAD (FT.)	% PG	RPM	ENCL.	HP	V/PH/HZ	CONFIGURATION	MFR	MODEL	NOTES
TOWNHOMES AND BUNGALOWS	370	IN-LINE CENTRIFUGAL	CLOSE	15	25	25	2888	ODP	⅓	208/1/60	DUTY/STANDBY	GRUNDFOS	UPS43-100	1,2,3

NOTES:

1. FURNISH WITH TRIPLE DUTY VALVE AND SUCTION DIFFUSER.
2. PROVIDE INTEGRAL PRESSURE VALVE.



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: J. FRUEHAN
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: -
DATE: MAY 2023

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CDM Smith NY Inc.
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ZBF GEOTHERMAL

ARVERNE EAST GEOTHERMAL AMBIENT LOOP

SCHEDULES I

PROJECT NO. 266417-277920
FILE NAME: GT-400

SHEET NO.
GT-400

ISSUED FOR NYSERDA DRAFT FINAL REPORT

PLATE AND FRAME HEAT EXCHANGER SCHEDULE

TAG	LOCATION	AREA SERVED	TYPE	PLATE MATERIAL	PUMP	CONFIGURATION	GROUND SIDE					LOAD SIDE					DIMENSIONS					WEIGHT (LBS)	MFR	MODEL	NOTES
							GPM	EWT (°F)	LWT (°F)	%PG	PD (PSI)	GPM	EWT (°F)	LWT (°F)	%PG	PD (PSI)	H (IN.)	W (IN.)	FRAME (IN.)	PLATE THICKNESS (IN.)	NO. PLATES				
BC–HX–1,2	BUILDING C	BUILDING C	PLATE & FRAME	ALLOY 304	P–C–1,2	DUTY/STANDBY	480	100	90	25	9.8	480	87	97	25	8.8	76	19	57	0.0157	161	2318	ALFA LAVAL	AQ4L–FG	–
BD–HX–1,2	BUILDING D	BUILDING D	PLATE & FRAME	ALLOY 304	P–D–1,2	DUTY/STANDBY	700	100	90	25	9.8	700	87	97	25	8.8	73	26	62	0.0157	209	3756	ALFA LAVAL	AQ6T–BFG	–
BE–HX–1,2	BUILDING E	BUILDING E	PLATE & FRAME	ALLOY 304	P–E–1,2	DUTY/STANDBY	310	100	90	25	9.8	310	87	97	25	9.9	76	19	45	0.0157	113	1989	ALFA LAVAL	AQ4L–FG	–
BF–HX–1,2	BUILDING F	BUILDING F	PLATE & FRAME	ALLOY 304	P–F–1,2	DUTY/STANDBY	TBD	100	90	25	9.8	TBD	87	97	25	TBD	TBD	TBD	TBD	TBD	TBD	TBD	ALFA LAVAL	TBD	–
BG–HX–1,2	BUILDING G	BUILDING G	PLATE & FRAME	ALLOY 304	P–G–1,2	DUTY/STANDBY	440	100	90	25	9.8	440	87	97	25	10.0	76	19	57	0.0157	161	2318	ALFA LAVAL	AQ4L–FG	–
BH–HX–1,2	BUILDING H	BUILDING H	PLATE & FRAME	ALLOY 304	P–H–1,2	DUTY/STANDBY	570	100	90	25	9.8	570	87	97	25	9.8	76	19	69	0.0157	213	2670	ALFA LAVAL	AQ4L–FG	–
BI–HX–1,2	BUILDING I	BUILDING I	PLATE & FRAME	ALLOY 304	P–I–1,2	DUTY/STANDBY	260	100	90	25	9.8	260	87	97	25	9.9	76	19	45	0.0157	95	1881	ALFA LAVAL	AQ4L–FG	–
BJ–HX–1,2	BUILDING J	BUILDING J	PLATE & FRAME	ALLOY 304	P–J–1,2	DUTY/STANDBY	TBD	100	90	25	9.8	TBD	87	97	25	TBD	TBD	TBD	TBD	TBD	TBD	TBD	ALFA LAVAL	TBD	–
BK–HX–1,2	BUILDING K	BUILDING K	PLATE & FRAME	ALLOY 304	P–K–1,2	DUTY/STANDBY	90	100	90	25	9.5	90	87	97	25	9.5	52	13	32	0.0157	60	664	ALFA LAVAL	AQ2L–FG	–
DC–HX–1	BUILDING C	DRY COOLER 1	PLATE & FRAME	ALLOY 304	P–DC1–1,2	DUTY	750	100	90	25	9.8	750	87	97	25	9.8	62	26	62	0.0157	225	3901	ALFA LAVAL	AQ6T–BFG	–
DC–HX–2	BUILDING C	DRY COOLER 1	PLATE & FRAME	ALLOY 304	P–DC2–1,2	DUTY	750	100	90	25	9.8	750	87	97	25	9.8	62	26	62	0.0157	225	3901	ALFA LAVAL	AQ6T–BFG	–

