File NR CG1-*10817C
WR Doc ID 6556224

State of Washington
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REPORT OF EXAMINATION
FOR WATER RIGHT CHANGE

Changed Place of Use
Added or Changed Point of Withdrawal
Added Irrigated Acres

PRIORITY DATE	WATER RIGHT NUMBER
April 28, 1970	GWC 7298 [G1-*10817C]

MAILING ADDRESS	SITE ADDRESS (IF DIFFERENT)
CMF Farming Properties, LLC 697 Loomis Trail Road Lynden, WA 98264	

Total Quantity Authorized for Withdrawal

WITHDRAWAL RATE	UNITS	ANNUAL QUANTITY (AF/YR)
150	GPM	46.7

Total withdrawals from all sources must not exceed the total quantity authorized for withdrawal listed above.

Purpose

PURPOSE	WITHDRAWAL RATE			ANNUAL QUANTITY (AF/YR)		PERIOD OF USE (mm/dd)
	ADDITIVE	NON-ADDITIVE	UNITS	ADDITIVE	NON-ADDITIVE	
Irrigation	150		GPM	46.7		05/01-10/31

IRRIGATED ACRES		PUBLIC WATER SYSTEM INFORMATION	
ADDITIVE	NON-ADDITIVE	WATER SYSTEM ID	CONNECTIONS
66.5	364.2		

Source Location

COUNTY	WATERBODY	TRIBUTARY TO	WATER RESOURCE INVENTORY AREA
Whatcom	Groundwater		WRIA 1 (Nooksack)

SOURCE FACILITY/DEVICE	PARCEL	WELL TAG	TWP	RNG	SEC	QQ Q	LATITUDE	LONGITUDE

23B01	400223342459	BHX550	40N	02E	23	NW NE	48.9478	-122.5161
23B02	400223342459	BHX508	40N	02E	23	NW NE	48.9478	-122.5153
23G01	400223337340	BHN424	40N	02E	23	SW NE	48.9444	-122.5160
23G02	400223337340	BHX509	40N	02E	23	SW NE	48.9440	-122.5160
23G03	400223337340	BHX511	40N	02E	23	SW NE	48.9434	-122.5160
23G04	400223337340	BHX512	40N	02E	23	SW NE	48.9435	-122.5150
23G05	400223337340	BHX513	40N	02E	23	SW NE	48.9442	-122.5147
23J01	400223421236	BHN422	40N	02E	23	NE SE	48.9406	-122.5115
23L01 Horizontal Well	400223210199	BIS479	40N	02E	23	NE SW	48.9425	-122.5245
23N01	400223117082	BHX515	40N	02E	23	SW SW	48.9385	-122.5271
23P01 Infiltration Trench	400223233068	BHX516	40N	02E	23	SE SW	48.9372	-122.5211
Future Well(s)	Multiple	-	40N	02E	22	E/4 E/4	-	-
Future Well(s)	Multiple	-	40N	02E	23	W/2	-	-
Future Well(s)	Multiple	-	40N	02E	23	W/2 E/2	-	-
Future Well(s)	400223421236	-	40N	02E	23	SE SE	-	-
Future Well(s)	400223421236	-	40N	02E	23	W/2 SE NE	-	-
Future Well(s)	400223421236	-	40N	02E	23	W/2 W/2 NE SE	-	-

Datum: WGS84

Place of Use (See Attached Map)

PARCELS (NOT LISTED FOR SERVICE AREAS)

400222460378, 400222484507, 400222487090, 400222501067, 400222510203, 400223012342, 400223016209, 400223016490, 400223031430, 400223085342, 400223039491, 400223110199, 400223149098, 400223152498, 400223155430, 400223177082, 400223185262, 400223185490, 400223200340, 400223210199, 400223233068, 400223234482, 400223257485, 400223276482, 400223287440, 400223320459, 400223337340, 400223342459, 400223360455, 400223375446, 400223376511, 400223379377, 400223421236, 400223466067, 400223515031, 400223515090, ,

LEGAL DESCRIPTION OF AUTHORIZED PLACE OF USE

- NE ¼ NE ¼ EXCLUDING the W 30 rods, and EXCLUDING a portion defined as follows beginning at a point 230 feet west of the NE corner thence E 230 feet to the northeast corner thence south along east section line 240 feet thence west parallel to north line of NE ¼ 220 feet thence northerly 240 feet more or less to the point of beginning;
- SE ¼ NE ¼ EXCLUDING the southerly 990 feet of the northerly 2,390 feet of the easterly 220 ft of the NE 1/4;
- NE ¼ SE ¼ lying east of Bertrand Creek;
- N 7 acres of W 22 rods of E ½, and E ½ E ½ EXCLUDING Lots 1, 2, and 3 of the Am. Van Beek Short Plat, of the SE ¼ SE ¼;

All in Section 22, Township 40 North, Range 2 East W.M. and LESS Roads and easements.

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- S ½, and NW ¼ EXCLUDING the W 180 feet of the N 200 feet and EXCLUDING the E 150 feet of the N 290 feet thereof, of the NW ¼ NW;
- S ½, and portion of the N ½ described as follows beginning at the NW corner of the NE ¼ NW ¼ thence S01°37’28”E along west line thereof 150.09 feet to the point of beginning thence S 89°40'33"E 674.53 ft thence N00°19'27"E 75 feet thence S89°40'33"E 209.62 feet thence S00° 00'00"E 233.93 feet thence S89°40'33"E 60 ft thence S00°00'00"E 209.82 feet thence S89°40'33"E 214.46 feet thence S01°59'26"E 81.33 feet thence S89°40'33"E 210.17 feet thence S01°59'26"E 74.01 feet to the S line of the N ½ of the NE ¼ NW ¼ thence N89°43'03"W along said line to the W line of the NE ¼ NW ¼ thence N01°37’28”W to the point of beginning, and the S 270 feet of the E 210 feet of the N 600 feet, of the NE ¼ NW ¼;
- S ½ NW ¼;
- N ½ SW ¼;
- SW ¼ SW ¼ EXCLUDING the south 1,100 feet thereof;
- E ½ W ½, and N ½ W ½ W ½, and E ½ EXCLUDING a portion defined as follows beginning at the SE corner of the SW ¼ thence N01°59’25”W along the E line of SW ¼ 792.72 feet thence N89°32’51”W 159 feet thence S60°23’29”W 217.33 feet thence S01°59’25”E parallel to the E line of SW ¼ 652.72 feet to S line of SW ¼ thence S89°32’51”E along the S line of the SW ¼ to point of beginning, of the SE ¼ SW ¼;
- SW ¼ NE ¼;
- S 56 2/3 rods EXCLUDING North 3 acres thereof, of the SE ¼ NE ¼;
- W ½ E ½ E ½, and Lot 2 Gentry Short Plat, and W ½ W ½ E ½ EXCLUDING the N 280 feet of W 90 feet thereof, and E ½ W ½ EXCLUDING the N 265 feet thereof, and W ½ W ½ EXCLUDING parcel 400223276511 (which is approximately the N 210 feet of the W 200 feet), of the NW ¼ NE ¼;
- NW ¼ SE ¼;
- N ½ and SW ¼ of the NE ¼ SE ¼;
- SE ¼ SE ¼ EXCLUDING the W 350 feet of the S 1,245 feet thereof;

All in Section 23, Township 40 North, Range 2 East W.M. and LESS Roads and Easements.

Proposed Works

Nine existing wells (23B01, 23B02, 23G01, 23G02, 23G03, 23G04, 23G05, 23J01, and 23N01), one horizontal well (23L01), and one infiltration trench (23P01) and future wells that are or will be less than 50 feet deep and are, or will be, completed in the Sumas Outwash Aquifer. The wells pump water into an unlined pond where a floating pump is used to pump the water through a treatment system consisting of sand filters for particle removal before delivering the water to the irrigation system. The irrigation system consists of buried mainlines and sub-mains serving different irrigation zones. For berries, the water is delivered through drip irrigation. For annual crops (grass, potatoes, corn, etc…) water is typically delivered by travelling big gun sprinklers, which are connected to the mainlines with flexible hose.

Development Schedule

BEGIN PROJECT	COMPLETE PROJECT	PUT WATER TO FULL USE
Started	December 31, 2018	December 31, 2023

Measurement of Water Use	
How often must water use be measured?	Weekly
How often must water use data be reported to Ecology?	Annually (Jan 31)
What volume should be reported?	Total Annual Volume
What rate should be reported?	Annual Peak Rate of Withdrawal (gpm)

Provisions

Maximum Pumping Rates from Existing Wells
Existing points of withdrawal may be pumped up to the following rates:

Well	Maximum Pumping Rate (gpm)
23B01	80
23B02	80
23G01	80
23G02	80
23G03	80
23G04	80
23G05	80
23J01	80
23L01	750
23N01	250
23P01	250

Setback from Property Lines and Bertrand Creek
Future wells are not allowed within a setback distance from property not owned by the water right holder, and from the mainstem Bertrand Creek, of 200 feet for traditional vertical wells, and 300 feet for horizontal wells (any portion of the structure).

