File NR CS1-*17211C@1
WR Doc ID 5600736

DEPARTMENT OF ECOLOGY
State of Washington

State of Washington
PROTESTED
REPORT OF EXAMINATION
FOR WATER RIGHT CHANGE

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

PRIORITY DATE	WATER RIGHT NUMBER
April 2, 1962	SWC 9177 [CS1-*17211C@1]

MAILING ADDRESS	SITE ADDRESS (IF DIFFERENT)
ENFIELD FARMS INC 1064 BIRCH BAY LYNDEN ROAD LYNDEN WA 98264	

Total Quantity Authorized for Withdrawal or Diversion

WITHDRAWAL OR DIVERSION RATE	UNITS	ANNUAL QUANTITY (AF/YR)
90	GPM	29.28

Total withdrawals (from this water right) from all sources must not exceed the total quantities authorized for withdrawal listed above.

Purpose

	WITHDRAWAL OR DIVERSION RATE			ANNUAL QUANTITY (AF/YR)		
PURPOSE	ADDITIVE	NON-ADDITIVE	UNITS	ADDITIVE	NON-ADDITIVE	PERIOD OF USE (mm/dd)
Irrigation	90		GPM	29.28	16.92	04/15 - 10/01

IRRIGATED ACRES		PUBLIC WATER SYSTEM INFORMATION	
ADDITIVE	NON-ADDITIVE	WATER SYSTEM ID	CONNECTIONS
27.6	233.4		

Source Location

COUNTY	WATERBODY	TRIBUTARY TO	WATER RESOURCE INVENTORY AREA
WHATCOM	GROUNDWATER		1-NOOKSACK

SOURCE FACILITY/DEVICE	PARCEL	WELL TAG	TWP	RNG	SEC	QQ Q	LATITUDE	LONGITUDE
HW-1	400222136219	BHN668	40N	02E	22	NW SW	48.94107	-122.54688
HW-3	400221456167	BHN678	40N	02E	21	NE SE	48.93962	-122.55488
HW-4	400222065318	BHE777	40N	02E	22	SW NW	48.94410	-122.54657
HW-6	400222210076	BHN667	40N	02E	22	SE SW	48.93788	-122.54681
IW-1	400222021162	BHN673	40N	02E	22	NW SW	48.94041	-122.55118

IW-2	400221460037	BHN666	40N	02E	21	SE SE	48.93597	-122.55593
IW-3	400221460037	BHE776	40N	02E	21	SE SE	48.93693	-122.55598
Future Well	400221522186	NA	40N	02E	21	NE SE	-	-
Future Well	400221469097	NA	40N	02E	21	NE SE	-	-
Future Well	400222206332	NA	40N	02E	22	SE NW	-	-
Future Well	400222077282	NA	40N	02E	22	SW NW	-	-
Future Well	400222015202	NA	40N	02E	22	NW SW	-	-
Future Well	400222021162	NA	40N	02E	22	NW SW	-	-
Future Well	400222136219	NA	40N	02E	22	NE SW	-	-
Future Well	400222210076	NA	40N	02E	22	NE SW		

Datum: NAD83/WGS84

Place of Use (See Attached Map)

PARCELS

400221456167, 400221522186, 400221469097, 400221460037, 400222334134, 400222206332, 400222136219, 400222015202, 400222021162, 400222210076, 400222065318, 400222077282, 400222200400 and 400227282462

LEGAL DESCRIPTION OF AUTHORIZED PLACE OF USE

Section 21, Township 40 North, Range 2 East

S ½ NE ¼ SE ¼, Section 21, Township 40 North, Range 2 East W.M.; EXCEPT a tract beginning at the NE corner of the described property and running west 297 feet, thence south 110 feet, thence east 297 feet to the section line and thence north 110 feet to the point of beginning; AND EXCEPT a tract beginning at the NE corner of the described property thence south 230 feet to the true point of beginning, thence west 317 feet, thence south 206 feet, thence east 317 feet to the section line, thence north 206 feet to the true point of beginning.

