

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
APPLICATION FOR PERMIT

Ident. No. 22-14103

To appropriate the public waters of the State of Idaho

1. Name of Applicant William S Graham Phone (847) 274-7946
Name connector (check one): ☐ and ☐ or ☐ and/or
 Mailing address 241 Melrose Ave City Kenilworth
 State IL Zip 60043 Email bill@schaefers.com
c/o Keith C. Wilson Rocky Mountain Environmental Associates, Inc. Email kwilson@rockymountainenvironmental.com
 482 Constitution Way, Ste 303, Idaho Falls ID 83402 (208) 524-2353 Fax 208) 524-1795

2. Source of water supply Ground Water which is a tributary of _____
 3. Location of point of diversion:

Twp	Rge	Sec	Govt Lot	¼	¼	¼	County	Source	Local Name or tag #
4N	45E	5	2	SE	NW	NE	Teton	Ground Water	

4. Water will be used for the following purposes:

Amount 0.10 cfs for Heating purposes from 01/01 to 12/31 (both dates inclusive)
(cfs or acre-feet per year)

Amount 0.10 cfs for Cooling purposes from 01/01 to 12/31 (both dates inclusive)
(cfs or acre-feet per year)

Amount _____ for _____ purposes from _____ to _____ (both dates inclusive)
(cfs or acre-feet per year)

Amount _____ for _____ purposes from _____ to _____ (both dates inclusive)
(cfs or acre-feet per year)

5. Total quantity to be appropriated is (a) 0.10 cubic feet per second (cfs) and/or (b) _____ Acre-feet per year (af)

6. Proposed diverting works:

a. Describe type and size of devices used to divert water from the source Well pump to heat pump with open discharge into slough tributary to Teton River

b. Height of storage dam _____ feet; active reservoir capacity _____ acre-feet; total reservoir capacity _____ acre-feet. If the reservoir will be filled more than once each year, describe the refill plan in item 11

For dams 10 feet or more in height OR reservoirs with a total storage capacity of 50 acre-feet or more, submit a separate

Application for Construction or Enlargement of a New or Existing Dam. Application required? ☐ Yes ☐ No

c. Proposed well diameter is 8 inches; proposed depth of well is 40 feet.

d. Is ground water with a temperature of greater than 85°F being sought? ☐ Yes ☒ No

e. If well is already drilled, when? _____ ; drilling firm _____
 Well was drilled for (well owner) _____ ; Drilling Permit No. _____

7. Description of proposed uses (if irrigation only, go to item 8):

a. Hydropower; show total feet of head and proposed capacity in kW. _____

b. Stockwatering; list number and kind of livestock. _____

c. Municipal; show name of municipality or the applicant's qualifications as a municipal provider. _____

d. Domestic; show number of households. _____

e. Other; describe fully. Heating & Cooling using a heat pump.

RECEIVED

NOV 07 2013

Department of Water Resources¹
Eastern Region

22-14103

8. Description of place of use:

a. If water is for irrigation, indicate acreage in each subdivision in the tabulation below.

b. If water is used for other purposes, place a symbol of the use (example: D for Domestic) in the corresponding place of use below. See instructions for standard symbols.

Twp	Rge	Sec	NE ¼				NW ¼				SW ¼				SE ¼				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
4N	45E	5		G/L															

Total Number of acres to be irrigated _____

9. Describe any other water rights used for the same purposes as described above. Include water delivered by a municipality, canal company, or irrigation district. If this application is for domestic purposes, do you intend to use this water, water from another source, or both, to irrigate your lawn, garden, and/or landscaping?

N/A

10. a. Who owns the property at the point of diversion? Applicant

b. Who owns the land to be irrigated or place of use? Applicant

c. If the property is owned by a person other than the applicant, describe the arrangement enabling the applicant to make this filing:

11. Describe your proposal in narrative form, and provide additional explanation for any of the items above. Attach additional pages if necessary. This application for permit is for non-consumptive use for a heat pump used for heating and cooling of a nearby single-family residence.

See Attachment for USGS Topographical Map & Additional information of the Proposed Project

12. Time required for completion of works and application of water to proposed beneficial use is 3 Years (minimum 1 year)

13. MAP OF PROPOSED PROJECT REQUIRED - Attach an 8½"x11" map clearly identifying the proposed point of diversion, place of use, section #, township & range. A photocopy of a USGS 7.5 minute topographic quadrangle map is preferred.

The information contained in this application is true to the best of my knowledge. I understand that any willful misrepresentations made in this application may result in rejection of the application or cancellation of an approval.

Signature of Applicant

Signature of Applicant

Print Name (and title, if applicable)

Print Name (and title, if applicable)

For Department Use:

Received by KM Date 11-13-13 Time _____ Preliminary check by KM

Fee \$ 100.00 Receipted by KM Receipt No. ED39308 Date 11-18-13

22-14103

WATER TO WATER HEAT PUMP (WWHP)

NO.	OUTPUT WITH 40° SOURCE AND 120° LWT	ELECTRICAL DATA	BOILER MANUFACTURER AND MODEL
WWHP-1	106,200 BTUH	230V, 1PH, 60MCA	CLIMATEMASTER TMW120BG

NOTES:

- PROVIDE 30 PSI SAFETY RELIEF VALVE, WATER TEMPERATURE LIMIT SWITCH AND BLOCK TEMPERATURE SWITCH, PRESSURE/TEMPERATURE GAUGE, DRAIN VALVE
- PROVIDE LOW WATER CUTOFF.

HEAT EXCHANGER (HE)

NO.	SERVING	CAPACITY BTUH	HEAT PUMP SIDE			WELL SIDE			MANUFACTURER AND MODEL
			ΔP FT	ΔT °F	GPM	ΔP FT	ΔT °F	GPM	
HE-1	HEAT PUMP	106,200	14'	5	46.5	14.5'	5	45	GEA ECOFLEX NT50M CYFS-50

NOTES

- MAXIMUM OPERATING PRESSURE: 400 PSIG. MAXIMUM OPERATING TEMPERATURE: 350°F.
- CHANNEL PLATES AISI 316 STAINLESS STEEL, PRESSURE PLATES AISI 316 STAINLESS STEEL WITH MILD STEEL POWDER COATED FRAME.
- HEAT EXCHANGER SHALL BE INSULATED WITH FIBERGLASS INSULATION AND ALUMINUM CLADDING.