Pumping from the Unlined Ponds
The volume of water pumped from any unlined ponds utilized to distribute water within the authorized place of use must not exceed the volume of water pumped into the ponds from the authorized points of diversion and withdrawal. Metering data must be collected to verify this to be true.

Relationship to Other Irrigation Water Rights with the Exact Same Place of Use
GWC 789, GWC 866, GWC 3960, GWC 7298, G1-060050CL, G1-22077C, and SWC 2646 are authorized for a combined total of 977 gallons per minute (gpm) and 302.5 acre-feet per year (af/yr) for the irrigation of 430.7 acres within the same place of use.

Wells, Well Logs and Well Construction Standards
All wells constructed in the state must meet the construction requirements of WAC 173-160 titled "Minimum Standards for the Construction and Maintenance of Wells" and RCW 18.104 titled "Water

Well Construction". Any well which is unusable, abandoned, or whose use has been permanently discontinued, or which is in such disrepair that its continued use is impractical or is an environmental, safety or public health hazard must be decommissioned.

All wells must be tagged with a Department of Ecology unique well identification number. If you have an existing well and it does not have a tag, please contact the well-drilling coordinator at the regional Department of Ecology office issuing this decision. This tag must remain attached to the well. If you are required to submit water measuring reports, reference this tag number.

Installation and maintenance of an access port as described in WAC 173-160-291(3) is required.

Measurements, Monitoring, Metering and Reporting
An approved measuring device must be installed and maintained for each of the sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", WAC 173-173, which describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition the Department of Ecology for modifications to some of the requirements.

Recorded water use data shall be submitted via the Internet. To set up an Internet reporting account, contact the Bellingham Field Office. If you do not have Internet access, you can still submit hard copies by contacting the Bellingham Field Office for forms to submit your water use data.

Proof of Appropriation
The water right holder must file the notice of Proof of Appropriation of water (under which the superseding certificate of water right is issued) when the permanent distribution system has been constructed and the quantity of water required by the project has been put to full beneficial use. Once Ecology has accepted the Proof of Appropriation form, the applicant shall retain the services of a Certified Water Rights Examiner (CWRE) to verify the extent of the perfected right and prepare the necessary documentation to allow Ecology to issue a water right certificate for this project. The certificate will reflect the extent of the project perfected within the limitations of this authorization. Elements of a proof inspection may include, as appropriate, the source(s), system instantaneous capacity, beneficial use(s), annual quantity, place of use, and satisfaction of provisions. Information on hiring a CWRE is available on Ecology's website at:
http://www.ecy.wa.gov/programs/wr/rights/cwrep.html or by calling the appropriate Ecology regional office.

Schedule and Inspections
Department of Ecology personnel, upon presentation of proper credentials, will have access at reasonable times, to the project location, and to inspect at reasonable times, records of water use, wells, diversions, measuring devices and associated distribution systems for compliance with water law.

Real Estate Excise Tax
This decision may indicate a Real Estate Excise Tax liability for the seller of water rights. The Department of Revenue has requested notification of potentially taxable water right related actions, and therefore will be given notice of this decision, including document copies. Please contact the state Department of

Revenue to obtain specific requirements for your project. Phone: (360) 570-3265. The mailing address is: Department of Revenue, Real Estate Excise Tax, PO Box 47477, Olympia WA 98504-7477 Internet: http://dor.wa.gov/. E-mail: REETSP@DOR.WA.GOV.

Findings of Facts

Upon reviewing the investigator's report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I concur with the investigator that the water right is eligible for change, the additional wells will tap the same body of public groundwater as the original wells; there will be no impairment of existing rights; the combined total withdrawal from the original and the additional wells will not enlarge the right; and there will be no detriment to the public interest.

Therefore, I ORDER approval of Application No. CG1-*10817C subject to existing rights and the provisions specified above.

Your Right To Appeal

You have a right to appeal this Order to the Pollution Control Hearings Board (PCHB) within 30 days of the date of receipt of this Order. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do the following within 30 days of the date of receipt of the Order.

File your appeal and a copy of this Order with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.

- Serve a copy of your appeal and this Order on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.
- You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608
Pollution Control Hearings Board 1111 Israel RD SW Ste 301 Tumwater, WA 98501	**Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

Signed at Bellevue, Washington, this _____ day of _____ 2016.

_____

Tom Buroker, Section Manager

For additional information visit the Environmental Hearings Office Website: http://www.eho.wa.gov. To find laws and agency rules visit the Washington State Legislature Website: http://www1.leg.wa.gov/CodeReviser.

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INVESTIGATOR'S REPORT
Change Application Submitted by: CMF Farming Properties LLC
Water Right Control Number: CG1-*10817C
Investigators: Andrew B. Dunn, Adam Neff, Jim Bucknell (RH2 Engineering, Inc.)

BACKGROUND

This report serves as the written findings of fact concerning Water Right Change Application Number CG1-*10817C.

Eight water right change applications were filed under the name of CMF Properties Management LLC associated with its Home Fields operations (CG1-*00443C, CG1-*00929C, CG1-22077C, CG1-*05151C, CG1-*10817C, CS1-*07323C, CS1-*12412C, and CG1-060050CL). RH2 Engineering, Inc., (RH2) was chosen by the applicant to process these water right change applications through the cost reimbursement program. On January 6, 2016, the applicant requested that the water rights be issued in the name of CMF Farming Properties, LLC (CMF), which is associated with the same operation.

It was requested on March 2, 2016, by the applicant, that change application CS1-*12412C cease to be processed.

A number of objectives are desired to be achieved with the proposed transfers with the overarching goal of making CMF's water right documents cover existing uses and provide flexibility of operation, including the following.

1. Cease direct pumping from Bertrand Creek (CS1-*07323C).
2. Change water rights to have the place of use (POU) cover the entire property (all 7).
3. Add all existing and future wells as points of withdrawal to provide operational flexibility (all except CS1-*12412C).
4. Spread the water rights to allow irrigation of additional acres (all 7).

EXISTING Water Right Attributes

Water Right Owner:	CMF Farming Properties, LLC (Certificate originally issued to Vince Crabtree)
Priority Date:	April 28, 1970
Place of Use	E1/2E1/2SW1/4, Sec. 23, T. 40 N., R. 2 E.W.M., LESS the east 330 feet of the south 792 feet thereof; AND LESS roads. ½ of E ½ of NW ¼ of NE ¼ of Sec. 23, Twp. 40 N., Rge. 2 E.W.M.

County	Waterbody	Tributary To	WRIA
Whatcom	Groundwater		1 (Nooksack)

Purpose	Rate	Unit	Af/yr	Begin Season	End Season
Irrigation of 29 acres	150	GPM	63	05/01	10/31

Source Name	Parcel	Well Tag	Twp	Rng	Sec	QQ Q	Latitude	Longitude
23P01 Infiltration Trench	400223233068	BHX516	40N	02E	23	SE SW	48.9372	-122.5211

Af/yr = Acre-feet per year; GPM = Gallons per minute; Sec. = Section; QQ Q = Quarter-quarter of a section; WRIA = Water Resource Inventory Area; W.M. = Willamette Meridian; Datum in NAD83/WGS84.

REQUESTED Water Right Attributes

Applicant Name:	CMF Farming Properties, LLC
Date of Application:	3/24/2015
Place of Use	• NE ¼ NE ¼ EXCLUDING the W 30 rods, and EXCLUDING a portion defined as follows beginning at a point 230 feet west of the NE corner thence E 230 feet to the northeast corner thence south along east section line 240 feet thence west parallel to north line of NE ¼ 220 feet thence northerly 240 feet more or less to the point of beginning; • SE ¼ NE ¼ EXCLUDING the southerly 990 feet of the northerly 2,390 feet of the easterly 220 ft of the NE 1/4; • NE ¼ SE ¼ lying east of Bertrand Creek; • N 7 acres of W 22 rods of E ½, and E ½ E ½ EXCLUDING Lots 1, 2, and 3 of the Am. Van Beek Short Plat, of the SE ¼ SE ¼; **All in Section 22, Township 40 North, Range 2 East W.M. and LESS Roads and easements.** • S ½, and NW ¼ EXCLUDING the W 180 feet of the N 200 feet and EXCLUDING the E 150 feet of the N 290 feet thereof, of the NW ¼ NW; • S ½, and portion of the N ½ described as follows beginning at the NW corner of the NE ¼ NW ¼ thence S01°37’28”E along west line thereof 150.09 feet to the point of beginning thence S 89°40'33"E 674.53 ft thence N00°19'27"E 75 feet thence S89°40'33"E 209.62 feet thence S00° 00'00"E 233.93 feet thence S89°40'33"E 60 ft thence S00°00'00"E 209.82 feet thence S89°40'33"E 214.46 feet thence S01°59'26"E 81.33 feet thence S89°40'33"E 210.17 feet thence S01°59'26"E 74.01 feet to the S line of the N ½ of the NE ¼ NW ¼ thence N89°43'03"W along said line to the W line of the NE ¼ NW ¼ thence N01°37’28”W to the point of beginning, and the S 270 feet of the E 210 feet of the N 600 feet, of the NE ¼ NW ¼; • S ½ NW ¼; • N ½ SW ¼; • SW ¼ SW ¼ EXCLUDING the south 1,100 feet thereof; • E ½ W ½, and N ½ W ½ W ½, and E ½ EXCLUDING a portion defined as follows beginning at the SE corner of the SW ¼ thence N01°59’25”W along the E line of SW ¼ 792.72 feet thence