N ½ SE ¼ SE ¼, Section 21, Township 40 North, Range 2 East W.M.; EXCEPT the east 299.5 feet of the south 728 feet.

S ½ SE ¼ SE ¼, Section 21, Township 40 North, Range 2 East W.M.; EXCEPT the east 299.5 feet; AND EXCEPT a tract beginning at the southeast corner of the section thence west 299.5 feet to the true point of beginning, thence 220.5 feet west, thence 520 feet north, thence 299.5 feet east, thence 520 feet south to the true point of beginning.

Section 22, Township 40 North, Range 2 East

N ½ SW ¼, Section 22, Township 40 North, Range 2 East W.M.

NW ¼ SE ¼, Section 22, Township 40 North, Range 2 East W.M.

N ½ S ½ SW ¼ NW ¼, Section 22, Township 40 North, Range 2 East W.M.; EXCEPT south 182.26 feet of west 239 feet.

S ½ S ½ SW ¼ NW ¼, Section 22, Township 40 North, Range 2 East W.M.; EXCEPT north 188 feet of west 463.41 feet.

SW ¼ SE ¼, Section 22, Township 40 North, Range 2 East W.M.; EXCEPT 1 acre in the SE corner southerly of Bertrand Creek; ALSO EXCEPT a tract described as follows, beginning at the south quarter corner thence running east along section line 350 feet to the true point of beginning, thence north 208.7 feet, thence east 208.7 feet, thence south 208.7 feet, thence west along the section line 208.7 feet to the true point of beginning.

SE ¼ SW ¼, Section 22, Township 40 North, Range 2 East W.M.; EXCEPT the west 100 feet of the north 310 feet; AND EXCEPT the west 400 feet of the south 300 feet; AND EXCEPT the east 427 feet of the south 371.25 feet.

East 130 feet of the south 290 feet of the N ½ SW ¼ SW ¼, Section 22, Township 40 North, Range 2 East W.M.;

Section 27, Township 40 North, Range 2 East

Lot 1 Maberry Short Plat as recorded in book 3 short plats page 149 within the NW ¼ NE ¼, Section 27, Township 40 North, Range 2 East W.M.

ALL except roads.

Proposed Works

Three infiltration trenches (HW-1, HW-3, and HW-6), three wells (IW-1, IW-2, and IW-3), and one horizontal well (HW-4) that are less than 50 feet deep and completed in the Sumas Outwash aquifer. The irrigation system consists of 4 to 8-inch mainlines with 3 to 4-inch sub-mains serving approximately 20 irrigation zones covering a total of 261 irrigated acres. Two pumphouse facilities contain sand filters for particle removal and a meter for fertigation. Water is delivered to berries using drip irrigation. When crops are irrigated with traveling big gun sprinklers, the reels are connected to the mainlines with flexible hoses.

Development Schedule

BEGIN PROJECT	COMPLETE PROJECT	PUT WATER TO FULL USE
Started	December 31, 2015	December 31, 2019

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

Relationship to Other Water Rights

SWC 4435, SWC 1384, SWC 9177, GWC 1300, GWC 3986(C), G1-00502C, G1-20922C, G1-21213C, G1-21356C, and water right claim G1-030294CL are authorized for a combined total of 1,589.82 gpm and 293.4 af/yr (277.0 af/yr for the irrigation of 261 acres and 16.4 af/yr for industrial use) 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.

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 new points of withdrawal will tap the same source of supply as the original point of diversion; there will be no impairment of existing rights; the combined total withdrawal from the new points of withdrawal will not enlarge the right; and there will be no detriment to the public interest.

Therefore, I ORDER partial approval of Application No. CS1-*17211C@1 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 31 day of December 2014.

Jerry Liszak, Acting 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.

INVESTIGATOR'S REPORT

Water Right Control Number CS1-*17211C@1
Enfield Farms, Inc.

BACKGROUND

This report serves as the written findings of fact concerning Water Right Application Number CS1-*17211C@1 which proposes to change Surface Water Certificate (SWC) 9177. Much of this report was adapted from the eight Reports of Examination completed by RH2 Engineering, Inc. discussed below.