NOTES:

1. SEE SPECIFICATION SECTION 235700

BRAZED PLATE HEAT EXCHANGER SCHEDULE

LOCATION	TYPE	QTY.	PLATE MATERIAL	CONFIGURATION	GROUND SIDE					LOAD SIDE					DIMENSIONS					WEIGHT (LBS)	MFR	MODEL	NOTES
					GPM	EWT (°F)	LWT (°F)	%PG	PD (PSI)	GPM	EWT (°F)	LWT (°F)	%PG	PD (PSI)	H (IN.)	W (IN.)	FRAME (IN.)	PLATE THICKNESS (IN.)	NO. PLATES				
TOWNHOMES AND BUNGALOWS	BRAZED PLATE	185	ALLOY 316	DUTY	15	100	90	25	9.8	480	87	97	25	8.8	8.2	2.9	2.1	0.0157	13	2.4	ALFA LAVAL	CB16–13H	–

NOTES:

1. SEE SPECIFICATION SECTION 235700

AMBIENT LOOP CONNECTION SCHEDULE

TAG	CONNECTION	FLOW (GPM)	CONN. SIZE	CONN. QTY.	DETAIL	PHASE
(1)	BUILDING D	700	8"ø	1	D	3
(2)	DRY COOLER – D	750	8"ø	1	D	4
(3)	BUILDING C	480	6"ø	1	D	4
(4)	BUILDING E	310	6"ø	1	D	4
(5)	BUILDING K	90	3"ø	1	D	4
(6)	BUILDING J	TBD	TBD	1	D	5
(7)	TH2 – 1	270	4"	18	H	5
(8)	TH3 – 1	195	4"	13	H	5
(9)	TH3 – 2	270	4"	18	H	5
(10)	B3 – 1	150	4"	10	H	5
(11)	B3 – 2	45	4"	3	H	5
(12)	B2 – 1	135	4"	16	H	5
(13)	B2 – 2	35	4"	4	H	5
(14)	B2 – 3	60	4"	4	H	5
(15)	BUILDING I	260	4"	1	D	6
(16)	BUILDING G	440	6"	1	D	6
(17)	DRY COOLER – H	750	8"	1	D	7
(18)	BUILDING H	570	6"	1	D	7
(19)	B1 – 1	120	4"	8	H	8
(20)	TH1 – 1	105	4"	7	H	8
(21)	B1 – 2	120	4"	8	H	8
(22)	B1 – 3	120	4"	8	H	8
(23)	TH1 – 2	135	4"	9	H	8
(24)	B1 – 4	120	4"	8	H	8
(25)	B1 – 5	120	4"	8	H	8
(26)	TH1 – 3	105	4"	7	H	8
(27)	B1 – 6	120	4"	8	H	8
(28)	B1 – 7	120	4"	8	H	8
(29)	TH1 – 4	105	4"	7	H	8
(30)	TH1 – 5	135	4"	9	H	8
(31)	TH1 – 6	105	4"	7	H	8

NOTES:

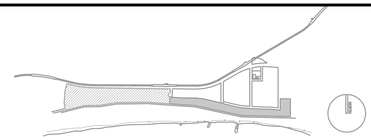
1. SEE SHEET GT–200 FOR DETAILS

BOREFIELD SCHEDULE

TAG	BOREFIELD	BOREHOLE COUNT	FLOW (GPM)	CIRCUIT COUNT	BOREHOLE SPACING (FT.)	PHASE	NOTES
BF1	BF1	100	650	10	20	3	
BF2	BF2	60	390	6	20	4	
BF3	BF3	100	700	10	30	3	
BF4	BF4	TBD	TBD	TBD	TBD	5	1
BF5	BF5	58	260	6	25	4	
BF6	BF6	50	390	5	25	7	
BF7	BF7	40	260	4	20	7	
BF8	BF8	75	480	8	20	6	
BF9	BF9	TBD	TBD	TBD	TBD	9	1

NOTES:

1. BOREFIELD SIZING TO OCCUR UPON REFINEMENT OF BUILDING DESIGN. CONNECTION TO AMBIENT LOOP IS OPTIONAL.



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: J. FRUEHAN
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: –
DATE: MAY 2023

