

Permit No: 57-11860

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
IN-OFFICE REVIEW/BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 57-11860

Exam
07/17/2019

Date:

1. Does this qualify for an in-office field exam (IDAPA 035.02.r)? Y X N
- a. Irrigation of 5 acres or less
 - b. Storage of up to 14.6 AF for stockwater purposes only
 - c. Any use other than irrigation or storage, if the combined diversion rate is 0.24 cfs or less
 - d. Other < >

2. Current Owner: Mollie L Hoagland and Steve Hoagland
8532 Birmingham Rd
Melba, ID 83641

Owner of Record Correct? X Y N

Address of Record Correct? X Y N

3. Fees have been paid: X Y N Receipt No: C102779 (\$50.00)

4. **SOURCE**

TRIBUTARY

GROUNDWATER

NONE

Method of Determination: Visual Inspection during field exam site visit

Change in Source: Y X N

B. OVERLAP REVIEW

1. Other water rights with the same place of use: NONE

Water Right No.	Source	Purpose of Use	Basis

Comments: N/A

2. Other water rights with the same point of diversion: NONE

Water Right No.	Source	Purpose of Use	Basis

Comments: N/A

C. DIVERSION AND DELIVERY SYSTEM

1. **LOCATION OF POINT(S) OF DIVERSION:**

Source	Gov t. Lot	¼	¼	¼	Sec.	Twp	Rge		County
GROUNDWATER	L3		NW	SW	8	01N	03W	B.M.	OWYHEE

Method of Determination: The point of diversion (POD) was determined by aerial photography and a review of the existing spatial data point. Groundwater source was confirmed during on-site field exam.

Change in POD? Y X N Amendment Required? Y X N

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2. **PLACE OF USE:** Use: DOMESTIC

TWP	RGE	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
01N	03W	8										X							
		Lot #										L 3							

PLACE OF USE: Use: HEATING

TWP	RGE	Sec	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
01N	03W	8										X							
		Lot #										L 3							

Method of Determination: The shop and house (as one building) are visible in aerial photography. Visual inspection also confirmed POU during on-site field exam.

Change in POU? ____Y ____X ____N Amendment Required? ____Y ____X ____N

3. X Delivery System Diagram Attached (required). Indicate all major components and distances between components. Indicate weir size/pipe as applicable.

 X Aerial Photo Attached (required for irrigation of 10+ acres).

 X Photo of Diversion and System Attached

4. Well or Diversion Identification No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size
D0071721	unknown	1.0	unknown	unknown	unknown

*Code to correspond with No. on map and aerial photo

D. FLOW MEASUREMENTS

1. Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date

2. Measurements: Theoretical calculation utilized to determine flow rate.

E. FLOW CALCULATIONS

 X Additional Computation Sheets Attached

Measured Method: Theoretical Calculation determined using Theoretical Horsepower Equation Worksheet on excel (cjh 1/92); worksheet attached. The pump for this system is one (1) - 1.0 hp pump (indicated in the original application for permit and was confirmed by the permit holder during the field exam). A static water level of 5 feet below ground surface (bgs) was listed on the well driller's report (Well Tag No D0071721) and is used for all theoretical calculations. Pumping water level was calculated

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using the Theoretical Dynamic Pumping Level Diagram for Wells (8/95) rdh. The calculation sheet states that if static water level is known on a small system (using 5 feet for static) up to a 10 hp system, then 10 feet below static is used. Scenarios were calculated with a 15 feet pumping water level (10 feet below static) and a 25 feet pumping water level (20 feet below static). The permit holder stated that the system is set at 40 psi and sometimes 50 psi when it is excessively cold outside. Scenarios were calculated using both pressures to determine system capacity. The system capacity was calculated at 0.05 cfs or approximately 21 to 24 gpm (see attached sheet for calculation specifics).

Calculation = 0.05 cfs

Permit allowed = 0.05 cfs

License recommended for 0.05 cfs.

F. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation: N/A

$V = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) = \underline{\hspace{2cm}}$
I.R.

$V = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation season}) \times 1.9835 = \underline{\hspace{2cm}}$
D.R.

$V = \text{Smaller of } \begin{matrix} V \\ \text{I.R.} \end{matrix} \text{ and } \begin{matrix} V \\ \text{D.R.} \end{matrix} = \underline{\hspace{2cm}}$

2. Volume Calculations for Other Uses: Heating: Volume=13.8 AF

Heating use volume determined theoretically utilizing the Heating, and Cooling Energy Estimator (spreadsheet attached). Heating use is for a 750 square foot home and a 2250 square foot shop (3000 square feet total).

Domestic: Volume= 0.6 AF

Domestic Use volume determined using IDWR Processing Memo #22 for one single household, without irrigation included (per condition of original permit).

G. PURPOSE OF USE

Irrigation Y X N # Stock Domestic # of Homes 1 (ONE)

Other: HEATING

Change in Purpose of Use? Y X N

Method of Determination: Visual Inspection of building and heating system.

If Yes: From Use To Use Amount CFS AFA

H. NARRATIVE/REMARKS/COMMENTS

Heating and domestic use is for one (1) 750 square foot home and one (1) 2250 square foot shop. Water delivery system consists of one POD, a ground water well that according the well driller's report was constructed to 644 feet below ground surface, with a 5 foot static water level. At the time of construction the well driller performed well testing with a resulting water temperature of 92 to 93 degrees Fahrenheit. Water is pumped from the well (1.0 hp pump) into a ¾ inch water line that is connected to an open direct radiant heating flooring system (Radiantec). The heating flooring system has (8) eight (1/2) half inch tubing lines that run water through the floor of the shop, and (3) three (1/2) half inch tubing lines that run water through the flooring of the house (schematic diagram attached). The water line is also hooked up to and feeds water into a water heater that is set up for domestic purposes (showers, etc.).

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All lines exit water through tubing that is diverted to the river near the house (see photos). Cooling is not utilized with this system. The home is cooled with an electric air conditioning unit. The well also provides water to (2) spigots (see photos).

Target temperature in shop based on initial design was 65 °F with a target source temperature of 130 °F. Actual source temperature is approximately 90 to 95 °F. This allows shop temperature to be 50 to 55°F when utilizing the heating system.

On 10/17/2019 I called and spoke to Radiantec (heating system manufacturer) to determine if a minimum temperature was needed for system operation. Radiantec informed me that for the most part, any temperature can be used in the system, it just means that the pump will be running longer to provide the heat needed. The system can operate on the actual supply temperature (90 to 95°F), it just means that instead of the 65°F design estimate, the actual temperature is lower (50 to 55°F).

Conditions:

It was found that the project was being operated in compliance with the conditions of the permit.

Condition #1 (proof due date) and Condition #2 (Subject to all prior water rights) will be removed at licensing

Condition # 3 (046) Right holder shall comply with the drilling permit requirements of Idaho Code § 42-235 and applicable Well Construction Rules of the Department. This condition will be removed at licensing.

Condition # 4 (WB5) Domestic use is for 1 homes and does not include lawn, garden, landscape, or other types of irrigation. This condition will be carried over to licensing

Condition # 5 (X10) Low temperature geothermal water diverted under this right shall not be used for domestic purposes unless it is first used for heating purposes. This condition will be carried over to licensing.

Have conditions of permit approval been met? ☒ Yes ☐ No

I. RECOMMENDATIONS

1. Recommended Amounts

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>DIVERSION RATE</u>	<u>ANNUAL VOLUME</u>
HEATING	01/01 TO 12/31	0.03 CFS	13.8 AF
DOMESTIC	01/01 TO 12/31	0.02 CFS	0.6 AF
	<u>Totals:</u>	0.05 CFS	14.4 AF

2. Recommended Amendments

☐ Change P.D. as reflected above ☐ Add P.D. as reflected above ☒ None

☐ Change P.U. as reflected above ☐ Add P.U. as reflected above ☒ None

Other: NONE

J. AUTHENTICATION

Permit No: 57-11860

Field Examiner's Name

Date

2/2/2021

Ashley Ritter

Reviewer

Date

11/26/25

P. B. Munn

State of Idaho
Department of Water Resources
Attachment to Field Exam
57-11860

This map depicts the HEATING and DOMESTIC place of use boundary for this water right at the time of this approval and is attached to the approval document solely for illustrative purposes.