CALCULATED FLOW RATE IS AS FOLLOWS:

WELL WATER FLOW WILL BE BASED ON THE SUM
OF THE HEAT PUMP FLOW + DOMESTIC FLOW +
30% OF THE IRRIGATION FLOW OR THE FIRE FLOW,
WHICH EVER IS GREATEST.

PROVIDE VALVES ON DOMESTIC HEAT PUMP AND IRRIGATION
THAT WILL CLOSE ANYTIME FIRE FLOW IS SENSED.

DOMESTIC FLOW REQUIREMENT..... 23 GPM

HEAT PUMP..... 46 GPM

LANDSCAPING FLOW IS CALCULATED
AT 30% OF DESIGN = 30% OF 20GPM..... 6 GPM

TOTAL 75 GPM

PUMP SHALL RUN AUTOMATICALLY ON A CALL FROM THE
PRESSURE SWITCH. VFD AND PUMP SHALL MAINTAIN CONSTANT
SYSTEM PRESSURE OF 60PSI.

Information Prepared by:
Chuck Winmill, P.E.
CN Engineers
P.O. Box 4195
410 S Cache
Jackson, WY 83001
p 307-733-8765 Ext. 4
f 307-733-1580
cwinmill@cnengineers.net

Methods for Determining Rates of Flow for Geothermal Heating Systems

Application Processing #23

Data Supplied by Applicant's Engineer

1. Engineering Maximum Required Flow Rate = 45 gpm = 0.10 cfs
 2. Designed Floor Space = 4482 ft²
 3. Design Temperature = -20° F
 4. Temperature Drop across system = 4.7° F
 5. Space Heat Load = 106,200 BTU/hr
 6. Engineering calculations based on 45° F ground water.
-

IDWR Guideline for determining Design Heat Load:

$$E = (e)(\Delta T)(0.8)(A) = \text{BTU/hr required}$$

e = efficiency factor BTU/hr-sq.ft.-°F

Assume = 0.28

0.28 – Best Energy Efficiency
 0.44 – Better Energy Efficiency
 0.67 – Average Residential Efficiency
 1.11 – Poor Energy Efficiency

$$A = \text{Floor space} = 4482 \text{ ft}^2$$

$$\Delta T = \text{Design Temperature difference } (t_i - t_o)$$

$$t_i = \text{Inside Temp} = 70^\circ \text{ F}$$

$$t_o = \text{Outside Temp} = -20^\circ \text{ F} = \text{Design Temperature}$$

$$\Delta T = (t_i - t_o) = [(70^\circ \text{ F}) - (-20^\circ \text{ F})] = 90^\circ \text{ F}$$

$$E = (0.28)(90^\circ)(4482 \text{ ft}^2) = 112946.4 \text{ BTU/hr}$$

IDWR Guideline for Estimating Rate of Flow for Geothermal Heating Systems:

Temperature Drop: $\Delta T_s = \text{Temperature drop across the system} = 4.7^\circ \text{ F}$

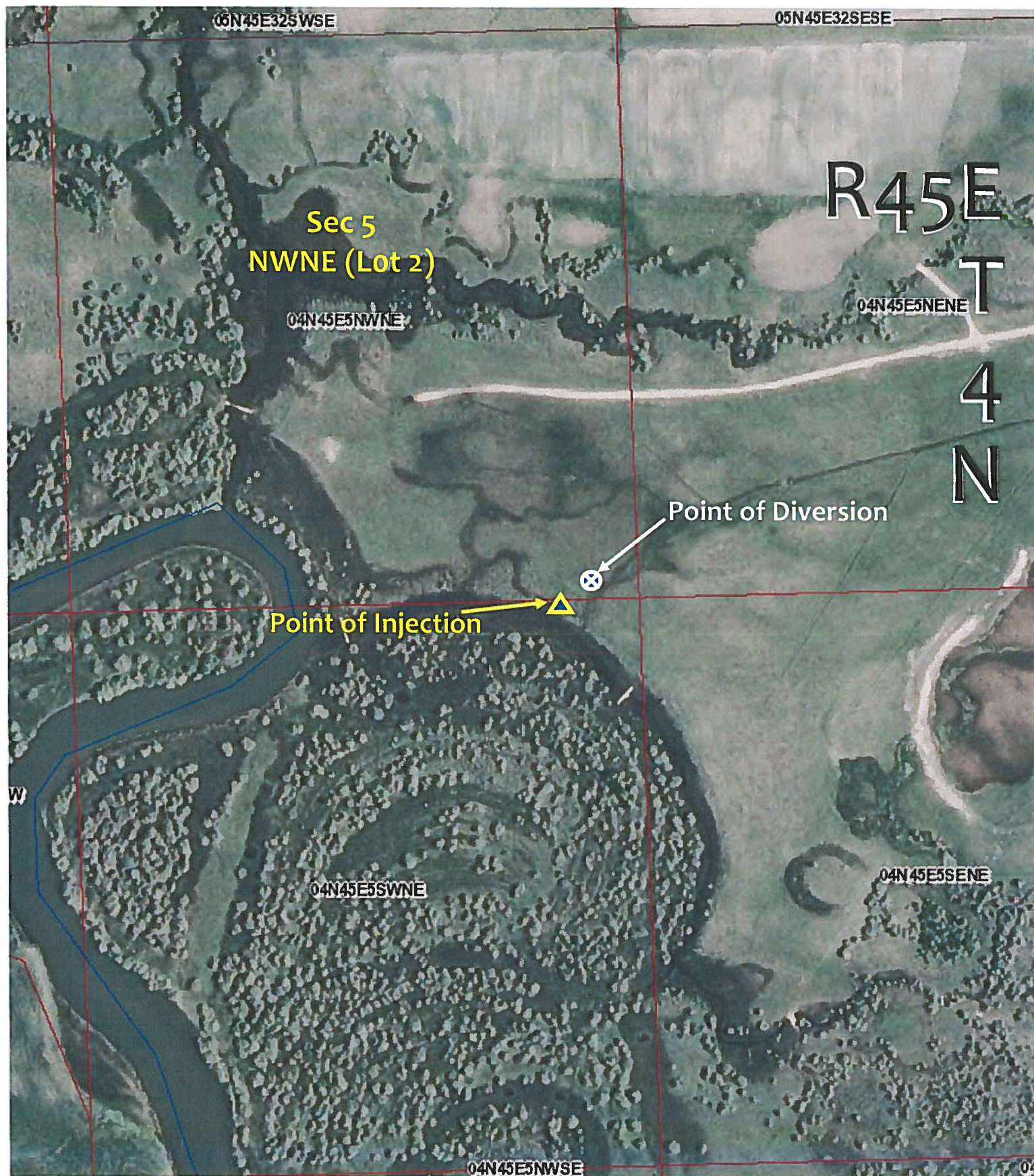
Flow Rate Required: $W = O \div (500)(\Delta T_s)$