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Tel: (212) 785-9123

ZBF GEOTHERMAL

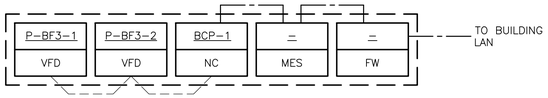
ARVERNE EAST GEOTHERMAL AMBIENT LOOP

SCHEDULES II

PROJECT NO. 266417–277920
FILE NAME: GT–401

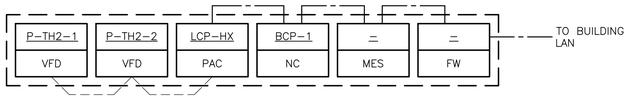
SHEET NO.
GT-401

ISSUED FOR NYSERDA DRAFT FINAL REPORT



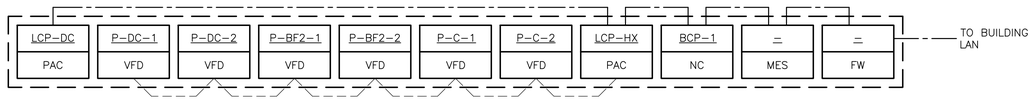
CONNECTION A

DETAIL A – NTS



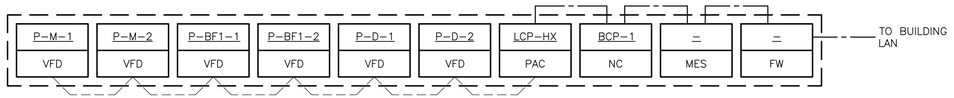
CONNECTION B

DETAIL B – NTS



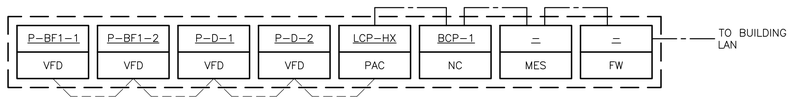
CONNECTION C

DETAIL C – NTS



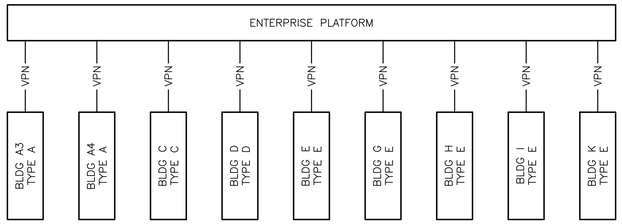
CONNECTION D

DETAIL D – NTS



CONNECTION E

DETAIL E – NTS



NETWORK DIAGRAM

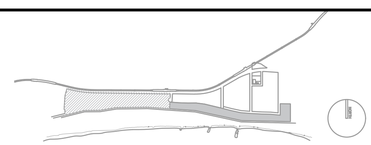
DETAIL F – NTS

LEGEND

ASC APPLICATION SPECIFIC CONTROLLER
BCP BUILDING CONTROL PANEL
FC FIBER CONVERTER
FW FIRE WALL
MC MANUFACTURER CONTROLLER
MES MANAGED ETHERNET SWITCH
LAN LOCAL AREA NETWORK
LCP LOCAL CONTROL PANEL
NC NETWORK CONTROLLER
PAC PROGRAMMABLE APPLICATION CONTROLLER
PP PATCH PANEL
VFD VARIABLE FREQUENCY DRIVE
VFD VARIABLE SPEED DRIVE