	N89°32’51”W 159 feet thence S60°23’29”W 217.33 feet thence S01°59’25”E parallel to the E line of SW ¼ 652.72 feet to S line of SW ¼ thence S89°32’51”E along the S line of the SW ¼ to point of beginning, of the SE ¼ SW ¼; • SW ¼ NE ¼; • S 56 2/3 rods EXCLUDING North 3 acres thereof, of the SE ¼ NE ¼; • W ½ E ½ E ½, and Lot 2 Gentry Short Plat, and W ½ W ½ E ½ EXCLUDING the N 280 feet of W 90 feet thereof, and E ½ W ½ EXCLUDING the N 265 feet thereof, and W ½ W ½ EXCLUDING parcel 400223276511 (which is approximately the N 210 feet of the W 200 feet), of the NW ¼ NE ¼; • NW ¼ SE ¼; • N ½ and SW ¼ of the NE ¼ SE ¼; • SE ¼ SE ¼ EXCLUDING the W 350 feet of the S 1,245 feet thereof; **All in Section 23, Township 40 North, Range 2 East W.M. and LESS Roads and Easements.**

County	Waterbody	Tributary To	WRIA
Whatcom	Groundwater		01 (Nooksack)

Purpose	Rate	Unit	Af/yr	Begin Season	End Season
Irrigation of 430.7 acres	150	GPM	46.7	05/01	10/31

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Source Name	Parcel	Well Tag	Twp	Rng	Sec	QQ Q	Latitude	Longitude
23B01	400223342459	BHX550	40N	02E	23	NW NE	48.9478	-122.5161
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23G01	400223337340	BHN424	40N	02E	23	SW NE	48.9444	-122.5160
23G02	400223337340	BHX509	40N	02E	23	SW NE	48.9440	-122.5160
23G03	400223337340	BHX511	40N	02E	23	SW NE	48.9434	-122.5160
23G04	400223337340	BHX512	40N	02E	23	SW NE	48.9435	-122.5150
23G05	400223337340	BHX513	40N	02E	23	SW NE	48.9442	-122.5147
23J01	400223421236	BHN422	40N	02E	23	NE SE	48.9406	-122.5115
23J02	400223421236	BHN423	40N	02E	23	NE SE	48.9419	-122.5076
23L01 Horizontal Well	400223210199	BIS479	40N	02E	23	NE SW	48.9425	-122.5245
23N01	400223117082	BHX515	40N	02E	23	SW SW	48.9385	-122.5271
23P01 Infiltration Trench	400223233068	BHX516	40N	02E	23	SE SW	48.9372	-122.5211
23R02	400223466067	BHN421	40N	02E	23	SE SE	48.9387	-122.5101
23R03	400223466067	BHX514	40N	02E	23	SE SE	48.9387	-122.5121
Future Wells	-	-	40N	02E	23	-	-	-
Future Wells	-	-	40N	02E	22	E/2 E/2	-	-

Af/yr = Acre-feet per year; GPM = Gallons per minute; Sec. = Section; QQ Q = Quarter-quarter of a section; WRIA = Water Resource Inventory Area; W.M. = Willamette Meridian; Datum in NAD83/WGS84.

Legal Requirements for Requested Change

The following is a list of requirements that must be met prior to authorizing the proposed change in POU and point of withdrawal of the subject water right.

Public Notice

RCW 90.03.280 requires that notice of a water right application be published once a week, for two consecutive weeks, in a newspaper of general circulation in the county or counties where the water is to be stored, diverted and used. Notice of this application was published in the *LYNDEN TRIBUNE* on June 17, 2015, and June 24, 2015.

No protests were received.

Consultation with the Department of Fish and Wildlife

The Department of Ecology must give notice to the Department of Fish and Wildlife (WDFW) of applications to divert, withdraw or store water. Mr. Steven Boessow, Water Rights Biologist, with WDFW was notified of the proposed decision on this pending water right change application via e-mail from RH2 on February 23, 2016. No comment was received.

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Consultation with the Lummi Nation and Nooksack Tribe

The Lummi Nation and Nooksack Tribe were notified of the water right change application by Ecology. Neither the Lummi Indian Business Council (LIBC) nor the Nooksack Tribe provided comments on this change application.

State Environmental Policy Act

A water right application is subject to a State Environmental Policy Act (SEPA) threshold determination (i.e., an evaluation whether there are likely to be significant adverse environmental impacts) if any one of the following conditions are met.

(a) It is a surface water right application for more than 1 cubic foot per second (cfs), unless that project is for agricultural irrigation, in which case the threshold is increased to 50 cfs, so long as that irrigation project will not receive public subsidies;
(b) It is a groundwater right application for more than 2,250 gpm;
(c) It is an application that, in combination with other water right applications for the same project, collectively exceed the amounts above;
(d) It is a part of a larger proposal that is subject to SEPA for other reasons (e.g., the need to obtain other permits that are not exempt from SEPA); and
(e) It is part of a series of exempt actions that, together, trigger the need to do a threshold determination, as defined under WAC 197-11-305.

Because this application does not meet any of these conditions, it is categorically exempt from SEPA and a threshold determination is not required.

Water Resources Statutes and Case Law

RCW 90.03.380(1) states that a water right that has been put to beneficial use may be changed. The point of diversion, POU, and purpose of use may be changed if it would not result in harm or injury to other water rights.

The Washington Supreme Court has held that Ecology, when processing an application for change to a water right, is required to make a tentative determination of extent and validity of the claim or right. This is necessary to establish whether the claim or right is eligible for change. *R.D. Merrill v. PCHB* and *Okanogan Wilderness League v. Town of Twisp.*

RCW 90.44.100 allows Ecology to amend a ground water permit to (1) allow the user to construct a replacement or additional well at a new location outside of the location of the original well, or to (2) change the manner or POU of the water, if:

(a) The additional or replacement well taps the same body of public ground water as the original well per RCW 90.44.100(2)(a);
(b) Where a replacement well is approved, the user must discontinue use of the original well and properly decommission the original well per RCW 90.44.100(2)(b)
(c) Where an additional well is constructed, the user may continue to use the original well, but the combined total withdrawal from all wells shall not enlarge the right conveyed by the original permit or certificate per RCW 90.44.100(2)(c); or
(d) Other existing rights shall not be impaired per RCW 90.44.100(2)(d).

When changing or adding points of withdrawal to groundwater rights (RCW 90.44.100), or when consolidating exempt wells with an existing permit or certificate (RCW 90.44.105), the wells must draw from the *same body of public groundwater*. Indicators that wells tap the *same body of public groundwater* include:

(a) Hydraulic connectivity;
(b) Common recharge (catchment) area;
(c) Common flow regime; and
(d) Geologic materials that allow for storage and flow, with recognizable boundaries or effective barriers to flow.

RCW 90.03.380(1) states that the acreage irrigated under a water right may be enlarged if the annual consumptive quantity is not increased. The annual consumptive quantity is the average of the highest 2 years, of the most recent 5-year period of ongoing beneficial use of the water right, reduced by the estimated annual amount of return flows.

Cost Reimbursement Processing

This application is being processed under a Cost Reimbursement Agreement between the applicant and the Department of Ecology. The applicant selected RH2 to process this application on Ecology's behalf. The change application is being processed without requiring processing of previously filed water right change applications, as allowed under RCW 90.03.265, since the transfers will not diminish the water available to earlier pending applicants for changes or transfers from the same source of supply.

INVESTIGATION

Site Visit/Site Description

On October 14, 2015, Mr. Andrew B. Dunn and Mr. Adam Neff from RH2 and Mr. Matthew Maberry (Owner), Ms. Tracy Hull (Special Projects Supervisor), Mr. Gary TeVelde (Special Projects Manager & Irrigation Installation), and Mr. Chad Hanks (Irrigation Manager) from CMF and Mr. Chuck Lindsay and Ms. Katherine Beeler, their consultant from Associated Earth Sciences, Inc (AESI) met to perform the site visit. Before travelling to the proposed place of use, we met at the CMF office and discussed general and specific farm operations and the proposed transfers.

The CMF processing plant reportedly receives water from the Berthusen Road Water Association.

The primary crops grown and anticipated to be grown on the farm include primarily raspberries and blueberries with some strawberries. All of these crops are irrigated using drip irrigation methods. Raspberries and blueberries are irrigated with drip lines that are either hanging, buried, or lying on the ground along the row. Strawberries are irrigated exclusively with buried drip lines. Row spacing for the typical crops grown is 42 inches for strawberries, 10 feet for raspberries, and 11 feet for blueberries. The spacing on the raspberries and blueberries is to allow for mechanical harvesting. Blueberries are commercially viable for a lifetime. Raspberries are often grown on a field for 6 years before being

removed. After removal, the fields can be either planted immediately back into raspberries, or other crops are rotated in. These other crops usually consist of grass, wheat, and potatoes. Of the rotational crops, only potatoes are typically irrigated. When potatoes are grown, they are irrigated with travelling big gun sprinklers.