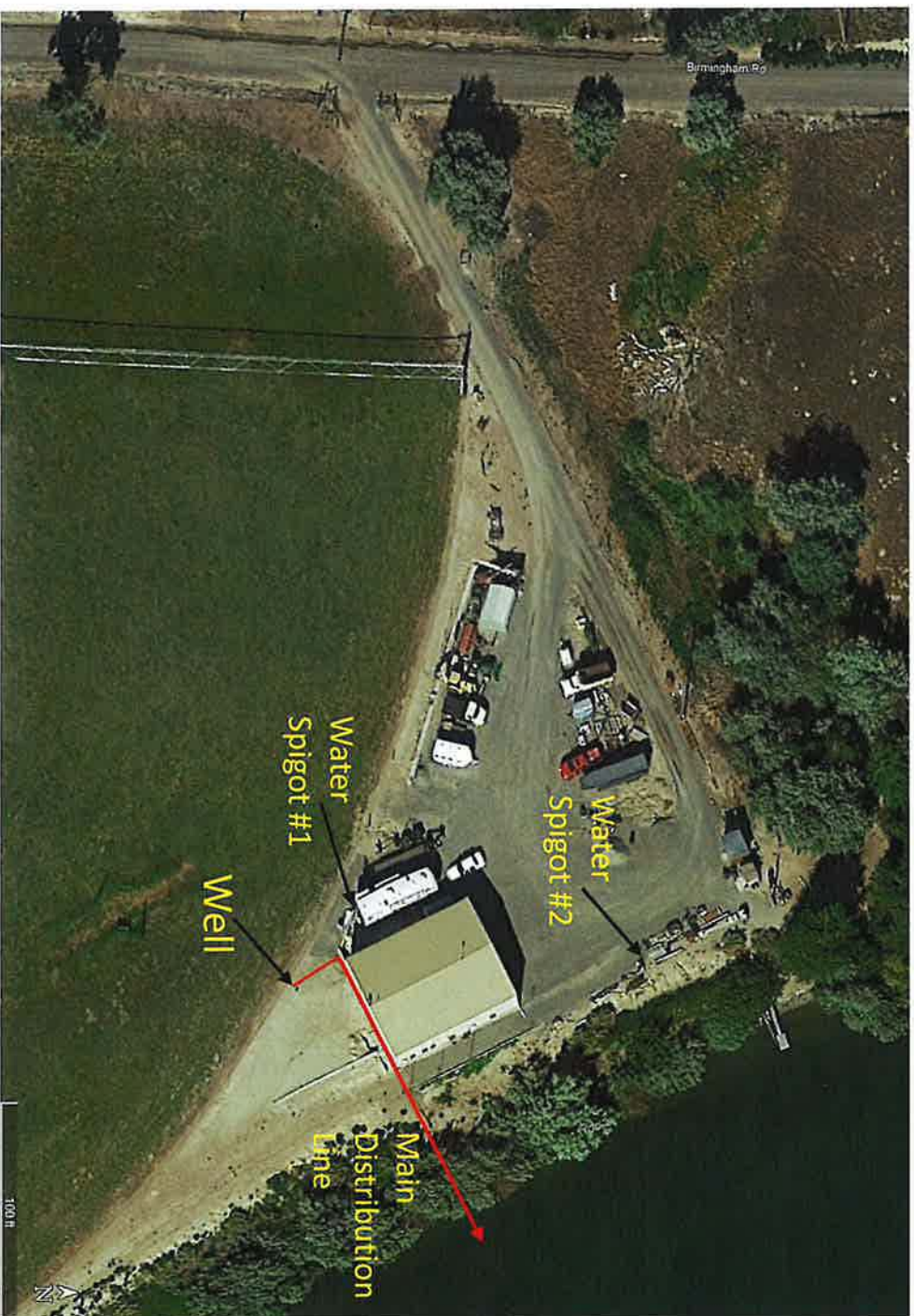
03W



-  Point of Diversion
-  Place Of Use Boundary
-  Townships
-  PLS Sections
-  Quarter Quarters

0 62.5 125 250 Feet





System Diagram

THEORETICAL HORSEPOWER EQUATION WORKSHEET (ch 1/32)

Water Right No.: 57-11860
 Reviewer: Ashby Rimer
 Date of Review: 2/3/2020

P/D No.:

PUMP HORSEPOWER
 BOOSTER HORSEPOWER

PUMPING LEVEL
 STATIC WATER LEVEL
 DISCHARGE PRESSURE
 Well Depth
 RATE OF FLOW (cfs)

Scenario 1	Scenario 2	Scenario 3	Scenario 4
Well #1	Well #1	Well #1	Well #1
1	1	1	1
0	0	0	0
15	15	25	25
5	5	5	5
40	50	40	50
644	644	644	644
0.06	0.05	0.05	0.04
26	21	24	20

The above calculates the formula =

$$Q = \frac{8.8 * (\text{Efficiency}) * \text{hp}}{\text{depth to water} + 2.31 * \text{psi} + \text{friction}}$$

Assumptions: 70 efficiency.
 No Friction

Examiners Notes:

The pump for this system is one (1) - 1.0 hp pump (indicated in the original application for permit and was confirmed by the permit holder during the field exam). A static water level of 5 feet was listed on the well driller's report (Well Tag No D0071721) and is used for all theoretical calculations above. Pumping water level was calculated using the Theoretical Dynamic Pumping Level Diagram for Wells (8/95)rdh. The calculation sheet states that if static water level is known on a small system (using 5 feet for static) up to a 10 hp system, then 10 feet below static is used. Scenarios were