CABLE LEGEND

SHIELDED TWISTED PAIR
ETHERNET
FIBER OPTIC



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: –
DATE: MAY 2023

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ZBF GEOTHERMAL

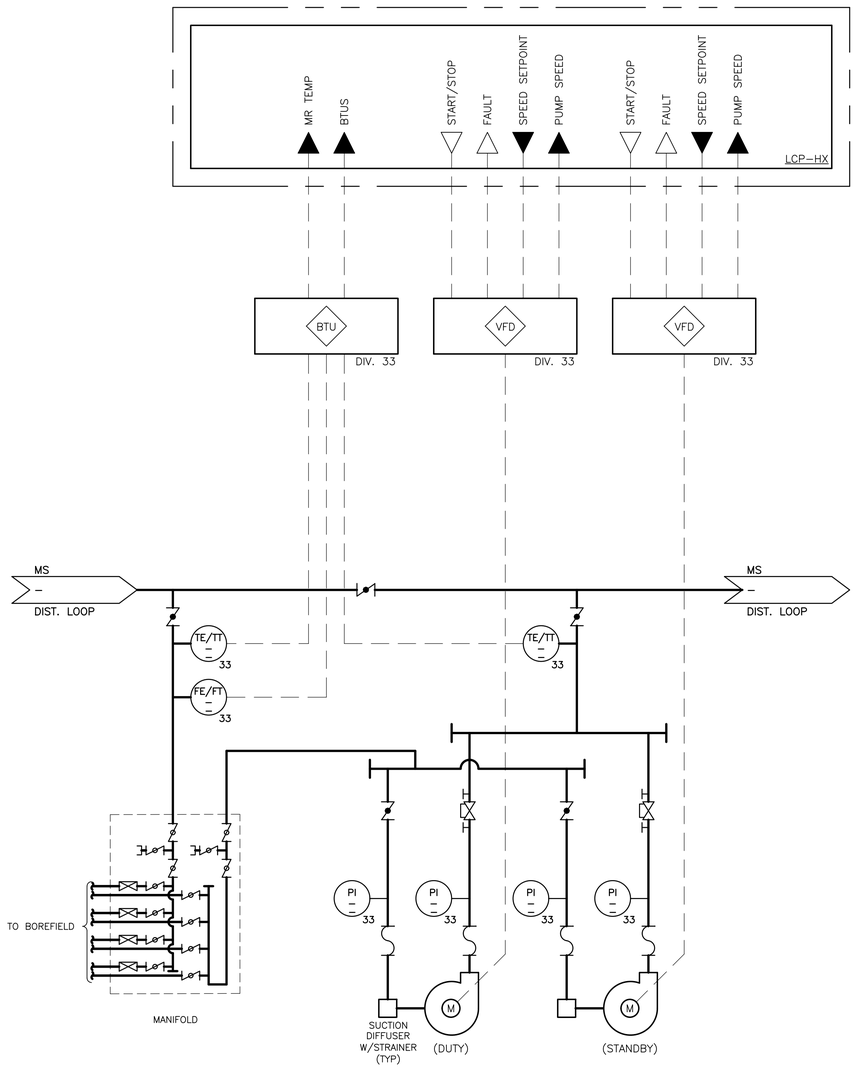
ARVERNE EAST GEOTHERMAL AMBIENT LOOP

NETWORK DIAGRAM

PROJECT NO. 266417-277920
FILE NAME: GT-800

SHEET NO.
GT-800

ISSUED FOR NYSERDA DRAFT FINAL REPORT



BOREFIELD PUMP

DIAGRAM 1

NTS

SEQUENCE OF OPERATION

LEAD SELECTION
THE DUTY PUMP WILL BE STARTED AND STOPPED BY THE BMS. THE BMS SHALL ALTERNATE DUTY AND STANDBY PUMPS WEEKLY.

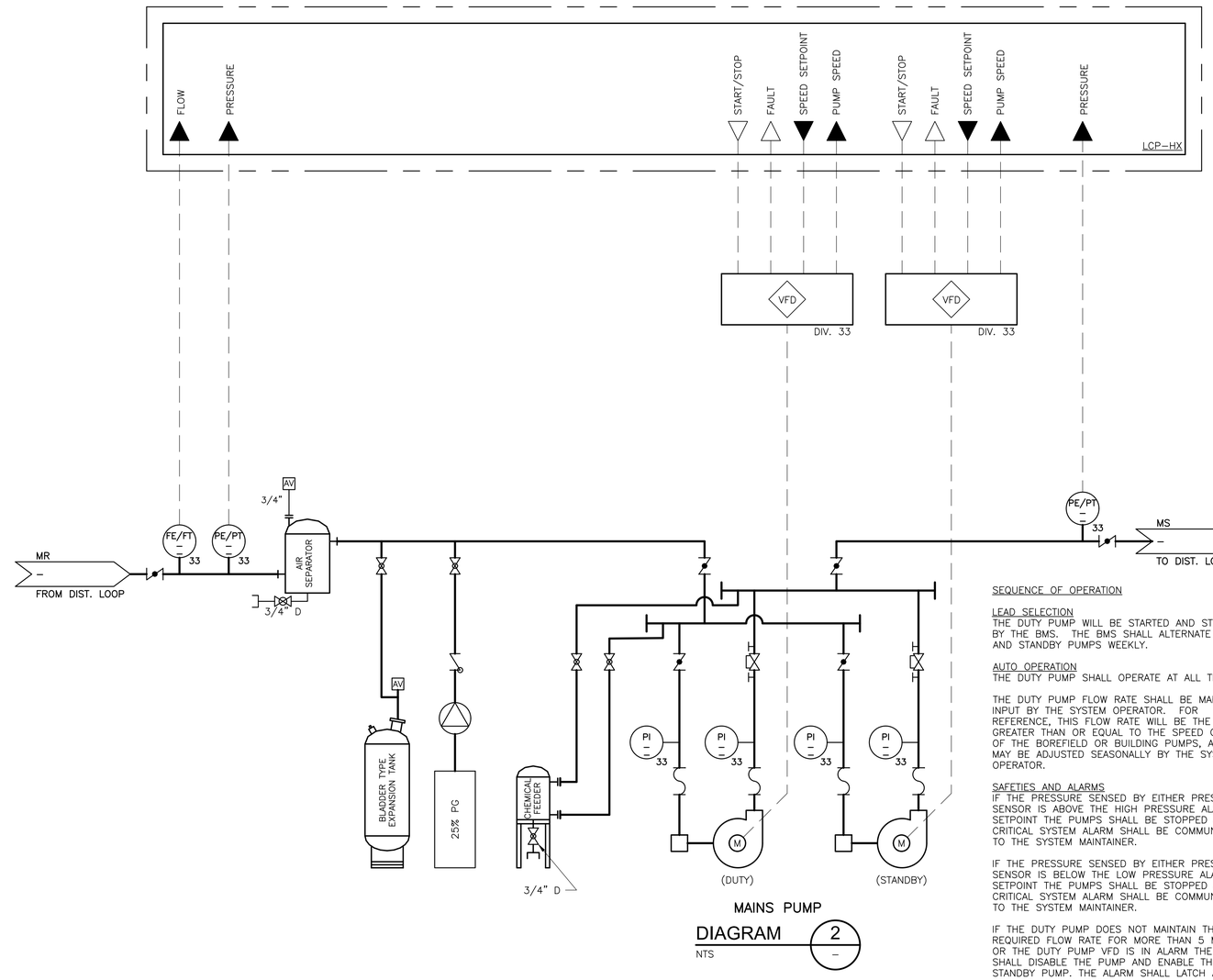
AUTO OPERATION
THE DUTY PUMP SHALL OPERATE AT ALL TIMES.