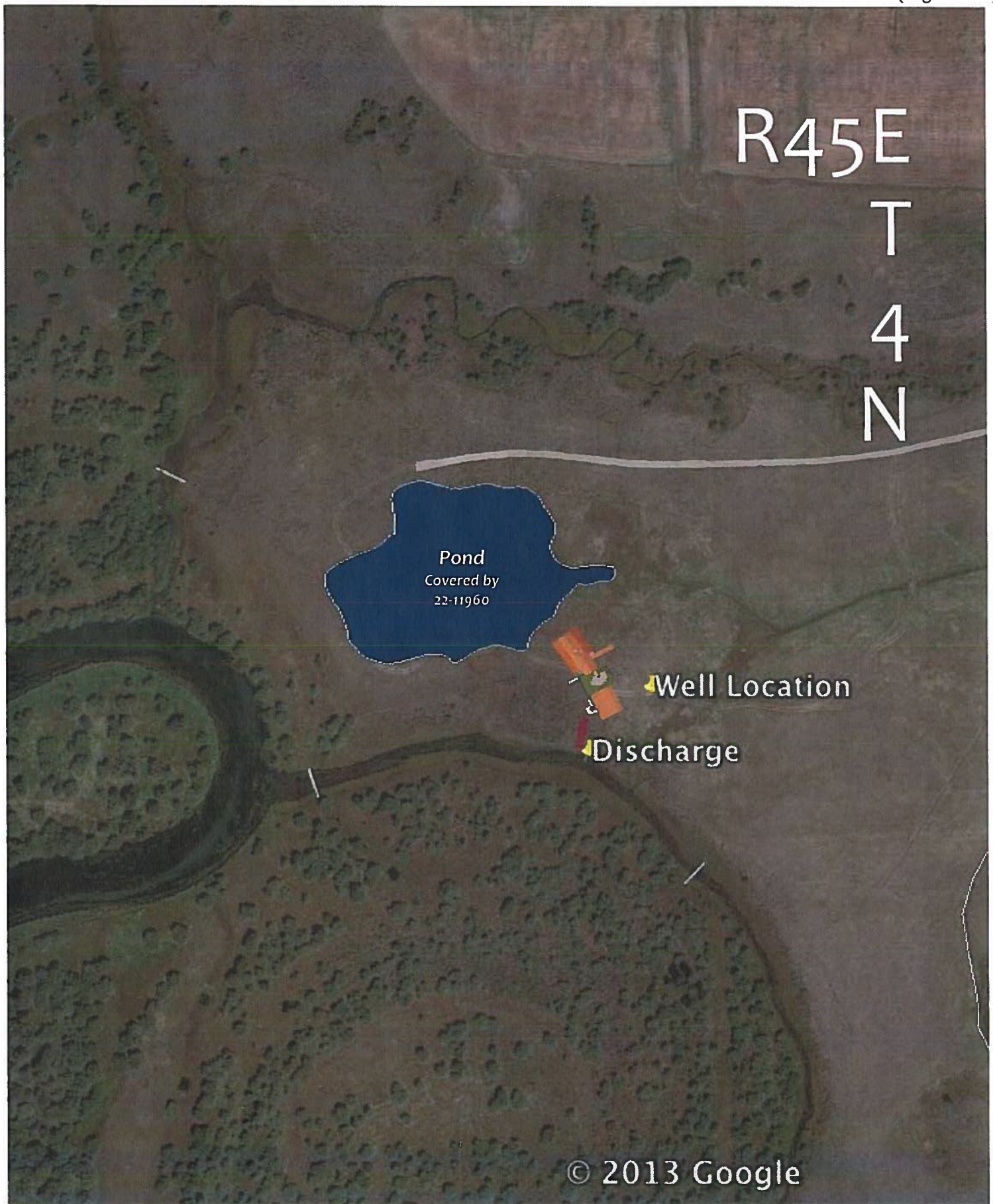
$$O = \text{Space Heat Load in BTU/hr} = 112946.4 \text{ BTU/hr}$$