calculated with a 15 feet pumping water level (10 feet below static) and a 25 feet pumping water level (20 feet below static). The permit holder stated that the system is set at 40 psi and sometimes 50 psi when it is excessively cold outside. Scenarios were calculated using both pressures to determine system capacity. Based on scenario 2 and 3, (Scenario 1 and 4 represent the most conservative and aggressive estimates, respectively) the system capacity is 0.05 cfs or approximately 21 to 24 gpm.

Heating, and Cooling Energy Estimator*

Heating Estimator

50 X 60 FloorArea 3000 ft²
 HeatLoss kBtu/h
 40 X 3 HeatSqFt 120 kBtu/h-ft² →
 HeatReqd 360.0 kBtu/h
 HeatHours 1000 Hours/year

Read Me

GPMpTonH 2.5 Gal/min
 GPMpTonC 2.5 Gal/min
 Heating 4500000 Gal/year
 Cooling 0 Gal/year
 Total 4500000 Gal/year
 601604 Cu.Ft./year
 13.811 AcreFt/year

2.5 gpm/ton is optimal for open loops

Heating AF = 13.81

HeatHours Estimates			
Region		Low	High
South	House	600	800
	School	200	400
	Office	200	700
Mid-USA	House	800	1000
	School	300	500
	Office	700	900
North	House	1000	1500
	School	500	600
	Office	900	1100

HeatSqFt Estimates (kBtu/h per 1000 ft ² of Floor Area)					
Region		Poor Quality	Std. Quality	Hi. Quality	Super Eff.
South	House	30	20	15	10
	School	30	22	15	10
	Office	22	18	14	11
Mid-USA	House	40	32	25	16
	School	35	27	20	13
	Office	25	22	15	12
North	House	50	40	30	20
	School	40	30	25	15
	Office	30	24	18	13