THE DUTY PUMP SPEED SHALL BE DETERMINED BASED ON THE MAINS SUPPLY TEMPERATURE ENTERING THE BOREFIELD AS SCHEDULED BELOW:

EWT (°F)	SPEED
>85	100%
80–85	90%
75–80	80%
70–75	70%
65–70	60%
60–65	50%
55–60	60%
50–55	70%
45–50	80%
40–45	90%
<40	100%

SAFETIES AND ALARMS
IF THE DUTY PUMP DOES NOT MAINTAIN THE REQUIRED FLOW RATE FOR MORE THAN 5 MINUTES OR THE DUTY PUMP VFD IS IN ALARM THE BMS SHALL DISABLE THE PUMP AND ENABLE THE STANDBY PUMP. THE ALARM SHALL LATCH AND REQUIRE MANUAL RESET.

IF BOTH SYSTEM PUMP VFDS ARE IN ALARM A CRITICAL SYSTEM ALARM SHALL BE COMMUNICATED TO THE SYSTEM MAINTAINER.



MAINS PUMP

DIAGRAM 2

NTS

SEQUENCE OF OPERATION

LEAD SELECTION
THE DUTY PUMP WILL BE STARTED AND STOPPED BY THE BMS. THE BMS SHALL ALTERNATE DUTY AND STANDBY PUMPS WEEKLY.

AUTO OPERATION
THE DUTY PUMP SHALL OPERATE AT ALL TIMES.

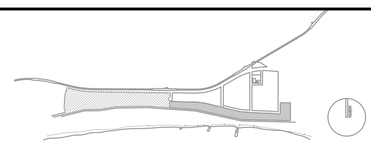
THE DUTY PUMP FLOW RATE SHALL BE MANUALLY INPUT BY THE SYSTEM OPERATOR. FOR REFERENCE, THIS FLOW RATE WILL BE THE GREATER THAN OR EQUAL TO THE SPEED OF ANY OF THE BOREFIELD OR BUILDING PUMPS, AND MAY BE ADJUSTED SEASONALLY BY THE SYSTEM OPERATOR.

SAFETIES AND ALARMS
IF THE PRESSURE SENSED BY EITHER PRESSURE SENSOR IS ABOVE THE HIGH PRESSURE ALARM SETPOINT THE PUMPS SHALL BE STOPPED AND A CRITICAL SYSTEM ALARM SHALL BE COMMUNICATED TO THE SYSTEM MAINTAINER.

IF THE PRESSURE SENSED BY EITHER PRESSURE SENSOR IS BELOW THE LOW PRESSURE ALARM SETPOINT THE PUMPS SHALL BE STOPPED AND A CRITICAL SYSTEM ALARM SHALL BE COMMUNICATED TO THE SYSTEM MAINTAINER.

IF THE DUTY PUMP DOES NOT MAINTAIN THE REQUIRED FLOW RATE FOR MORE THAN 5 MINUTES OR THE DUTY PUMP VFD IS IN ALARM THE BMS SHALL DISABLE THE PUMP AND ENABLE THE STANDBY PUMP. THE ALARM SHALL LATCH AND REQUIRE MANUAL RESET.

IF BOTH SYSTEM PUMP VFDS ARE IN ALARM A CRITICAL SYSTEM ALARM SHALL BE COMMUNICATED TO THE SYSTEM MAINTAINER.