CMF provided RH2 with a map showing the mainlines, sublaterals, zones, and pump houses. There are more than 40 irrigation zones within the proposed place of use. Piping on the farm ranges in diameter from 3-inch to 6-inch diameter. In addition to the pumps associated with the 16 points of withdrawal/diversion, there are also two unlined ponds that have water pumped into and out of them during the irrigation season. There are multiple pump houses around the farm that contain sand filters for particle removal, plumbing to allow for introduction of fertilizer into the irrigation system (fertigation), and these often contain water flow meters. All water is filtered before being distributed to the drip systems.

All of the points of diversion/withdrawal that serve water to this farm can be turned on or off to meet the irrigation need and demand. CMF utilizes staff to determine when fields need to be irrigated and incorporate automated soil moisture probes tied in with the irrigation controller on some fields. All irrigation is demand-based as opposed to simply being on a regular schedule. No irrigation was occurring during the site visit due to it being outside the irrigation season.

Each existing and proposed well, horizontal well, infiltration trench, and surface water diversion was visited to confirm the location in the change application documents. Depth to water measurements were taken at all wells during the site visit using a water level probe. The measurements obtained are discussed in the hydrogeology section of this investigation. The pumps associated with the infiltration trench and the surface water diversions as well as those that pump from the unlined ponds had been removed for the season.

History of Water Use

Information on the history of water use under this water right was pieced together from a variety of sources, including a project summary report prepared by AESI (2015), an affidavit, system infrastructure maps, pump curves, aerial photos, irrigation guides, the site visit, and weather records.

The POU encompasses roughly 35 acres, representing a portion of parcels 400223210199 and 400223233068, which are owned by CMF Farming Properties, LLC. The POU is described on the water right certificate as the E1/2 E1/2 SW1/4, Sec. 23, T.40 N., R.2 E.W.M. LESS the east 330 feet of the south 792 feet thereof; AND LESS roads.

The original and current point of withdrawal is infiltration trench 23P01.

Affidavit

One affidavit, by Mr. Matthew Maberry, relating to knowledge of farming and irrigation practices under G1-10817C, was provided with the change application. The affidavit was signed and notarized on November January 6, 2016. In that affidavit, Mr. Maberry states that he has been familiar with the farming and irrigation operations within the place of use since 1990 and the operational, historical, farming,

irrigation, and general water use practices described in the AESI report (2015), are “true and correct” to the best of his knowledge.

Instantaneous Rate

Over time, many of the wells have been connected to zones located outside of the area they were originally intended to serve. Due to this, it is difficult to review specific wells to know if the instantaneous rate for a particular water right has been maintained through time.

CMF provided pump curves for many of the wells and surface water diversions used on the farm. They identified approximate pumping rates for all wells and surface water diversions (AESI, 2015). The current combined pumping rate of all existing sources is approximately 1,055 gpm, which is higher than the authorized combined water right instantaneous capacity of 977 gpm under the seven water rights being changed.

At the site visit, CMF provided a map showing all of the irrigation zones. Each zone identified the designed application rate. The zones found within the existing place of use include Crabtree East Zones 2 and 3 and Crabtree South Zone 3. The zones within the place of use are designed to distribute up to 200 gpm.

Based on the information provided, we have determined that the full water right instantaneous rate of 150 gpm has been maintained through beneficial use in the existing place of use and is eligible to be carried through the change application process.

Irrigated Acres

Aerial photos of the CMF property were provided with the application packet (AESI, 2015). These aerial photos were labeled with the following dates: 1976, 1983, 1989, 07/15/1998, 07/15/2004, 07/31/2005, 09/6/2006, 06/25/2009, 08/25/2011, and 04/23/2013. The aerial photos from 1998 to present were also viewed using Google Earth™.

The aerial photos were reviewed to determine the number of acres irrigated historically. The oldest aerial photo reviewed was from 1976, which was taken 5 years after the certificate was issued. The 1976 through 1998 aerial photos suggest that possibly pasture/turf was being grown. However, row crops might have been grown too. There was forest in the northern place of use over this period. Agricultural production on approximately 30 acres. From 2004 through 2014, approximately 32 acres of berries were being grown within the place of use. The acres of berries decreased in 2015 to approximately 29 acres due to ground being cleared for construction of horizontal well 23L01.

Over the history of the water right, the minimum number of acres that has been irrigated for a period of at least five years, based on the aerial photographs, is at least 29 acres.

Annual Volume

Based on review of the aerial photos, it was determined that the full 29 acres authorized have been continuously irrigated under this water right.

Prior to 2004, it appears that the primary crop being grown was pasture grass. The irrigation methods in use during this time period were most likely movable big gun and handlines. The current crop of raspberries have been irrigated using subsurface drip since 2010 (AESI, 2015).

There are currently no water meters installed on the points of withdrawal. Therefore, RH2 relied on the Washington Irrigation Guide (WIG, 1985), older irrigation guides (1982 and 1969), weather data, and Water Resources Guidance GUID-1210 to estimate the highest annual volume of water pumped under this water right.

The first thing to be determined is the crop irrigation requirement (CIR). This is the amount of water that the crop would need to not experience any stress due to water availability. Given that the place of use is equidistant between the two closest WIG stations (Blaine and Clearbrook), we decided to average the crop irrigation requirements for those stations. The average of the data from the WIG (1985) suggests that, with a 2-year return interval, the CIR for a raspberry crop is 16.53 inches and for a pasture/turf crop is 13.74 inches. From the WIG data, it is apparent that the highest water use crop grown within the POU is raspberries.

The WIG (1985) CIR estimates are for an average year and are based on almost 30 years of weather data collected from 1951 to 1980. The University of Washington – Climate Impacts Group has predicted that over the next 10 to 30 years, average air temperatures in the Pacific Northwest will be 2 to 3 degrees Fahrenheit higher than the 1970 to 1999 averages and that less precipitation will occur during the summer months due to global climate changes affecting Washington State. The available weather data shows that the period of May through September was on average 2.56 degrees Fahrenheit warmer from 2011 through 2015, than the average temperature from the Blaine and Clearbrook stations provided in the WIG (**Table 1**). Therefore, it is apparent that, because the WIG values are based on weather data from 1951 to 1980, utilizing the WIG estimated CIR would result in underestimating the amount of irrigation water an irrigator has actually been using over the last 5 years.

Table 1. Weather Comparison of WIG Averages to Actual Data

	Temperature (degrees F)			Precipitation (inches)		
Irrigation Season	**WIG Average**	**Actual**	**Difference (Actual - WIG)**	**WIG Average**	**Actual**	**Difference (Actual - WIG)**
2015	58.65	**62.73**	**4.08**	10.41	**6.42**	**-3.99**
2014		62.45	3.80		13.14	2.74
2013		61.90	3.25		11.70	1.30
2012		**59.91**	**1.26**		**8.64**	**-1.77**
2011		59.33	0.68		11.04	0.63

- Irrigation season is considered to be May through September.
- WIG data from 1985 document.
- Annual data is average of the Clearbrook and Blaine weather stations.
- Weather data was obtained from the Western Regional Climate Center. http://www.wrcc.dri.edu/summary/Climsmwa.html

Station Circular 512 (Irrigation Water Requirements Estimates for Washington, November 1969) and EB1513 (Irrigation Requirements for Washington Estimates and Methodology, 1982) show that, for the Bellingham station (closest location to the site), the crop irrigation requirement will increase as the return

period increases. These documents show an increase of 1 to 3 inches going from the 2-year to the 5-year and 10-year return intervals.

Publication EB1513 presents CIR estimates for various crops (based on average weather data from 1948 through 1973) and 2-, 5-, 10-, and 20-year return intervals to account for climatic variability. Publication EB1513 states that the CIR 2-year return period values will be adequate on the average, once every 2 years. Similarly, the 5-year, 10-year, and 20-year CIR values will be adequate on the average 4 of 5 years, 9 of 10 years, and 19 of 20 years, respectively. Again, it should be noted that these CIR values and return periods are based on weather data collected from 1948 through 1973 and, as discussed above, likely underestimate the current CIR values and return interval time periods due to ongoing global climate change.

Publication EB1513 indicates that, for Bellingham (closest location to site), the raspberry crop CIR increased by approximately 17 percent while the pasture/turf CIR increased by approximately 23 percent going from the 2-year to the 10-year return interval. Increasing the WIG raspberry CIR by 17 percent results in a 19.34 inch CIR for raspberries. Increasing the WIG pasture/turf CIR by 23 percent results in a 16.90 inch CIR for pasture/turf. RH2 has assumed that increasing the WIG values to represent the anticipated 10-year return interval for the crop is a reasonable way to estimate the actual CIR for this water right.

Ecology guidance document 1210 indicates that the efficiency of the subsurface drip irrigation method utilized by CMF to irrigate raspberries ranges between 75 percent and 95 percent, with an average of 90 percent (Ecology Guidance 1210). The application efficiency for the moving big gun irrigation method utilized to irrigate pasture/turf ranges between 55 percent and 75 percent, with an average of 65 percent. The application efficiency for handline impact sprinklers utilized to irrigate pasture/turf ranges between 60 percent and 85 percent, with an average of 75 percent.