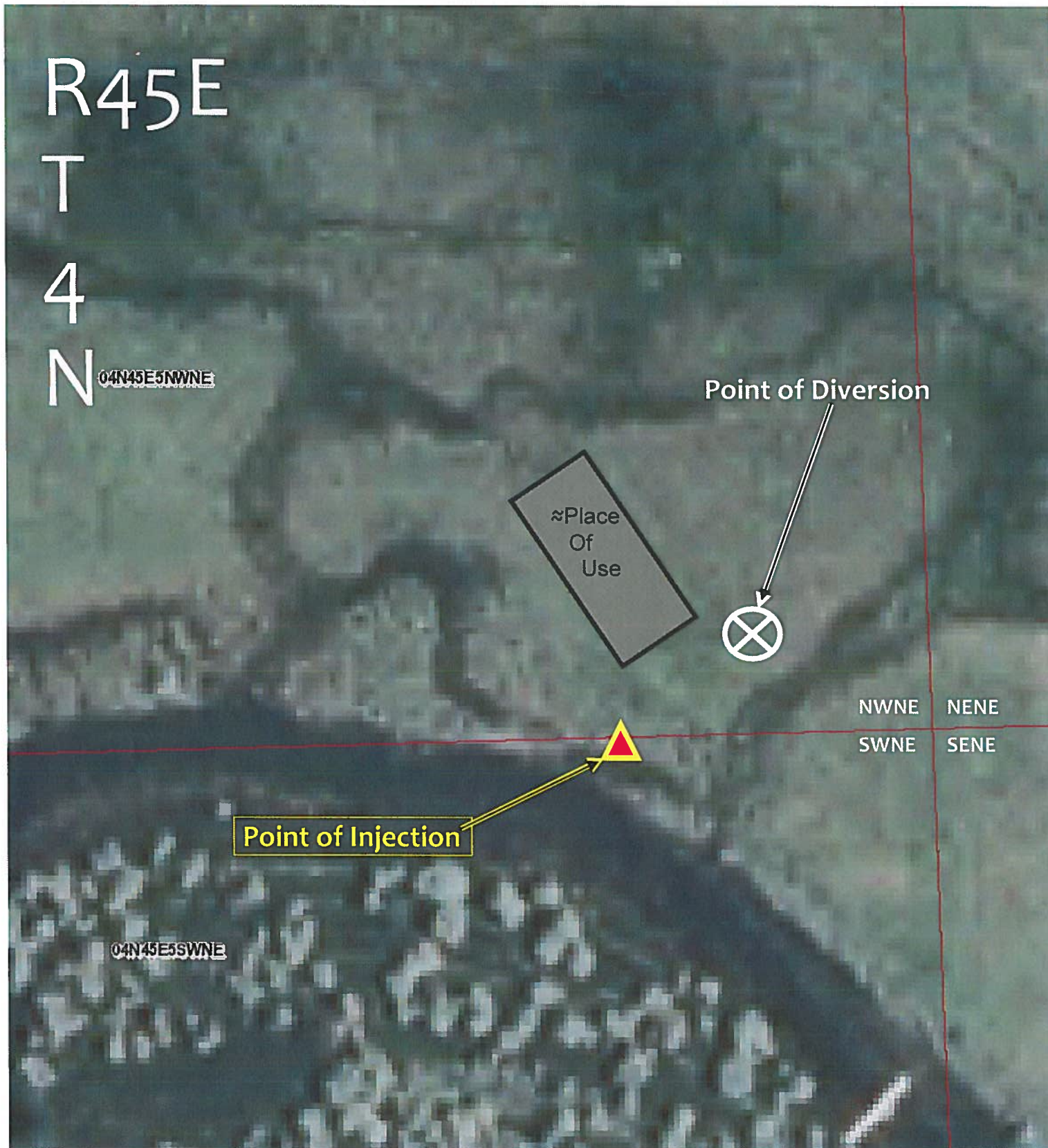
$$W = (112946.4 \text{ BTU/hr}) \div [(500)(4.7^\circ \text{ F})] = 48.06 \text{ gpm} = 0.107 \text{ cfs}$$

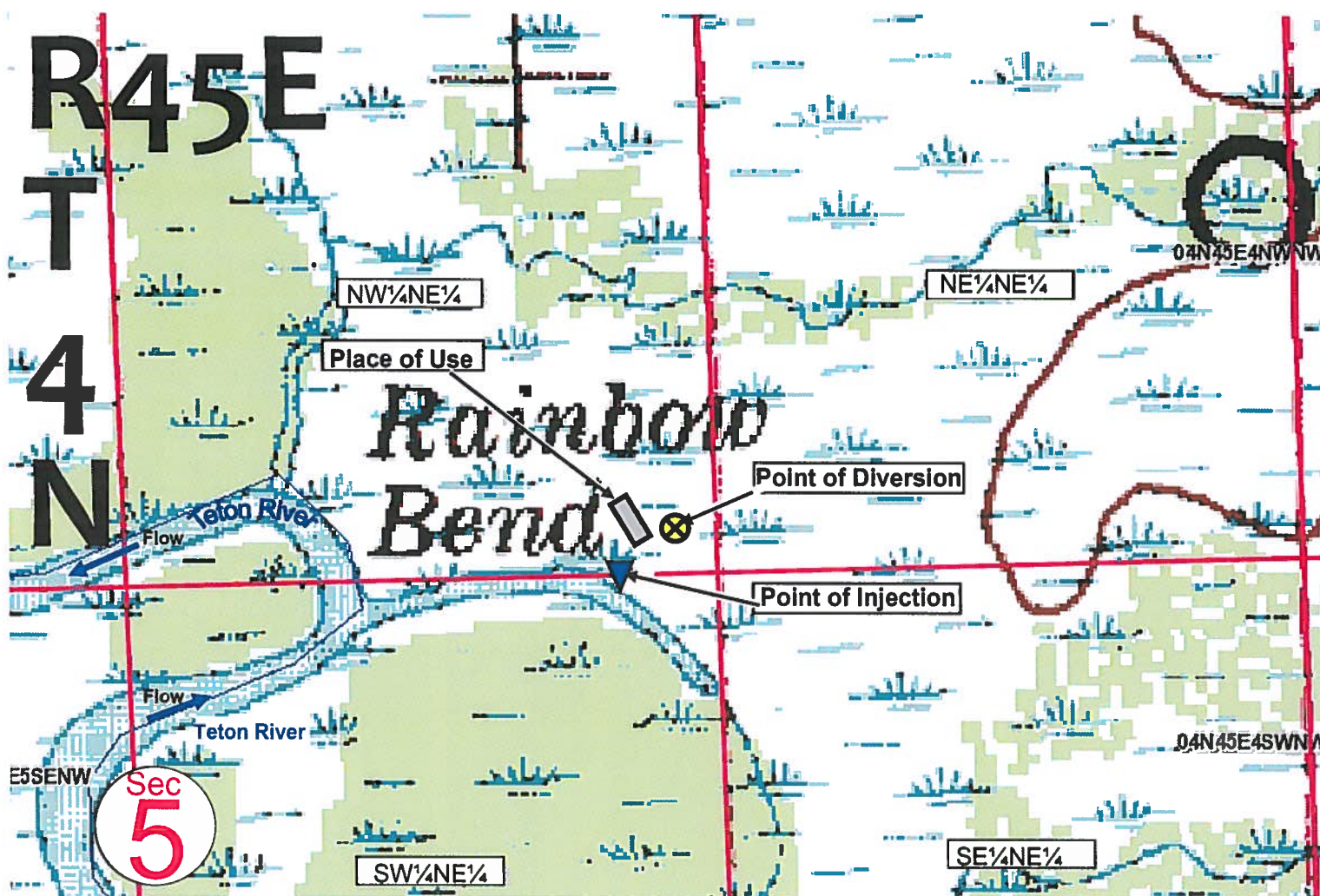
The IDWR guidelines are not for the design of heating systems; however, calculations using these guidelines the calculated flow rate required = 0.11 cfs.

The engineering data provided estimated the maximum design flow of 45 gpm (0.10 cfs) as a reasonable flow rate.









This application for permit to drill a well is for non-consumptive use for a heat pump used for heating and cooling of a nearby single-family residence with open discharge of used water into a slough tributary to the Teton River.