Cooling Estimator

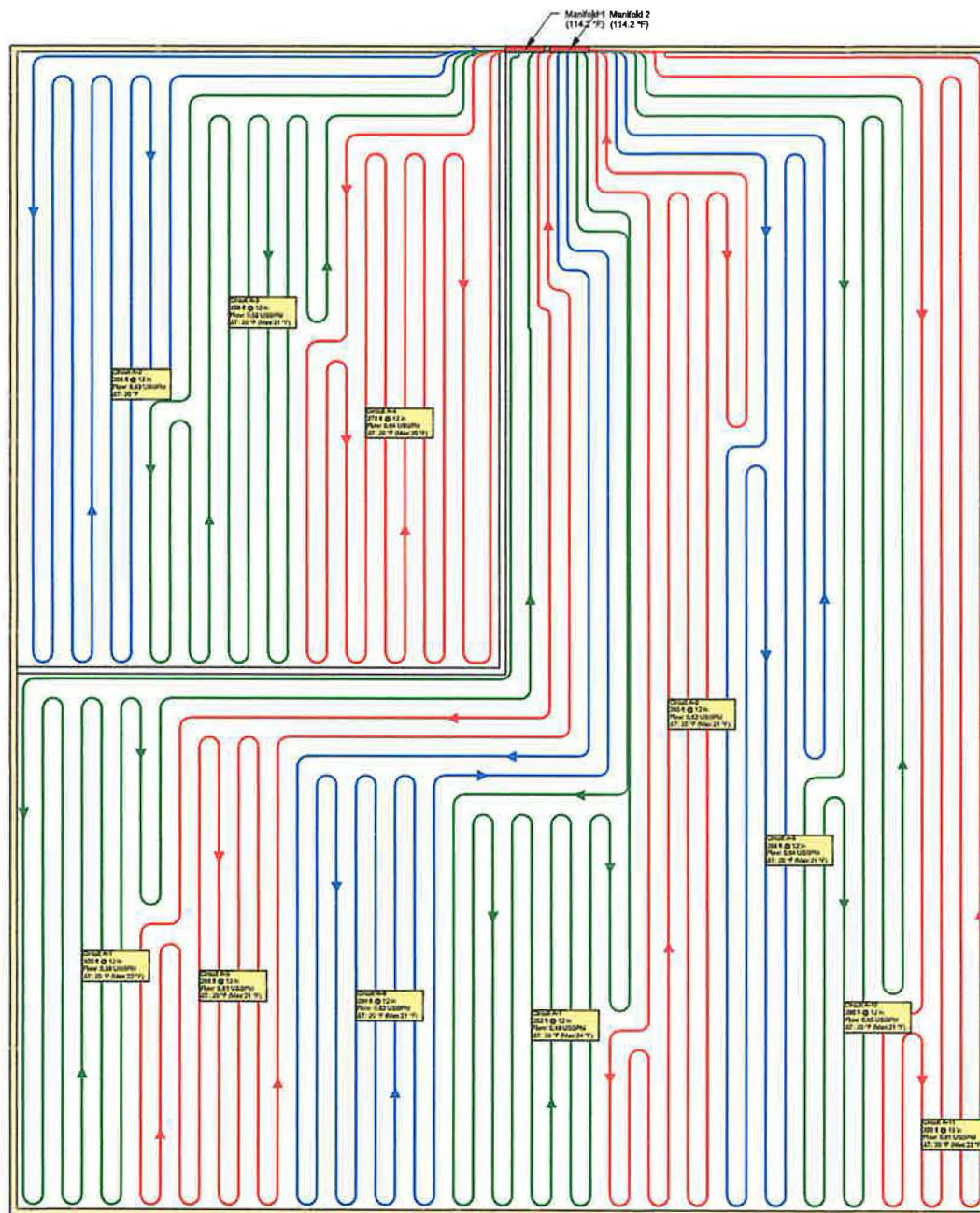
HeatGain kBtu/h
 CoolSqFt kBtu/h-ft² →
 CoolReqd 0.0 kBtu/h
 CoolHours Hours/year