Table 2 contains calculations of the annual volume during different the period when pasture/turf was grown. For this scenario, the WIG values have been adjusted upward to account for climate change and a longer return interval, as discussed above.

Table 2. Annual Volume Calculated for Pasture/Turf

Method	Crop	CIR (inches)	Application Efficiency	TIR (inches)	TIR (feet)	Volume (af/yr)
Adjusted WIG 10-year return interval	Pasture	16.90	75%	22.53	1.88	54.5
• Crop is pasture/turf. • Irrigation method is assumed to be handlines. • WIG value is average of Clearbrook and Blaine Stations. • 10-year return interval is the WIG times 1.23. • 29 acres of irrigation. • Application efficiency equal to the average values provided in Ecology Guidance 1210. • Water right limit is 63 af/yr.						

Table 3. Annual Volume Calculated for Blueberries

Method	Crop	CIR (inches)	Application Efficiency	TIR (inches)	TIR (feet)	Volume (af/yr)
Adjusted WIG 10-year return interval	Raspberries	19.34	90%	21.49	1.79	51.9
• Crop is raspberries • Irrigation method is subsurface drip. • WIG value is average of Clearbrook and Blaine Stations. • 10-year return interval is the WIG times 1.17 for raspberries • 29 acres of irrigation. • Application efficiency near the average values provided in Ecology Guidance 1210 (90%). • Water right limit is 63 af/yr.						

Tables 2 and **3** show that historically, less than the full water right annual limit of 63 af/yr has likely been used. The total irrigation requirement has decreased by irrigating raspberries instead of pasture through crop rotation. Therefore, it is reasonable to conclude that a maximum of 54.5 afy has been used and not lost due to non-use without sufficient cause.

Proposed Use

The primary purposes of these change/transfer applications are to consolidate the water rights onto agricultural property owned by CMF and to make the existing points of withdrawal common to the water rights where appropriate.

Proposed Place of Use

The proposed POU is approximately 537 acres located in Sections 22 and 23, Township 40 North, Range 2 East, W.M. The proposed POU includes the one tax parcel that comprises the existing POU and 35 additional tax parcels which form a contiguous block of primarily agricultural property. A summary of the property ownership in the proposed POU is presented in **Table 4**.

Table 4. Summary of Land Ownership in Proposed Place of Use
Water Right GWC 7298

GeoTax Parcel No.	Parcel Owner	Parcel Area (acres)	Irrigable Land (acres)
400222 460378	CMF Farming Properties LLC	53.76	38.0
400222 484507	CMF Farming Properties LLC	4.59	3.0
400222 487090	CMF Farming Properties LLC	7.00	4.7
400222 501067	Bertrand Court LLC	1.36	0.9
400222 510203	Bertrand Court LLC	13.00	3.5
400223 012342	CMF Farming Properties LLC	6.45	1.1
400223 016209	Bertrand Court LLC	11.60	5.8
400223 016490	Maranda J. Maberry	3.91	3.3
400223 031430	CMF Family Properties LLC	7.83	1.1
400223 085342	CMF Farming Properties LLC	33.55	26.7
400223 039491	Matthew C. Maberry	4.04	3.0

400223 110199	CMF Farming Properties LLC	42.11	42.1
400223 149098	CMF Farming Properties LLC	5.43	4.3
400223 152498	CMF Processing Properties LLC	3.36	0.0
400223 155430	CMF Farming Properties LLC	32.17	27.5
400223 177082	CMF Farming Properties LLC	15.57	4.3
400223 185262	CMF Farming Properties LLC	0.51	0.5
400223 185490	CMF Processing Properties LLC	5.00	0.0
400223 200340	CMF Farming Properties LLC	40.00	39.4
400223 210199	CMF Farming Properties LLC	31.65	31.7
400223 233068	CMF Farming Properties LLC	14.94	12.8
400223 234482	CMF Processing Properties LLC	4.25	2.6
400223 257485	CMF Family Properties LLC	1.30	1.1
400223 276482	CMF Farming Properties LLC	1.34	1.0
400223 287440	CMF Farming Properties LLC	7.07	6.9
400223 320459	CMF Farming Properties LLC	7.78	7.6
400223 337340	CMF Farming Properties LLC	35.69	35.3
400223 342459	CMF Farming Properties LLC	4.37	2.4
400223 360455	CMF Farming Properties LLC	4.29	3.8
400223 375446	CMF Farming Properties LLC	4.31	4.2
400223 376511	CMF Farming Properties LLC	1.00	0.8
400223 379377	CMF Farming Properties LLC	4.31	4.1
400223 421236	CMF Farming Properties LLC	94.72	79.4
400223 466067	CMF Farming Properties LLC	19.59	19.3
400223 515031	CMF Farming Properties LLC	4.49	4.2
400223 515090	CMF Farming Properties LLC	4.72	4.3
Total		537.06	430.7

The proposed POU includes 36 tax parcels which are all owned by representatives of CMF (**Table 4**). The proposed POU has a total area of approximately 537 acres, of which roughly 430.7 acres are irrigable (**Table 4**).

Annual Consumptive Quantity

A change in the place of use, point of diversion (withdrawal), and or purpose of use of a water right to enable irrigation of additional acreage or the addition of new uses may be permitted if the change results in no increase in the annual consumptive quantity (ACQ) of water used under the water right (RCW 90.03.380). ACQ means the estimated or actual amount of water diverted in a year, allowed under a water right, reduced by the estimated annual amount of return flows. This quantity is then averaged using the greatest 2 years of use within the most recent 5-year period of continuous beneficial use of the water right. **Table 5** contains information on the crops grown within the place of use over the past five year period.

Table 5. Crops grown within the Place of Use Over Past 5 Years and Eligible for ACQ analysis

Irrigation Season	Crop	Acres
2011	Raspberries	29
2012	**Raspberries**	**29**

2013	Raspberries	29
2014	Raspberries	29
2015	**Raspberries**	**29**

The ACQ analysis for this change application will be performed on the 2011 through 2015 irrigation seasons (**Table 5**). Based on the data available, it appears that 2012 and 2015 represent the years when the crop irrigated would require application of the most irrigation water. Therefore, based on this data, these 2 years will be used as the 2 highest years of use within the last 5 years of consecutive water use. During 2012 and 2015, 32 acres of raspberries were irrigated.

As was discussed in the History of Water Use section above, there are no metering records that would allow an evaluation of annual TIR or ACQ for each of the past 5 years. **Tables 3** and **5** show that for the highest use in the past five years approximately 51.9 af/yr has been used for irrigation of the 29 acres of raspberries. **Table 6** shows the Annual Consumptive Quantity Calculation for this water right. Based on the monthly consumptive quantities shown in **Table 6**, the ACQ for this water right is 46.7 af/yr and 5.2 af/yr is return flows.

Table 6. Annual Consumptive Quantity Calculation

Month	Days	Blaine CIR (in)	Adjusted[1] CIR (in)	Adjusted[1] CIR (ft)	Irrigation acres	CIR (af)	Ea %	TIR (ft)	TIR (af)	Max Qa (af)[2]	WR Qa (af)[3]	CU %[4]	ACQ (af)[5]
May	31	2.80	2.95	0.25	29.0	7.1	90%	0.27	7.92	20.55	7.92	90%	7.13
June	30	4.21	4.70	0.39	29.0	11.4	90%	0.44	12.63	19.89	12.63	90%	11.37
July	31	5.69	6.58	0.55	29.0	15.9	90%	0.61	17.66	20.55	17.66	90%	15.89
August	31	3.83	4.29	0.36	29.0	10.4	90%	0.40	11.51	20.55	11.51	90%	10.36
September	30	0.94	0.82	0.07	29.0	2.0	90%	0.08	2.20	19.89	2.20	90%	1.98
	153	17.47	19.33	1.61	29.0	46.7			51.9	101.4	51.9		46.7

[1] Adjusted for drought at 117% of WIG at the average of the Blaine and Clearbrook stations for raspberries.
[2] Based on 150 gpm 24/7 for specific month
[3] Maximum calculated recently pumped Qa for GWC 7298.
[4] CU % is the percent consumptive use, which is equal to the Ea for subsurface drip, per Guidance 1210.
[5] Consumptive quantity
Average Ea% = 90.0%

Since the proposed use requests to increase the number of irrigated acres to the point that there will be no return flow, only the consumptive annual volume (46.7 af/yr) can be carried through the water right change. In his affidavit (dated January 6, 2016), Mr. Matthew Maberry acknowledged that if the change is approved, CMF will be deficit irrigating its crops (applying less water than the crop can consume) and that the deficit irrigation practices are reasonable and adequate for growing the crops they plan to grow on these fields. It is also possible that the water right holder might need to practice crop rotation and irrigate less than the full requested 430.7 acres in every given year in order to be able to provide a higher duty on the remaining fields.

Period of Use

The water right record for GWC 7298 identifies the period of use for irrigation as May 1 to October 31. This irrigation season is reasonable for the crops grown in Whatcom County and will be maintained through the change.

Other Rights Appurtenant to the Place of Use

The Department of Ecology's Water Resources Explorer was used to determine what rights might be appurtenant to the proposed POU (January 2016).