Based on the proximity of the site to the Teton River and tributary slough, the project area is located in an area zone where the Teton basin's aquifer surfaces and discharges into wetlands and surface flows into the Teton River. The USGS Topographical map, a copy of a portion displayed above, confirms the location of the project site, within the designated wetlands area.

Rocky Mountain Environmental's Hydrologist opines that an injection well in this area is inappropriate for this project as water injected directly into the ground would most likely resurface again in the proximal vicinity of the well, and flow into the Teton River without any long-lasting benefit to the aquifer. Discharge of the water into the slough tributary to the Teton River following use in the heat exchanger process of the heat pump system is similar to natural aquifer discharge to the same locations.



State of Idaho

DEPARTMENT OF WATER RESOURCES

900 N Skyline Dr., Ste A, Idaho Falls, Idaho 83402-1718

Phone: (208) 525-7161 FAX: (208) 525-7177 www.idwr.idaho.gov

December 23, 2013

C.L. "BUTCH" OTTER
Governor

GARY SPACKMAN
Director

WILLIAM GRAHAM
241 MELROSE AVE
KENILWORTH, IA 50043

Application For Permit No. 22-14103

Dear Applicant(s):

The Department of Water Resources has received your water right application. Please refer to the number referenced above in all future correspondence regarding this application.

A legal notice of the application has been prepared and is scheduled for publication in the TETON VALLEY NEWS on January 2 and 9, 2014. Protests to this application may be submitted for a period ending ten (10) days after the second publication.

If the application is protested, you will be sent a copy of each protest. All protests must be resolved before the application can be considered for approval. If the protest(s) cannot be resolved voluntarily, the Department will conduct a conference and/or hearing on the matter.

If the application is not protested, the Department will process your application and notify you of any action taken on the application. If your application is approved, the Department will send you a copy of the permit.

Please contact this office if you have any questions regarding the application.

Sincerely,

Sharla Cox
Administrative Assistant

CC: ROCKY MOUNTAIN ENVIRONMENTAL ASSOC
482 CONSTITUTION WAY STE 303
IDAHO FALLS, ID 83402

Cox, Sharla

From: Cox, Sharla
Sent: Monday, December 23, 2013 11:40 AM
To: 'Teton Valley News (office@tetonvalleynews.net)'
Subject: Legal Notice for your paper
Attachments: Teton Valley Cover Letter.doc

Contacts: Teton Valley News

Sharla

*Sharla Cox
Administrative Assistant
Idaho Dept of Water Resources
900 N Skyline Dr. Ste A.
Idaho Falls ID 83402
sharla.cox@idwr.idaho.gov
208-525-7161 phone
208-525-7177 fax*

The following application(s) have been filed to appropriate the public waters of the State of Idaho:

22-14103

WILLIAM GRAHAM
241 MELROSE AVE
KENILWORTH, IA 50043

Point of Diversion

L2(SENWNE) S5 T04N R45E

TETON County

Source GROUND WATER Tributary TETON RIVER

Use: COOLING

01/01 to 12/31 0.1 CFS

Use: HEATING

01/01 to 12/31 0.1 CFS

Total Diversion: 0.1 CFS

Date Filed: 11/7/2013

Place Of Use: HEATING and COOLING

T04N R45E S5 L2(NWNE)

Permits will be subject to all prior water rights. For additional information concerning the property location, contact Eastern Region office at (208) 525-7161. Protests may be submitted based on the criteria of Idaho Code § 42-203A. Any protest against the approval of this application must be filed with the Director, Dept. of Water Resources, Eastern Region, 900 N Skyline Dr Ste A, Idaho Falls ID 83402 together with a protest fee of \$25.00 for each application on or before January 21, 2014. The protestant must also send a copy of the protest to the applicant.

GARY SPACKMAN, Director

Published on January 2 and 9, 2014



State of Idaho

DEPARTMENT OF WATER RESOURCES

900 N Skyline Dr., Ste A, Idaho Falls, Idaho 83402-1718

Phone: (208) 525-7161 FAX: (208) 525-7177 www.idwr.idaho.gov

C.L. "BUTCH" OTTER
Governor

GARY SPACKMAN
Director

December 18, 2013

Water Resource Board
PO Box 83720
Boise ID 83720

Application to Permit No. 22-14103

Water Resource Board:

The Department of Water Resources is seeking written comment and/or recommendations from your agency regarding the above referenced water right application. A copy of the application is enclosed for your reference.

Please contact this office if you have any questions regarding the application.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Sharla Cox', is written over a large, light blue circular stamp or seal. The signature is fluid and cursive.

Sharla Cox
Administrative Assistance

Enclosure(s)



State of Idaho

DEPARTMENT OF WATER RESOURCES

900 N Skyline Dr., Ste A, Idaho Falls, Idaho 83402-1718

Phone: (208) 525-7161 FAX: (208) 525-7177 www.idwr.idaho.gov

C.L. "BUTCH" OTTER
Governor

GARY SPACKMAN
Director

December 18, 2013

Friends of the Teton River
PO Box 768
Driggs, ID 83422

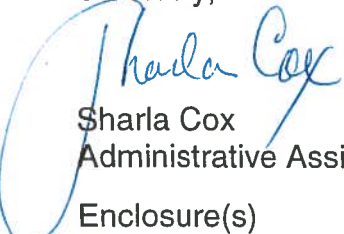
Application to Permit No. 22-14103
To Whom it May Concern:

The Department of Water Resources is seeking written comment and/or recommendations from your agency regarding the above referenced water right application. A copy of the application is enclosed for your reference.

This office can publish notice of the application as soon as the initial review is completed; therefore, your prompt response to this request is appreciated. If your agency desires to formally protest the approval of this application, you may do so after the notice is published by filing a written protest along with a \$25.00 filing fee within 10 days after final publication.

Please contact this office if you have any questions regarding the application.

Sincerely,


Sharla Cox
Administrative Assistance

Enclosure(s)



State of Idaho

DEPARTMENT OF WATER RESOURCES

900 N Skyline Dr., Ste A, Idaho Falls, Idaho 83402-1718

Phone: (208) 525-7161 FAX: (208) 525-7177 www.idwr.idaho.gov

C.L. "BUTCH" OTTER
Governor

GARY SPACKMAN
Director

December 18, 2013

Idaho Department of Environmental Quality
900 North Skyline, Suite B
Idaho Falls, ID 83402

Application to Permit No. 74-16008 and 22-14103

DEQ:

The Department of Water Resources is seeking written comment and/or recommendations from your agency regarding the above referenced water right application. A copy of the application is enclosed for your reference.