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
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APPROVED BY: –
DATE: MAY 2023

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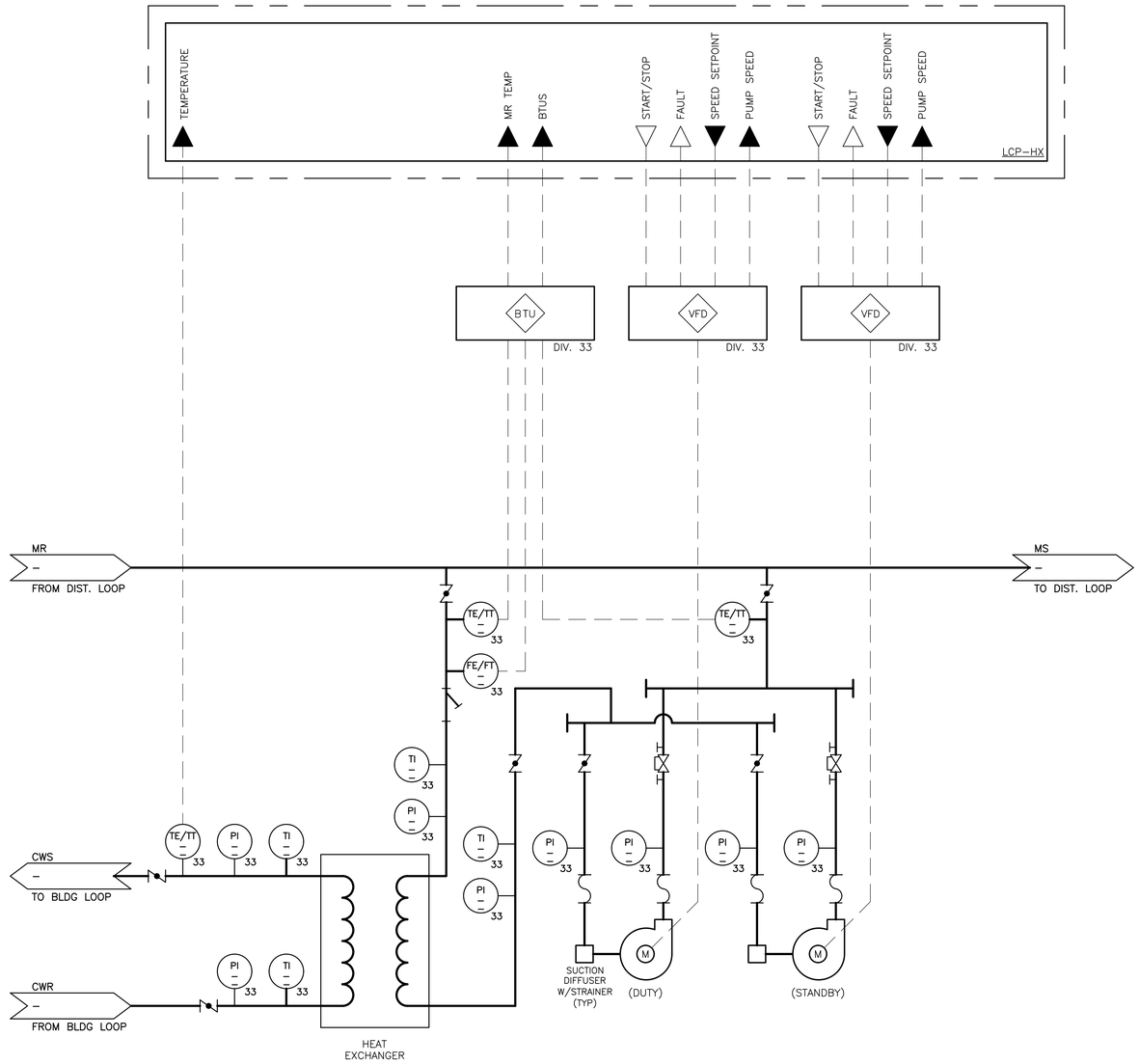
ZBF GEOTHERMAL

ARVERNE EAST GEOTHERMAL AMBIENT LOOP

CONTROL DIAGRAMS I

PROJECT NO. 266417–277920
FILE NAME: GT–801.DWG
SHEET NO.
GT-801

ISSUED FOR NYSERDA DRAFT FINAL REPORT



SERVICE PUMP DIAGRAM 1

1/4" = 1'–0"

SEQUENCE OF OPERATION

LEAD SELECTION
THE DUTY PUMP WILL BE STARTED AND STOPPED BY THE BMS. THE BMS SHALL ALTERNATE DUTY AND STANDBY PUMPS WEEKLY.