Besides the 7 irrigation water rights that are being changed concurrently by CMF, there are 13 other water right documents that appear to be appurtenant to at least a portion of the proposed place of use. Those water right documents are described in **Table 7** and include 4 certificates, 1 permit, and 8 claims.

Table 7. Other Water Rights Appurtenant to the Proposed Place of Use

Water Right Name	Water Right Number	Priority Date	Rates	Purpose of Use	Notes
Held (at least partially) by CMF					
Curtis E. Maberry	G1-24774C	11/25/1985	73.2 gpm 29.29 af/yr	Commercial industrial and community domestic	For processing plant and farm worker housing.
Curtis E. Maberry	G1-24775C	11/25/1985	22.4 gpm 3 af/yr	Domestic	3 homes
W.E. Holt	SWC 5726	6/15/1953	0.18 cfs	Irrigation of 18 acres	POU includes part of proposed POU.
Clifford Swope	G1-000683CL	1944	200 gpm 45 af/yr	Irrigation of 45 acres	POU includes part of proposed POU.
Winfred E. Maberry	G1-002743CL	1965	20 gpm 2 af/yr	Domestic	Date of first use later than 1945
Winfred E. Maberry	G1-002745CL	1965	20 gpm 2 af/yr	Domestic	Date of first use later than 1945
Walter & Barbara James	G1-027566CL	6/1970	10 gpm 2 af/yr	Domestic, steers, horses, and dog kennel	Date of first use later than 1945

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Van Beek-Heeringa	G1-029756CL	8/1/1950	10 gpm 1 af/yr	Domestic	Date of first use later than 1945
Van Beek-Heeringa	G1-034621CL	1949	680 gpm 81 af/yr	Irrigation of 20 acres and stock water	Date of first use later than 1945
Van Beek-Heeringa	S1-098217CL	6/15/1944	550 gpm 40 af/yr	Irrigation of 20 acres	Date of first use later than 1917
William Trammell	G1-147237CL	Not Specified	Not Specified	Domestic	Short form claim
Fully Held by Others					
Berthusen Road Water Association	G1-20260C	7/20/1972	30 gpm 48 af/yr	Municipal	
City of Lynden	S1-28116P	8/28/2001	0.57 cfs 70 af/yr	Domestic	[1]See note below
[1] To alleviate a public health emergency arising from the contamination of groundwater with ethylene dibromide (EBD) and 1,2-dichloropropane (1,2-DCP).					

The two Curtis Maberry certificates were issued for domestic (staff, homes, and farm worker housing) and commercial/industrial uses (processing plant).

The Holt certificate (SWC 5726) includes land that falls both within and outside of the proposed place of use. No tentative determination was made on this water right claim since its POU is not within the existing place of use of any of the 7 water rights being changed and since it is not being changed at this time.

The Clifford Swope claim (G1-000683CL) appears to include land that falls both within and outside of the proposed place of use. No tentative determination was made on this water right claim since its POU is not within the existing place of use of any of the 7 water rights being changed and since it is not being changed at this time.

The remaining 7 claims identify the date of first use as being after the adoption of the applicable surface or groundwater code. Therefore, without information to the contrary, it is assumed that they do not represent vested rights, but could be permit exempt (if applicable).

The Berthusen Road Water Association and City of Lynden water rights are not for agricultural irrigation and therefore the overlap of these rights with the proposed POU does not present a problem since the purposes of use are different.

For the reasons identified above, all of the historic water use within the existing place of use of the water right being changed will be attributed to the water right being changed.

Hydrologic/Hydrogeologic Evaluation

A separate hydrogeologic memorandum was prepared by Adam Neff, L.G., focusing on the same body of public groundwater test and impairment (RH2 Engineering Technical Memorandum, February 8, 2016). A summary of that memorandum is presented here and more detail can be obtained from the memorandum, located in the water right file.

The existing and proposed POUs involved in these water right changes lie on Lynden Terrace just west of the town of Lynden. The project area is generally flat with a slight slope from the north to the south at approximately 0.5 percent. The area is primarily composed of glaciomarine drift and recessional glacial outwash materials from the Vashon glaciers. The POU is within the Bertrand Creek surface water sub-basin.

All POWs withdraw water from the Sumas outwash aquifer which is approximately 30 to 40 feet thick within the project area. Based on depth-to-water measurements taken in twelve existing wells on the property during the site visit on October 14, 2015, and depth to water measurements recorded in nearby wells, the general groundwater flow is toward the southwest (**Figure 1**). Based on the groundwater measurements during the site visit and the USGS mapped groundwater contours (Creahan, 1988) there appears to be a groundwater divide across the site running from northeast to southwest, with the groundwater east of the divide flowing primarily south toward an unnamed tributary of Bertrand Creek, Fishtrap Creek, and the Nooksack River (referred to as the Fishtrap Creek groundwater sub-basin), while the groundwater to the west discharges to the main stem of Bertrand Creek (referred to as the Bertrand Creek groundwater sub-basin).

Pumping Impacts on Surface Water Bodies

Under Washington State water law, a water right holder is typically prohibited from transferring a surface water right from one tributary to another. As has been discussed previously, groundwater is directly connected to surface water in the Bertrand Creek and Fishtrap Creek sub-basins, and because of this, the same rules apply to the transfer of groundwater. This connection also allows for water rights to be transferred from a surface water diversion to a groundwater withdrawal. This connection also means that water rights must continue to withdraw water from POWs/points of diversion (PODs) (whether existing or future) that are located within this same source of supply. Based on the groundwater contours available, the boundary between the mainstem Bertrand Creek and the Fishtrap Creek groundwater sub-basins on the CMF Home Fields property is a line running northeast-southwest through the eastern one-third of Section 23, Township 40 North, Range 2 East W.M. (**Figure 1**).

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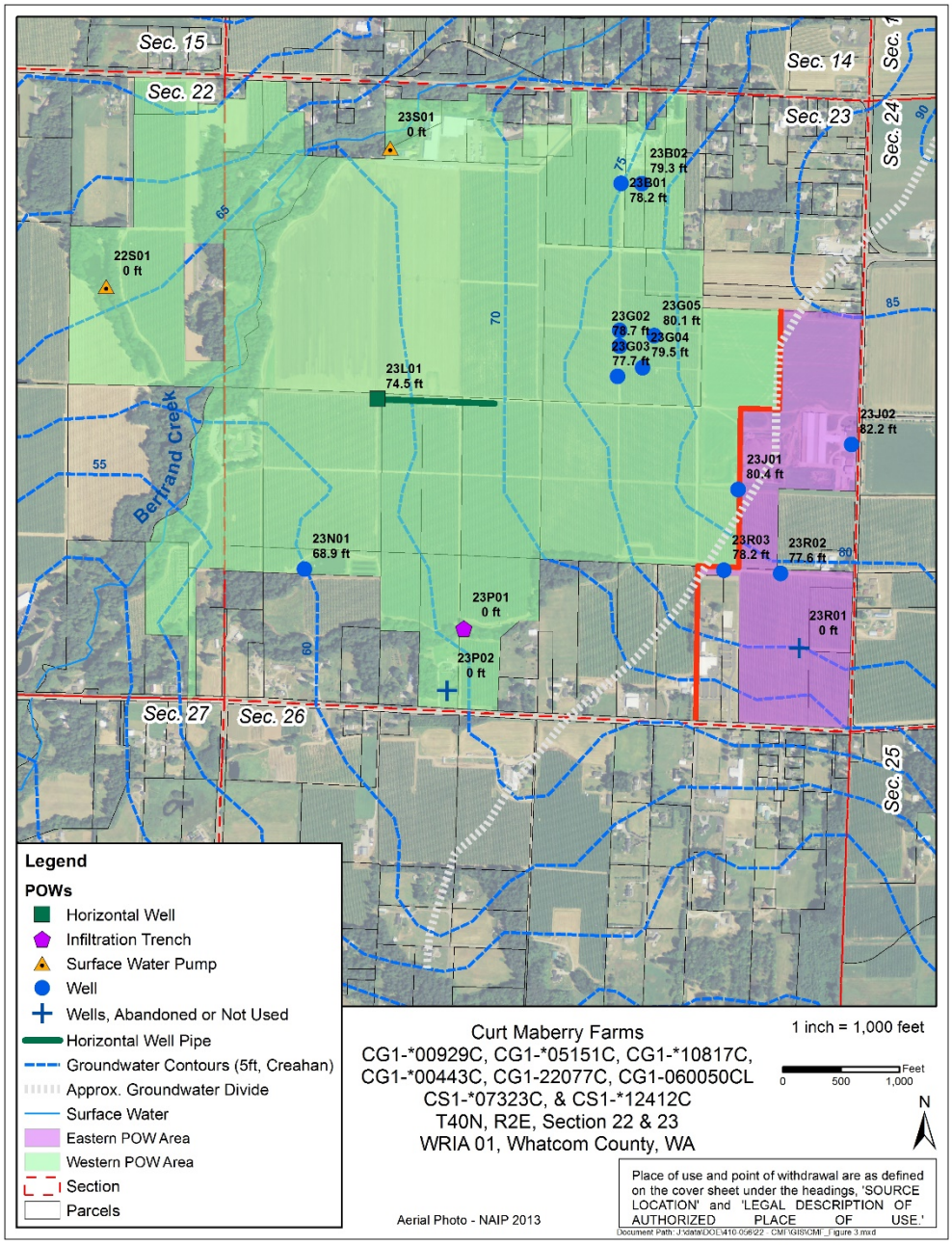

Figure 1. Well Locations and Groundwater Flow Direction

Same Body of Public Groundwater

All the POWs tap into the Sumas Aquifer. However, contours indicate the presence of a groundwater divide running through the project area. This groundwater divide prevents the movement of a point of withdrawal from one side to the other. The existing POWs for two of the groundwater rights in this group were within the eastern (Fishtrap Creek) groundwater sub-basin, five rights had POWs/PODs in the

western (Bertrand Creek) groundwater sub-basin, and one had POWs within both subbasins (**Figure 1)**. CMF has agreed to limit the use of the one that straddles the divide, G1-*05151C (GWC 3960), to only the Bertrand groundwater sub-basin.