Ten water right change applications were filed by Enfield Farms, Inc. (Enfield Farms) associated with their Home Fields operation. RH2 Engineering, Inc. (RH2) was chosen to process eight of these water right change applications (CG1-030294CL, CG1-*05902C, CG1-00502C@1, CG1-21356C, CG1-21213C@1, CG1-*02351C@1, CG1-20922C@1, and CS1-05117C@1) through the cost reimbursement program. The remaining two change applications will be processed by the Department of Ecology (CS1-*17211C@1 and CS1-*09876C).

Out of the eight applications to be processed by RH2, only six of these applications request changes to points of withdrawal (CG1-030294CL, CG1-*05902C, CG1-00502C@1, CG1-21356C, CG1-21213C@1, and CG1-20922C@1). The two change applications to be processed by the Department of Ecology (CS1-*17211C@1 and CS1-*09876C) request to change the points of diversion from surface water to points of withdrawal from groundwater.

The remaining two applications to be processed by RH2 are CG1-*02351C@1 (which seeks to add industrial as a purpose of use, change the place of use, and increase the number of irrigated acres) and CS1-05117C@1 (which seeks to change the place of use and increase the number of irrigated acres.)

All original and proposed points of diversion/withdrawal and the original and proposed place of use under these ten water rights are located within Sections 21, 22, and 27, Township 40 North, Range 2 East, W.M., in Whatcom County, Washington, Water Resources Inventory Area (WRIA) 1.

The overall goal of the change applications is to allow for water under any of these water rights to be withdrawn from any well and be used anywhere on the Home Fields property. These changes are intended to give Enfield Farms increased flexibility and water right coverage with respect to operation of their business on these fields.

Under these ten water right changes, Enfield Farms wants to be able to irrigate up to 261 acres. It also wants to be able to use some of the water in their processing plant for industrial purposes. On nine of the change applications (excluding CS1-*05117C), they have requested to include most existing and all future wells as points of withdrawal.

EXISTING Water Right Attributes

Water Right Owners:	**Enfield Farms, Inc.; Smit Farm Inc.; James and Deborah Brockmeyer**
Priority Date:	04/02/1962
Place of Use	SE ¼ NW ¼ and east 70 acres of the N ½ NW ¼ in Section 22, Township 40 North, Range 2 East W.M., LESS roads and EXCEPT the following tracts: (1) Beginning on th south side of the county road 20 feet west of the northeast corner of said NW ¼ NW ¼ , thence west 418 feet, thence south 313 feet, thence east 418 feet, thence north 313 feet to the point of beginning. (2) Commencing at the northeast corner of the said NW ¼, thence west 701.3 feet, thence southwestery 1163 feet, thence east 797 feet to the north-south center line of said Sec. 22, thence north 1163 feet to the point of beginning.

County	Waterbody	Tributary To	WRIA
Whatcom	Unnamed Slough	Bertrand Creek	1-Nooksack

Purpose	Rate	Unit	Ac-ft/yr	Begin Season	End Season
Irrigation of 20 acres	0.20	CFS	40	4/15	10/1

Source Name	Parcel	Well Tag	Twp	Rng	Sec	QQ Q	Latitude	Longitude
SD-2	400222206332		40N	02E	22	SE NW	48.945517	-122.54491