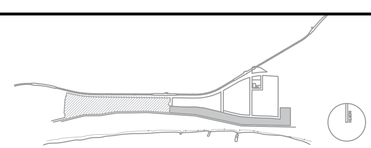
AUTO OPERATION
THE DUTY PUMP SHALL OPERATE AT ALL TIMES.

THE DUTY PUMP SPEED SHALL BE DETERMINED BASED ON THE CONDENSER WATER SUPPLY TEMPERATURE TO THE BUILDING AS SCHEDULED BELOW:

EWT (°F)	SPEED
>85	100%
80–85	90%
75–80	80%
70–75	70%
65–70	60%
60–65	50%
55–60	60%
50–55	70%
45–50	80%
40–45	90%
<40	100%

SAFETIES AND ALARMS
IF THE DUTY PUMP DOES NOT MAINTAIN THE REQUIRED FLOW RATE FOR MORE THAN 5 MINUTES OR THE DUTY PUMP VFD IS IN ALARM THE BMS SHALL DISABLE THE PUMP AND ENABLE THE STANDBY PUMP. THE ALARM SHALL LATCH AND REQUIRE MANUAL RESET.

IF BOTH SYSTEM PUMP VFDS ARE IN ALARM A CRITICAL SYSTEM ALARM SHALL BE COMMUNICATED TO THE SYSTEM MAINTAINER.



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

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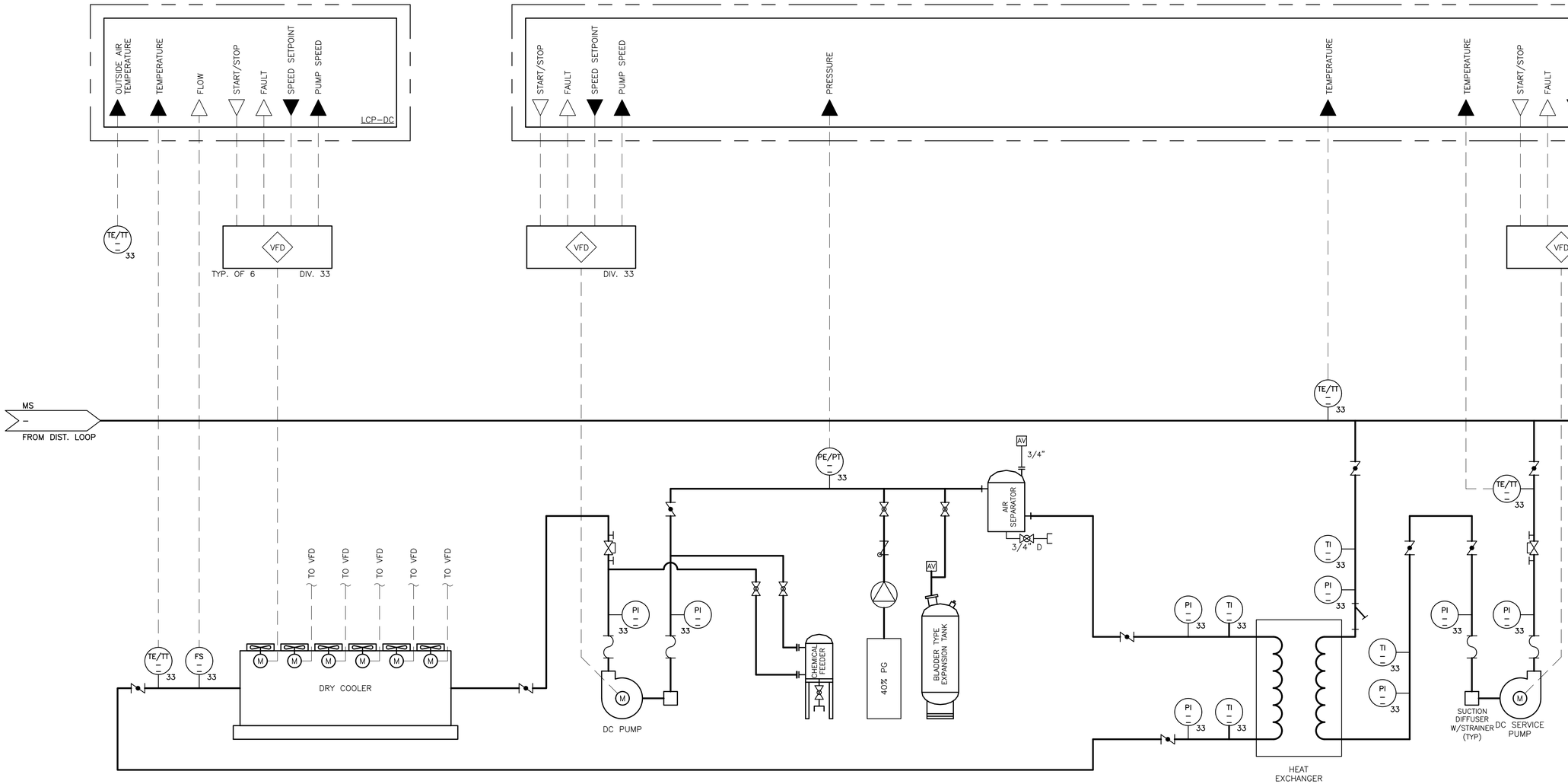
ZBF GEOTHERMAL