Due to this groundwater divide, the following water rights must continue to withdraw water from the Eastern POW Area corresponding to the Fishtrap Creek groundwater sub-basin, via existing POWs (23J02, 23R02, and 23R03) and future POWs: G1-22077C and GWC 789 (G1-*00443C).

The remaining four groundwater rights GWC 3960 (G1-*05151C), G1-060050CL, GWC 7298 (G1-*10817C), and GWC 866 (G1-*00929C) and the surface water right SWC 2646 (S1-*07323C) must continue to withdraw water from the Western POW Area corresponding to the Bertrand Creek groundwater sub-basin, via existing POWs (23B01, 23B02, 23G01, 23G02, 23G03, 23G04, 23G05, 23J01, 23L01, 23N01, and 23P01) and future POWs.

Pumping Impacts on Neighboring Wells

Nearby water rights were reviewed to determine the approximate distance between the proposed wells and existing wells for purposes of calculating the anticipated interference drawdown in the neighboring wells. In addition to the existing on-site wells (Wells 23B01, 23B02, 23G01, 23G02, 23G03, 23G04, 23G05, 23L01, 23N01, 23P01, 23J01, 23J02, 23R02, and 23R03), CMF has requested the ability to add additional wells in the future within the proposed POU. Since exact locations for the future wells have not been specified, analysis for impact was completed assuming that the wells are located on the edge of the POU boundary closest to any neighboring wells with which they could interfere. This "worst-case" assumption is made to be as protective of neighboring well users as possible.

Interference drawdown was calculated using a transmissivity of 1,775 feet squared per day (ft^2/day) based on pump test results identified on the well logs of wells within Section 23 and a storage coefficient of 0.2 since it is an unconfined aquifer. The maximum instantaneous rate used for the calculations was based on the AESI restriction of 100 gpm for all future vertical wells. The duration of pumping was determined from the water rights, using the maximum allotted irrigation period for the length of pumping; Western Area 153 days and Eastern Area 168 days. See **Table 8** for interference drawdown results.

Table 8. Estimated Interference Drawdown from Future Traditional POWs Due to Operation of Well at Maximum Pumping Rate

Qi (gpm)	POW Area	Duration (days)	Drawdown at Well (feet)	Drawdown at 100 feet (feet)	Drawdown at 200 feet (feet)	Drawdown at 500 feet (feet)	Drawdown at 1,000 feet (feet)	Theoretical Radius of Influence (feet)
100	Western Area	153	14.07	4.93	3.74	2.16	0.96	1,746
100	Eastern Area	168	14.15	5.01	3.82	2.24	1.04	1,829

For future horizontal wells, the same aquifer parameters were used, along with the maximum instantaneous rates for the two bodies of public groundwater (717 gpm Western POW Area; and 260 gpm Eastern POW Area), and the duration set for the length of time necessary to achieve the entire annual quantity for the two groups at the maximum pumping rate. See **Table 9** for interference drawdown results related to horizontal wells.

Table 9. Estimated Interference Drawdown from Future Horizontal POWs Due to Operation of Well at Maximum Pumping Rate

Qi (gpm)	POW Area	Duration (days)	Drawdown at Center of HW (feet)	Drawdown at 300 feet from center (feet)	Drawdown at 300 feet from ends (feet)	Theoretical Radius of Influence (feet)
717	Western Area	56	13.2	3.6	2.0	1,440
260	Eastern Area	89	10.5	2.6	1.1	1,628

As long as existing wells continue to be pumped at the existing rates (per AESI reports) and all new wells are not allowed within a setback distance from non-CMF owned property lines of 200 feet for traditional vertical wells and 300 feet for horizontal wells (any portion of the structure), the changes requested will not adversely impact neighboring water rights.

Impairment Considerations

Impairment of Minimum Instream Flow Water Rights

The term "instream flow" is used to identify a specific stream flow (typically measured in cfs) at a specific location for a defined time, and typically following seasonal variations. Instream flows are usually defined as the stream flows needed to protect and preserve instream resources and values, such as fish, wildlife, and recreation. Instream flows are most often described and established in a formal legal document, typically an adopted state rule.

Once established by rule, a minimum flow constitutes an appropriation with a priority date as of the effective date of the rule establishing the minimum flow (RCW 90.03.345). Thus, a minimum flow set by rule is an existing right which may not be impaired (RCW 90.03.345; RCW 90.44.030). Minimum flows for the Nooksack River Basin are established by Chapter 173-501 WAC.

The proposed changes will cause no greater impact on minimum instream flows established in Chapter 173-501 WAC than exist with the originally approved well locations. Therefore, the change will not cause any impairment of minimum instream flows.

Impairment, Qualifying Groundwater Withdrawal Facilities, and Well Interference

There are three concepts that are important when considering whether a withdrawal of water from a well would impair another existing water right. The concepts are defined as follows:

- Impairment is an adverse impact on the physical availability of water for a beneficial use that is entitled to protection, i.e., water rights that are both senior and junior in priority to the right the applicant seeks to change.
- Qualifying groundwater withdrawal facilities are defined as those wells which, in the opinion of the Department of Ecology, are adequately constructed. An adequately constructed well is one that (a) is constructed in compliance with well construction requirements; (b) fully penetrates the saturated thickness of an aquifer or withdraws water from a reasonable and feasible pumping lift (WAC 173-150); (c) the withdrawal facilities must be able to accommodate a reasonable variation

in seasonal pumping water levels; and (d) the withdrawal facilities including pumping facilities must be properly sized to the ability of the aquifer to produce water.

- Well interference may occur when several wells penetrate and withdraw groundwater from the same aquifer.

As discussed in the Hydrologic/Hydrogeologic Evaluation section, no impairment is expected to occur in neighboring wells as a result of pumping in the wells associated with this water right change application, for the following reasons:

1. The aquifer is very thin and most wells fully penetrate the aquifer (typically a depth of less than 50 feet with a saturated thickness of less than 30 feet).
2. The hydraulic conductivity of the aquifer is only moderate.
3. The aquifer is unconfined, which results in a higher storage coefficient (specific yield) than if the aquifer was confined.
4. All existing POWs will continue to be pumped at the existing rates.
5. All future POWs will be installed with setbacks from property lines with non-CMF owned properties.
6. Future POWs within the Western POW Area shall also be setback from Bertrand Creek the same distance as from non-CMF owned properties.

Pumping a well completed at the base of a thin aquifer with a moderate hydraulic conductivity and high storage coefficient will tend to create a steep cone of depression around the well. This steep cone of depression often reduces the ability to pump these wells at a high rate for a long enough duration to impact neighboring wells.

Public Interest Considerations

The changes proposed by the applicant will not be detrimental to the public interest.

Consideration of Protests and Comments

No comments were received and no protests were filed against this change application.

Conclusions

The subject water right is eligible for change, the additional wells will tap the same body of public groundwater as the original wells (as long as the stipulations described are followed); there will be no impairment of existing rights; the combined total withdrawal from the original and the additional wells will not enlarge the right; and there will be no detriment to the public interest.

RECOMMENDATIONS

Based on the above investigation and conclusions, I recommend that this request for a water right change be partially approved in the amounts and within the limitations listed below and subject to the provisions listed above.