CoolHours Estimates			
Region		Low	High
South	House	1100	1600
	School	600	1000
	Office	1200	1800
Mid-USA	House	800	1000
	School	400	550
	Office	700	1100
North	House	200	300
	School	200	300
	Office	300	600

CoolSqFt Estimates (kBtu/h per 1000 ft ² of Floor Area)					
Region		Poor Quality	Std. Quality	Hi. Quality	Super Eff.
South	House	32	25	17	10
	School	65	53	36	31
	Office	35	28	20	15
Mid-USA	House	30	22	15	9
	School	60	48	38	28
	Office	30	25	17	14
North	House	28	20	14	8
	School	50	42	30	26
	Office	28	22	16	12

* adapted from HeatCoolWater.xlsx with permission from the spreadsheet author, Dr. Steve Kavanaugh

Heating is for a 750 square foot home and 2250 square foot shop. Open loop system.



Project Number: Steve Hoagland

Project Name: Shop

Location:

Date: Tuesday, August 18, 2015

Prepared By:

Floor Plan: Ground Floor

Circuit Information:

Total Length: 3,116 ft - Barrier PEX 1/2"

Circuit	Length	Manifold	Tube Type
A-1	300	Manifold 2	1/2"
A-2	266	Manifold 1	1/2"
A-3	259	Manifold 1	1/2"
A-4	273	Manifold 1	1/2"
A-5	288	Manifold 2	1/2"
A-6	286	Manifold 2	1/2"
A-7	282	Manifold 2	1/2"
A-8	285	Manifold 2	1/2"
A-9	288	Manifold 2	1/2"
A-10	290	Manifold 2	1/2"
A-11	300	Manifold 2	1/2"



PROJECT NAME: **Steve Hoagland**

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UNDERFLOOR MATERIAL CALCULATION WORKSHEET

UNDERFLOOR MATERIAL CALCULATION WORKSHEET		HEATED AREA		FLOOR CONSTRUCTION					TUBING SELECTION			OPERATING PARAMETERS			COMPONENTS		PUMP	
				SQUARE FOOTAGE	SLAB ON GRADE	SUSPENDED SLAB	JOISTED FLOOR	PERCENT CARPETED	TUBING TYPE	TUBE SPACING	TOTAL TUBING REQ.	SUGGESTED CIRCUITS	ORDER QUANTITY	FLUID TEMP (suggested)	MAX. FLUID TEMP (degree F)	FLOW RATE (gal/minute)	ALUMINUM PLATES	SLAB MANIFOLD ADAPTORS
Zone 1	Apartment	750	X			1/2 PEX O2	10	900	3-300	3-300	130	150	2.25		3 Circuit			Medium
Zone 2	Shop	2250	X			1/2 PEX O2	12	2250	8-281	8-300	130	150	6.00		8			Med/High

Notes:



Radiantec
SINCE 1979
INCORPORATED

PROJECT NAME: Steve Hoagland

37659

HEATING CALCULATION

HEATED AREA		SQUARE FOOTAGE	ENERGY FACTOR	TEMPERATURE DIFFERENCE (degrees F)	ESTIMATED HEAT REQUIRED (BTU/hour)	HEAT PRODUCED BY THE FLOOR (BTU/hour)
Zone 1	Apartment	750	0.4	75	22500	30000
	Shop	2250	0.55	65	80438	90000
Zone 2						

Notes:

SOME IMPORTANT NOTES ABOUT FREE DESIGN ASSISTANCE

1. A complete design for an underfloor radiant heating system would include a complete review of the plans, a study of State and Local Building codes, a detailed heat loss calculation, coordination with the builder, several site visits, coordination with the supplier of the heating unit, a written contract, and a fee of several thousand dollars.
2. This free service is not to be confused with a complete design. *It is intended to be useful to the customer for making preliminary decisions.* This information is given in good faith, but Radiantec Company makes no warranty or assumes no liability for its accuracy.
3. It is not possible for Radiantec Company to be aware of the ramifications of all State and Local building codes. *Code compliance is the customer's responsibility.* Radiantec Company will assist the customer in obtaining waivers or exceptions when new technology conflicts with applicable codes. Radiantec Company will not apply restocking fees if exchanges are needed to meet applicable codes.