ARVERNE EAST GEOTHERMAL AMBIENT LOOP

CONTROLS DIAGRAMS II

PROJECT NO. 266417–277920
FILE NAME: GT–802.DWG
SHEET NO.
GT-802

ISSUED FOR NYSERDA DRAFT FINAL REPORT



SEQUENCE OF OPERATION

DRY COOLER SYSTEM
THE DRY COOLER SYSTEM IS ENABLED WHEN THE FOLLOWING CONDITIONS ARE PRESET:
- OUTSIDE AIR TEMPERATURE IS MORE THAN 20°F BELOW HX EWT.
- MAINS TEMPERATURE IS ABOVE 40°F.
- DRY COOLER BTU METER HAS LOGGED THE DRY COOLER HAS REJECTED LESS THAN 2500 MMBTUS (ADJ.) IN THE CURRENT YEAR.

PUMP OPERATION
THE DRY COOLER PUMPS START WHEN THE DRY COOLER SYSTEM IS ENABLED AND STOP WHEN DRY COOLER SYSTEM IS DISABLED.

THE DRY COOLER SERVICE PUMP FLOW RATE SHALL BE MANUALLY INPUT BY THE SYSTEM OPERATOR. FOR REFERENCE, THIS FLOW RATE WILL BE AS REQUIRED FOR A 10°F TEMPERATURE CHANGE IN THE FLUID WHEN THE DRY COOLER HAS AN APPROACH TEMPERATURE OF 15°F.

THE DRY COOLER PUMP FLOW RATE SHALL MATCH THE DRY COOLER SERVICE PUMP SPEED.

DRY COOLER VENDOR CONTROLS
THE DRY COOLER VENDOR CONTROLS ARE ENABLED WHEN THE DRY COOLER SYSTEM IS ENABLED AND DISABLED WHEN THE DRY COOLER SYSTEM IS DISABLED.

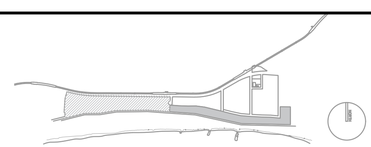
DRY COOLER VENDOR CONTROLS SHALL START FANS WHEN FLOW IS SENSED BY THE FLOW SWITCH.
DRY COOLER VENDOR CONTROLS SHALL MODULATE FAN SPEEDS TO MAINTAIN LWT AT 10°F GREATER THAN OUTSIDE AIR TEMPERATURE.

SAFETIES AND ALARMS
IF THE PRESSURE SENSED BY THE PRESSURE SENSOR IS ABOVE THE HIGH PRESSURE ALARM SETPOINT THE PUMPS SHALL BE STOPPED AND A CRITICAL SYSTEM ALARM SHALL BE COMMUNICATED TO THE SYSTEM MAINTAINER.

IF THE PRESSURE SENSED BY THE PRESSURE SENSOR IS BELOW THE LOW PRESSURE ALARM SETPOINT THE PUMPS SHALL BE STOPPED AND A CRITICAL SYSTEM ALARM SHALL BE COMMUNICATED TO THE SYSTEM MAINTAINER.

IF THE DRY COOLER IS ENABLED AND THE DIFFERENTEIAL TEMPERATURE BETWEEN THE MAINS AND THE DC SERVICE PUMP DISCHARGE TEMPERATURE IS NOT MORE THAN 5°F A CRITICAL SYSTEM ALARM SHALL BE COMMUNICATED TO THE SYSTEM MAINTAINER.

IF ANY PUMP OR FAN VFD IS IN ALARM A CRITICAL SYSTEM ALARM SHALL BE COMMUNICATED TO THE SYSTEM MAINTAINER.



KEY PLAN

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: S. GERBER
DRAWN BY: S. GERBER
SHEET CHK'D BY: D. FLAHERTY
CROSS CHK'D BY: D. OROURKE
APPROVED BY: M. GOSS
DATE: MAY 2023

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ZBF GEOTHERMAL

ARVERNE EAST GEOTHERMAL AMBIENT LOOP

CONTROLS DIAGRAMS III

PROJECT NO. 266417-277920
FILE NAME: GT-803.DWG
SHEET NO.
GT-803

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