Purpose of Use and Authorized Quantities

The amount of water recommended is a maximum limit and the water user may only use that amount of water within the specified limit that is reasonable and beneficial:

- 150 gpm (additive)
- 46.7 acre-feet per year (additive)
- Irrigation of 66.5 acres (additive) 364.2 acres (non-additive)
- May 1 to October 31

Points of Withdrawal

SOURCE FACILITY/DEVICE	PARCEL	WELL TAG	TWP	RNG	SEC	QQ Q	LATITUDE	LONGITUDE
23B01	400223342459	BHX550	40N	02E	23	NW NE	48.9478	-122.5161
23B02	400223342459	BHX508	40N	02E	23	NW NE	48.9478	-122.5153
23G01	400223337340	BHN424	40N	02E	23	SW NE	48.9444	-122.5160
23G02	400223337340	BHX509	40N	02E	23	SW NE	48.9440	-122.5160
23G03	400223337340	BHX511	40N	02E	23	SW NE	48.9434	-122.5160
23G04	400223337340	BHX512	40N	02E	23	SW NE	48.9435	-122.5150
23G05	400223337340	BHX513	40N	02E	23	SW NE	48.9442	-122.5147
23J01	400223421236	BHN422	40N	02E	23	NE SE	48.9406	-122.5115
23L01 Horizontal Well	400223210199	BIS479	40N	02E	23	NE SW	48.9425	-122.5245
23N01	400223117082	BHX515	40N	02E	23	SW SW	48.9385	-122.5271
23P01 Infiltration Trench	400223233068	BHX516	40N	02E	23	SE SW	48.9372	-122.5211
Future Well(s)	Multiple	-	40N	02E	22	E/4 E/4	-	-
Future Well(s)	Multiple	-	40N	02E	23	W/2	-	-
Future Well(s)	Multiple	-	40N	02E	23	W/2 E/2	-	-
Future Well(s)	400223421236	-	40N	02E	23	SE SE	-	-
Future Well(s)	400223421236	-	40N	02E	23	W/2 SE NE	-	-
Future Well(s)	400223421236	-	40N	02E	23	W/2 W/2 NE SE	-	-

Note: All additional or replacement wells constructed under this water right must be installed per the setback requirements identified in this Report of Examination.

Place of Use

As described starting on Page 2 of this Report of Examination.

Water Rights Associated with the Same Place of Use

Table 10 lists all of the state-issued water rights that are held by CMF, associated with the Home Fields POU, and being changed simultaneously. This table is intended to assist the water right holder and future investigators to more easily understand the attributes and limitations on the portfolio of state-issued water rights associated with irrigation of the Home Field POU. **Table 10** does not include either SWC 5726 (W.E. Holt), or claim G1-000683CL (Clifford Swope) which appear to include land that falls both within and outside of the proposed place of use, because they were not changed at the same time as the other

water rights. **Table 10** also does not account for any permit-exempt groundwater rights that might be used within the proposed place of use.

Table 10. Summary of Recommended Water Right Change Decisions, Associated with Irrigation of the Home Fields by CMF

Water Right	Qi (gpm)	Qa (af/yr)	Additive Irrigated Acres	Season of Use	Place of Use	Points of Diversion/ Withdrawal
SWC 2646 (S1-*07323C) (Kelly)	112	40.3	57.3	04/15-10/01	CMF Home Fields	**Western POW Area** 23B01, 23B02, 23G01, 23G02, 23G03, 23G04, 23G05, 23J01, 23L01, 23N01, 23P01, and future wells
G1-060050CL (Englert)	120	5.5	7.8	06/01 – 09/15		
GWC 866 (G1-*00929C) (Derr)	160	40.0	56.9	During irrigation season		
GWC 7298 (G1-*10817C) (Crabtree)	150	46.7	66.5	05/01 – 10/31		
GWC 3960 (G1-*05151C) (Bajema)	175	84.0	119.8	During irrigation season		
GWC 789 (G1-*00443C) (Fassett)	160	47.5	67.6	During irrigation season		**Eastern POW Area** 23J02, 23R02, 23R03, and future wells
G1-22077C (Vander Veen)	100	38.5	54.8	04/15 – 10/01		
Total	**977**	**302.5**	**430.7**			

Report by: _____

Jim Bucknell – RH2 Engineering, Inc. Date

DRAFT

Report by: _____

Andrew B. Dunn, L.G., L.HG., CWRE – RH2 Engineering, Inc. Date

Report by: _____

Adam Neff, L.G., - RH2 Engineering, Inc. Date

Reviewed by: _____

Buck Smith, L.G., L.HG. - Water Resources Program Date

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REFERENCES

Associated Earth Sciences, Inc., January 28, 2015, Project Summary, Water Right Change/Transfer Application G1-10817C, Whatcom County, Washington.

Cox, S.E. and Kahle, S.C, 1999, Hydrogeology, ground-water quality, and sources of nitrate in lowland glacial aquifers of Whatcom County, Washington, and British Columbia, Canada. United States Geological Survey, Water-Resources Investigations Report 98-4195.

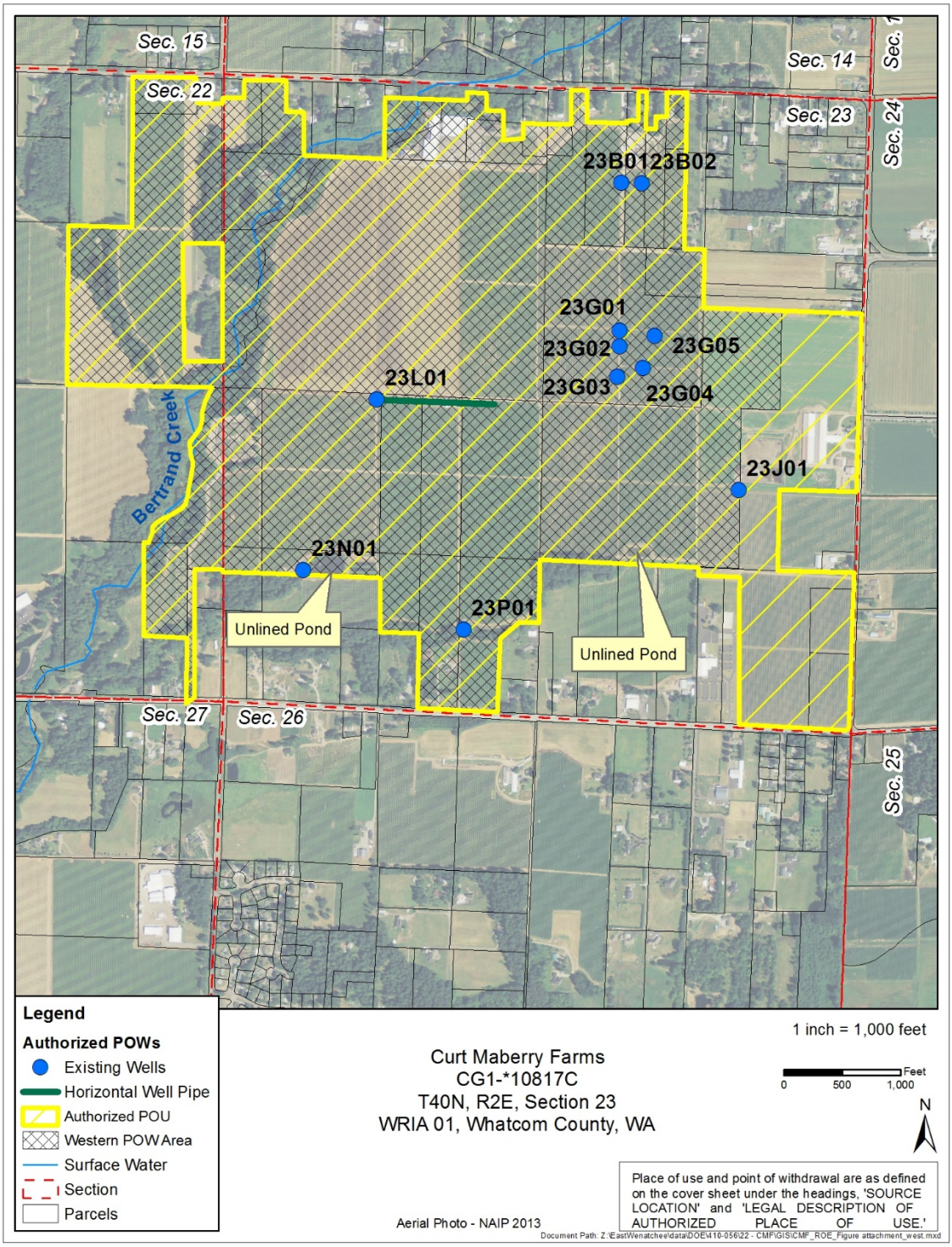
Creahan, K., 1988, Water Table Elevations and Groundwater Flow in an Unconfined Aquifer in Northern Whatcom County, Washington. Thesis, Western Washington University.

RH2 Engineering, Inc., February 8, 2016, Hydrogeologic Report for Curt Maberry Farms Home Fields Change Applications.

Notes and photos from site visit by Adam Neff, L.G. and Andrew B. Dunn, L.G., L.HG., RH2 Engineering, Inc., on October 14, 2015.

DRAFT

ATTACHMENT


Sec. 15
Sec. 22
Sec. 14
Sec. 23
Sec. 24
23B01
23B02
23G01
23G02
23G05
23G03
23G04
23L01
Bertrand Creek
23J01
23N01
23P01
Unlined Pond
Unlined Pond
Sec. 27
Sec. 26
Sec. 25
Legend
Authorized POWs
Existing Wells
Horizontal Well Pipe
Authorized POU
Western POW Area
Surface Water
Section
Parcels
1 inch = 1,000 feet
Feet
0
500
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N
Curt Maberry Farms
CG1-*10817C
T40N, R2E, Section 23
WRIA 01, Whatcom County, WA
Place of use and point of withdrawal are as defined on the cover sheet under the headings, 'SOURCE LOCATION' and 'LEGAL DESCRIPTION OF AUTHORIZED PLACE OF USE.'
Aerial Photo - NAIP 2013