This office can publish notice of the application as soon as the initial review is completed; therefore, your prompt response to this request is appreciated. If your agency desires to formally protest the approval of this application, you may do so after the notice is published by filing a written protest along with a \$25.00 filing fee within 10 days after final publication.

Please contact this office if you have any questions regarding the application.

Sincerely,

A handwritten signature in blue ink that reads "Sharla Cox". The signature is written in a cursive, flowing style. The first name "Sharla" is written in a larger, more prominent script than the last name "Cox".

Sharla Cox
Administrative Assistance

Enclosure(s)



State of Idaho

DEPARTMENT OF WATER RESOURCES

900 N Skyline Dr., Ste A, Idaho Falls, Idaho 83402-1718

Phone: (208) 525-7161 FAX: (208) 525-7177 www.idwr.idaho.gov

C.L. "BUTCH" OTTER
Governor

GARY SPACKMAN
Director

December 18, 2013

Idaho Department of Fish & Game
Attn: Tom Bassista
4279 Commerce Way
Idaho Falls ID 83401

Application to Permit No. 74-16008 and 22-14103

IDF&G:

The Department of Water Resources is seeking written comment and/or recommendations from your agency regarding the above referenced water right application. A copy of the application is enclosed for your reference.

Please contact this office if you have any questions regarding the application.

Sincerely,

A handwritten signature in blue ink that reads "Sharla Cox". The signature is written in a cursive style with a large, looping 'S' and 'C'.

Sharla Cox
Administrative Assistance

Enclosure(s)

Mathews, Kerrie

From: Mathews, Kerrie
Sent: Wednesday, November 20, 2013 2:24 PM
To: 'Keith C. Wilson'
Subject: Permit Application 22-14103 - William S Graham

Good Afternoon:

I am working on the application you submitted to appropriate ground water for a heating/cooling system. I have a couple questions I was hoping you could answer for me.

1. What is the discharge temperature to the Spring Creek Complex tributary to the Teton River?
2. The application indicates that the ground water in this area is more or less interconnected to the surface water, that being the case please provide the following;
 - a. Addition documentation/narrative supporting this argument,
 - b. Why is the applicant not considering discharge to his pond?
 - c. If the ground water and surface water are inter-connected in this reach, shouldn't the point of diversion be listed as Ground water tributary to the Teton River?

If you have any questions, please let me know.

Thanks,

Kerrie Mathews

Idaho Department of Water Resources
208-525-7161
208-390-6924

"Change is the law of life, and those who look only to the past or present are certain to miss the future."
-John F. Kennedy

MEMO

State of Idaho

Department of Water Resources

322 E Front Street, P.O. Box 83720, Boise, Idaho 83720-0098

Phone: (208) 287-4800 Fax: (208) 287-6700

Date: December 6, 2013
To: Kerrie Matthews
From: Craig Tesch
cc: Sean Vincent
Subject: Technical Review of Permit 22-14103

As requested, the IDWR Hydrology Section in the State Office has reviewed the information submitted for Permit 22-14103 to evaluate the interconnection of ground and surface water. Any temperature change issues related to the heat pump system, or from discharging groundwater into surface water, were not evaluated. Rocky Mountain Environmental submitted the application for permit to the IDWR Eastern office on November 7, 2013.

The applicant proposes to drill a well and use a heat pump to heat and cool a nearby single-family dwelling. Water would then be discharged directly into a slough tributary to the Teton River. A predominately alluvial fill, unconfined aquifer underlies this site and the Teton valley. The aquifer is recharged by tributary seepage and underflow, irrigation, and precipitation. A groundwater gradient map (Figure 1) originally published by Kilburn (1964), and reproduced with edits by Cosgrove (2007), shows all groundwater in the valley flowing towards the Teton River. The aquifer discharges to the river and to an extensive wetland along the river (Figure 2). The location of the discharge area is supported by Van Kirk (2013), who states "Essentially all recharge discharges to Teton River".

The proposed well is 8 inches in diameter, 40 feet deep, and approximately 150 feet northeast of the slough. The proposed well is also located in a wetland area mapped by Cosgrove (2007) and the USGS (see application for permit). The wetlands exist in an area where groundwater intercepts land surface, and is considered a fragile portion of the area ecosystem (Cosgrove, 2007). The driller's report (Figure 3), for a well a little more than a half-mile to the northeast, supports the existence of groundwater at land surface, and indicates that the aquifer is comprised of sands and gravels to the completed depth of 100 feet.

The impacts of pumping on the aquifer and connected surface waters will be time-dependent and can be assessed by consideration of well hydraulics principles. When the well first starts pumping, water will initially be taken from aquifer storage. The cone of depression will grow until water can be captured from either: 1) reduction in discharge from the aquifer, or 2) increase in recharge to the aquifer. Reduction in discharge will occur because groundwater that would have flowed to the river will be intercepted by pumping, which reduces the hydraulic gradient toward the river. If the rate of pumping is sufficient to reverse the hydraulic gradient, recharge will be induced from the river, and the river will go from a gaining reach to a losing reach.

Initially, groundwater storage and reduction in discharge will be the primary sources of water to the proposed well. Given enough time, the gradient may eventually reverse with river depletion serving as the entire source, providing water to the well equal to the pumping rate. The quantity of water supplied to the well by the river depletion source eventually will equal the amount of pumped groundwater that is discharged to the river 150 feet away; there would be no net gain or loss to the system. If the gradient is not reversed and there is only a reduction in groundwater discharge to the river, then that amount of reduction equals the amount of pumped groundwater discharged to the river 150 feet away. Either way, given enough time, there would be no net gain or loss to the system after groundwater storage reaches equilibrium.

In conclusion, impacts to the aquifer from the proposed diversion would be localized and negligible to the system overall based on the information provided. It is important to note that because groundwater is at land surface, waters of the wetland and slough are both part of the same hydraulically connected system. Groundwater that would be pumped from the proposed well and discharged to the slough is technically taken from, and injected into, the same system, albeit 150 feet away and at a different depth (pumped from 40 feet below ground and injected at zero feet).