Well head and distribution pipe



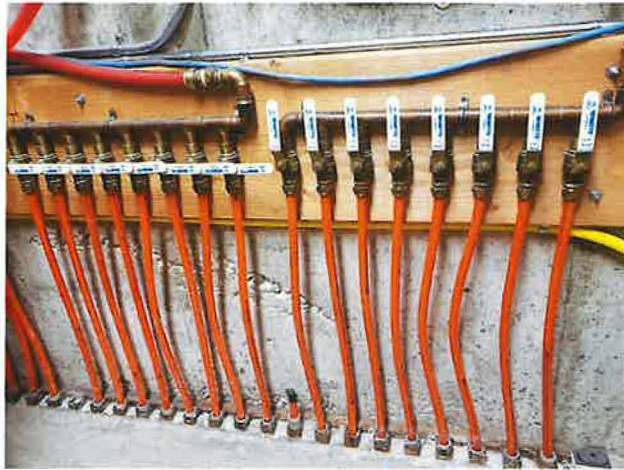
Well tag name plate



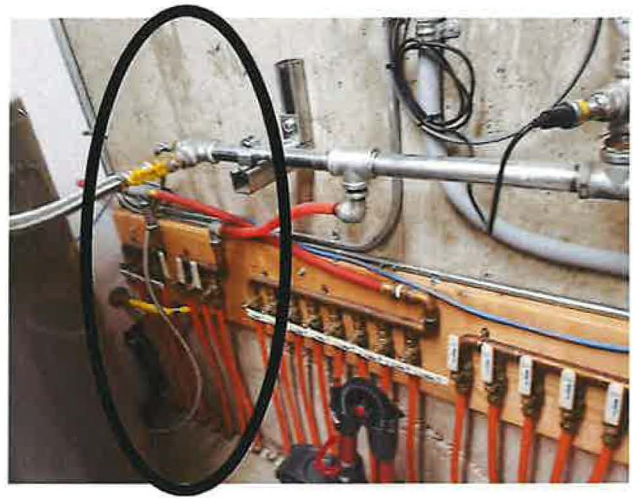
Distribution line into
shop



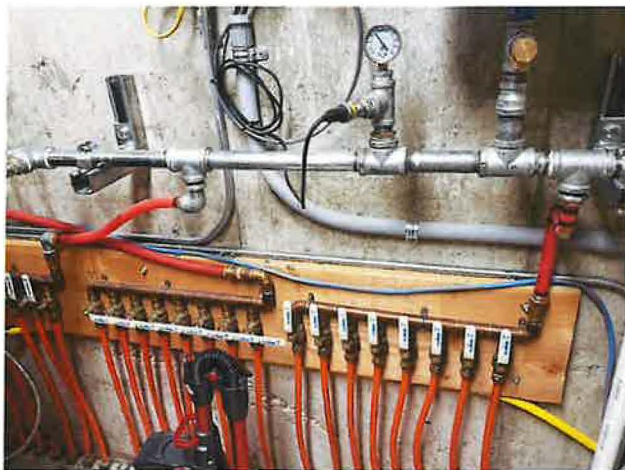
Shop Interior



Shop flooring lines, eight (8) input distribution lines and eight (8) exit lines



Residence flooring lines, three (3) input distribution lines and three (3) exit lines



Main distribution line to shop with pressure gage and residence heating lines, and return discharge lines



Hot water heater



Discharge line



Discharge line to river



Water spigot #1



Water spigot #2



Shop and residence/apartment building