References

- Cosgrove, D.M., 2007. Preliminary Assessment of Hydrogeology and Water Quality in Ground Water in Teton, County, Idaho. Idaho Water Resources Research Institute Technical Report 07-002. 16 pp.
- Kilburn, C. 1964. Ground water in the upper part of Teton Valley, Teton Counties, Idaho and Wyoming. USGS Water Supply Paper 1789. U.S. Government Printing Office, Washington, DC.
- Van Kirk, R., 2013. Groundwater-Surface Water Interactions in Henry's Fork Basin. Henry's Fork Foundation Presentation to Eastern Snake Hydrologic Modeling Committee. 31 slides.

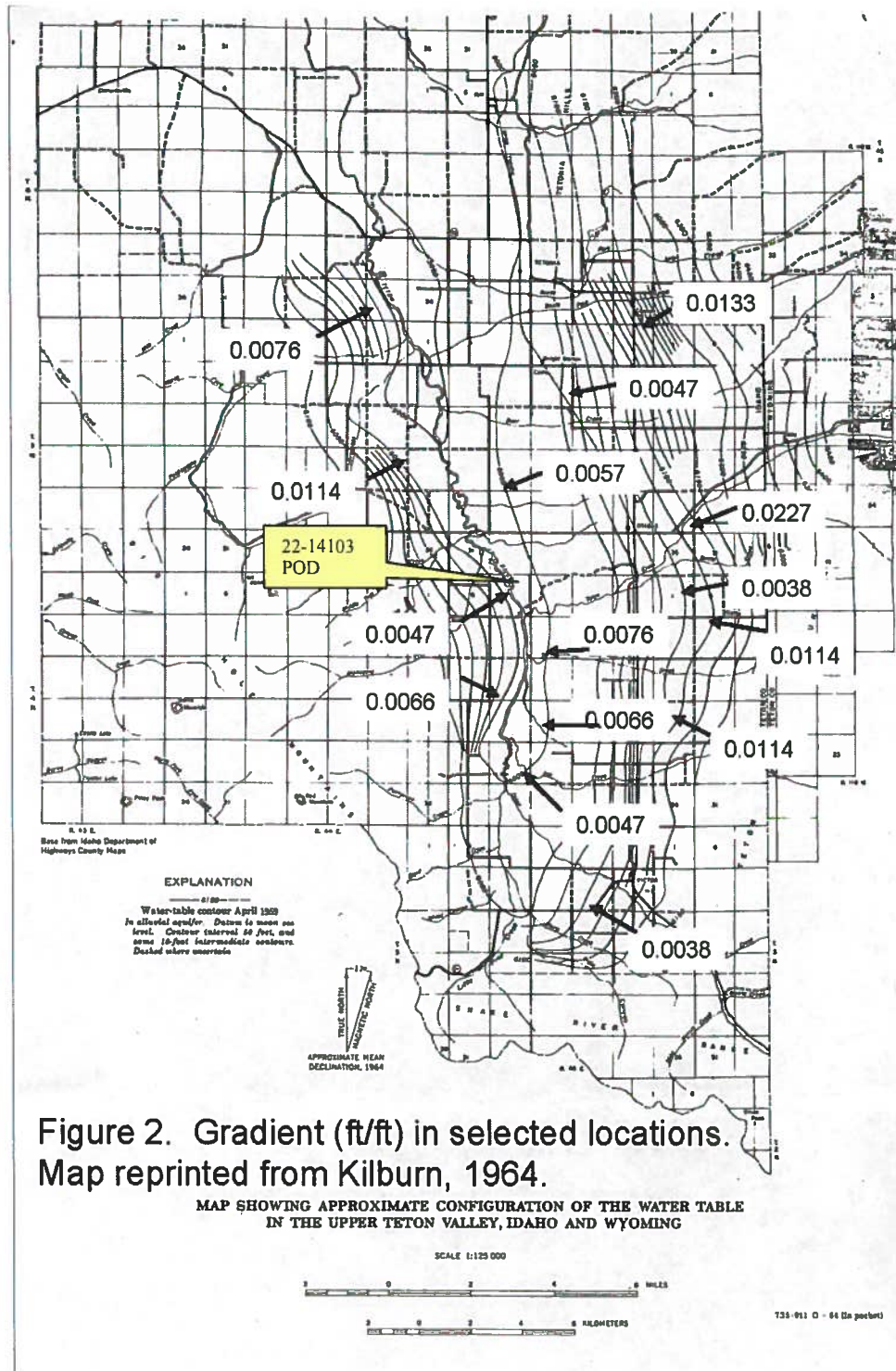


Figure 2. Gradient (ft/ft) in selected locations. Map reprinted from Kilburn, 1964.

Figure 1. Kilburn (1964) groundwater gradient map altered by Cosgrove (2007) for the Teton Valley with the approximate location of the proposed 22-14103 POD.

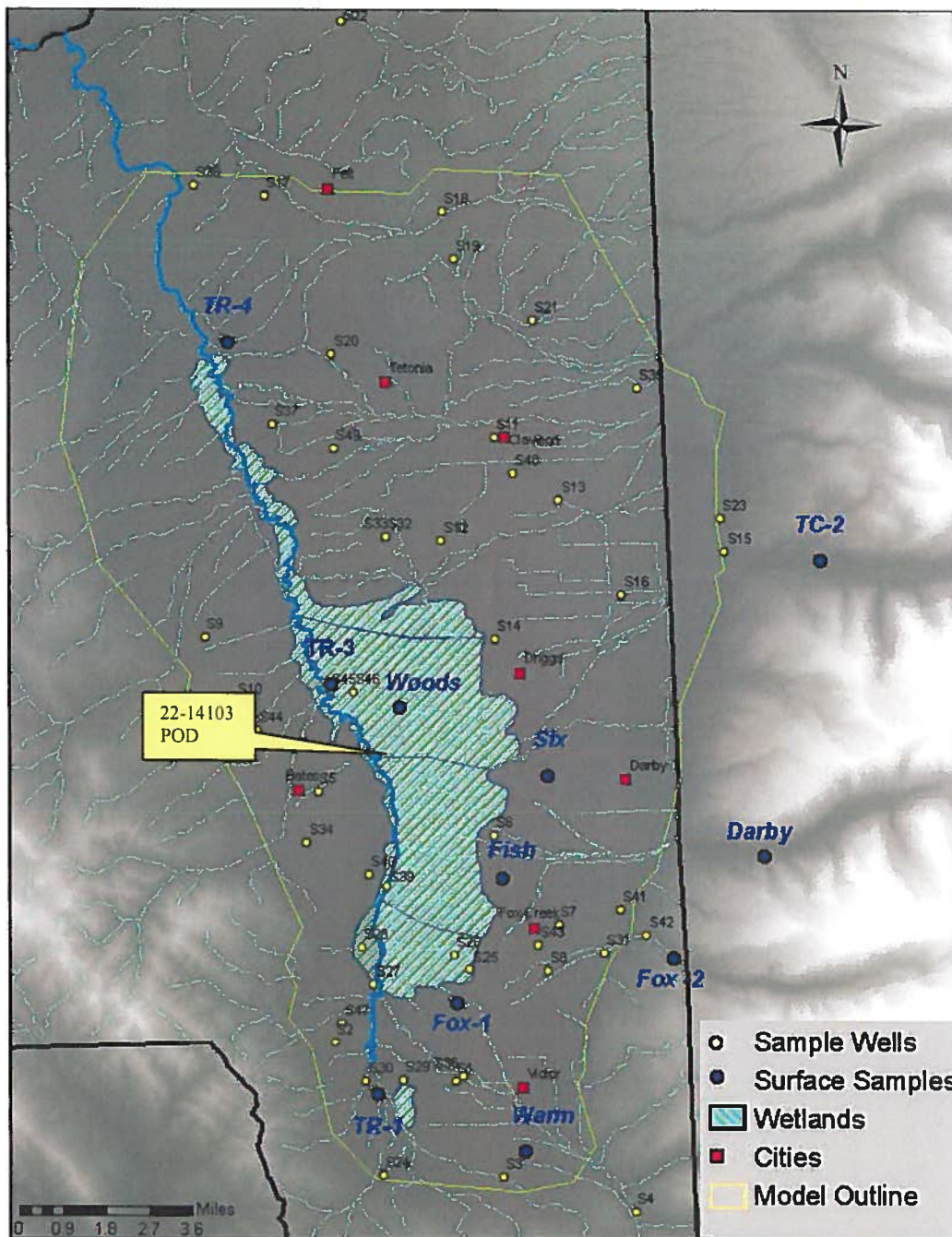


Figure 2. Wetlands area map by Cosgrove (2007) for the Teton Valley with the approximate location of the proposed 22-14103 POD.

Form 238-7
8/07

IDAHO DEPARTMENT OF WATER RESOURCES WELL DRILLER'S REPORT

1. WELL TAG NO. D 0058454
Drilling Permit No. 518
Water right or injection well # 28

2. OWNER: Self Klausen

Name _____
Address P.O. Box 1218
City Driggs State ID Zip 83422

3. WELL LOCATION:

Twp. 4 North ☒ or South ☐ Rge 45 East ☒ or West ☐
Sec. 4 1/4 NE 1/4 NW 1/4

Gov't Lot _____ County Teton

Lat. 43 ° 42 ' 46 " (Deg. and Decimal minutes)

Long. 111 ° 09 ' 30 " (Deg. and Decimal minutes)

Address of Well Site 159 South 2750 West

City Driggs

Lot _____ Blk _____ Sub Name _____

4. USE:
☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation ☐ Thermal ☐ Injection
☐ Other _____

5. TYPE OF WORK:
☒ New well ☐ Replacement well ☐ Modify existing well
☐ Abandonment ☐ Other _____

6. DRILL METHOD:
☒ Air Rotary ☐ Mud Rotary ☐ Cable ☐ Other _____

7. SEALING PROCEDURES:

Seal material	From (ft)	To (ft)	Quantity (lbs or ft ³)	Placement method/procedure
<u>Abut cement</u>	<u>95</u>	<u>15</u>	<u>4800 lbs</u>	<u>10" conductor pipe</u>
<u>Benchtite</u>	<u>65</u>	<u>0</u>	<u>850 lbs</u>	<u>10" conductor pipe</u>

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/Schedule	Material	Casing Liner	Threaded	Welded
<u>6"</u>	<u>13</u>	<u>95</u>	<u>280</u>	<u>steel</u>	☒	☐	☒
					☐	☐	☐
					☐	☐	☐
					☐	☐	☐

Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 95'

9. PERFORATIONS/SCREENS:

Perforations ☐ Y ☒ N Method _____

Manufactured screen ☒ Y ☐ N Type slotted

Method of installation lowered to bottom pulled back pipe

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
<u>95</u>	<u>100</u>	<u>30 mesh</u>		<u>6"</u>	<u>stainless</u>	

Length of Headpipe 2' Length of Tailpipe 6"

Packer ☒ Y ☐ N Type Triplex

10. FILTER PACK:

Filter Material	From (ft)	To (ft)	Quantity (lbs or ft ³)	Placement method
-----------------	-----------	---------	------------------------------------	------------------

11. FLOWING ARTESIAN:

Flowing Artesian? ☒ Y ☐ N Artesian Pressure (PSIG) _____

Describe control device Well Seal

12. STATIC WATER LEVEL and WELL TESTS:

Depth first water encountered (ft) 0' Static water level (ft) _____

Water temp (°F) _____ Bottom hole temp (°F) _____

Describe access port _____

Well test _____ Test method _____

Drawdown (feet)	Discharge or Yield (gpm)	Test duration (minutes)	Pump	Baker	Air	Flowing Artesian
			☐	☐	☐	☐

Water quality test or comments: _____

13. LITHOLOGIC LOG and/or repairs or abandonment:

Base Dia. (in)	From (ft)	To (ft)	Remarks, lithology or description of repairs or abandonment, water temp.	Water
				Y
12"	0'	25'	same clay/sand	X
10"	25'	40'	sand	X
10"	40'	60'	sand	X
10"	60'	65'	sand/gravel/s	X
10"	65'	80'	sand	X
10"	80'	95'	sand	X
6"	95'	100'	sand/gravel/s	X
				</

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JUL 30 2010

Department of Water Resources
Eastern Region

Completed Depth (Measurable): 100'

Date Started: 6-4-10 Date Completed: 6-11-10

14. DRILLER'S CERTIFICATION:

We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name Deering Drilling Co No 518

*Principal Driller Deering Drilling Date 7-2-10

*Driller Self Deering Date 7-2-10

*Operator II _____ Date _____

Operator I _____ Date _____

* Signature of Principal Driller and rig operator are required

Figure 3. Driller's report for the nearest well to the proposed 22-14103 POD.