Ac-ft/yr = Acre-feet per year; 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:	**Enfield Farms, Inc.**
Date of Application:	1/7/2013
Place of Use	**Section 21, Township 40 North, Range 2 East** S ½ NE ¼ SE ¼, Section 21, Township 40 North, Range 2 East W.M.; EXCEPT a tract beginning at the NE corner of the described property and running west 297 feet, thence south 110 feet, thence east 297 feet to the section line and thence north 110 feet to the point of beginning; AND EXCEPT a tract beginning at the NE corner of the described property thence south 230 feet to the true point of beginning, thence west 317 feet, thence south 206 feet, thence east 317 feet to the section line, thence north 206 feet to the true point of beginning. N ½ SE ¼ SE ¼, Section 21, Township 40 North, Range 2 East W.M.; EXCEPT the east 299.5 feet of the south 728 feet. S ½ SE ¼ SE ¼, Section 21, Township 40 North, Range 2 East W.M.; EXCEPT the east 299.5 feet; AND EXCEPT a tract beginning at the southeast corner of the section thence west 299.5 feet to the true point of beginning, thence 220.5 feet west, thence 520 feet north, thence 299.5 feet east, thence 520 feet south to the true point of beginning. **Section 22, Township 40 North, Range 2 East** N ½ SW ¼, Section 22, Township 40 North, Range 2 East W.M. NW ¼ SE ¼, Section 22, Township 40 North, Range 2 East W.M. N ½ S ½ SW ¼ NW ¼, Section 22, Township 40 North, Range 2 East W.M.; EXCEPT south 182.26 feet of west 239 feet. S ½ S ½ SW ¼ NW ¼, Section 22, Township 40 North, Range 2 East W.M.; EXCEPT north 188 feet of west 463.41 feet. SW ¼ SE ¼, Section 22, Township 40 North, Range 2 East W.M.; EXCEPT 1 acre in the SE corner southerly of Bertrand Creek; ALSO EXCEPT a tract described as follows, beginning at the south quarter corner thence running east along section line 350 feet to the true point of beginning, thence north 208.7 feet, thence east 208.7 feet, thence south 208.7 feet, thence west along the section line 208.7 feet to the true point of beginning. SE ¼ SW ¼, Section 22, Township 40 North, Range 2 East W.M.; EXCEPT the west 100 feet of the north 310 feet; AND EXCEPT the west 400 feet of the south 300 feet; AND EXCEPT the east 427 feet of the south 371.25 feet. East 130 feet of the south 290 feet of the N ½ SW ¼ SW ¼, Section 22, Township 40 North, Range 2 East W.M.; **Section 27, Township 40 North, Range 2 East** Lot 1 Maberry Short Plat as recorded in book 3 short plats page 149 within the NW ¼ NE ¼, Section 27, Township 40 North, Range 2 East W.M. All except roads.

County	Waterbody	Tributary To	WRIA
Whatcom	Groundwater		1-Nooksack

Purpose	Rate	Unit	Acre-feet/yr	Begin Season	End Season
Irrigation	90.0	GPM	40	April 15	October 1

Source Name	Parcel	Well Tag	Twp	Rng	Sec	QQ Q	Latitude	Longitude
HW-1	400222136219	BHN668	40N	02E	22	NW SW	48.94107	-122.54688

HW-2	400222334134	BHN677	40N	02E	22	SW SE	48.93631	-122.53764
HW-3	400221456167	BHN678	40N	02E	21	NE SE	48.93962	-122.55488
HW-4	400222065318	BHE777	40N	02E	22	SW NW	48.94410	-122.54657
HW-5	400222334134	BHE773	40N	02E	22	SW SE	48.93801	-122.53616
HW-6	400222210076	BHN667	40N	02E	22	SE SW	48.93788	-122.54681
IW-1	400222021162	BHN673	40N	02E	22	NW SW	48.94041	-122.55118
IW-2	400221460037	BHN666	40N	02E	21	SE SE	48.93597	-122.55593
IW-3	400221460037	BHE776	40N	02E	21	SE SE	48.93693	-122.55598
IW-4	400222334134	BHE774	40N	02E	22	SW SE	48.93605	-122.53884
IW-5	400222334134	BHE775	40N	02E	22	SW SE	48.93583	-122.53906
IW-6	400222334134	ACB994	40N	02E	22	SW SE	48.93808	-122.53561
Future Well	400221522186	NA	40N	02E	21	NE SE	NA	NA
Future Well	400221469097	NA	40N	02E	21	SE SE	NA	NA
Future Well	400222206332	NA	40N	02E	22	SE NW	NA	NA
Future Well	400222075251	NA	40N	02E	22	NW SW	NA	NA
Future Well	400222200400	NA	40N	02E	22	SE NW	NA	NA
Future Well	400222077282	NA	40N	02E	22	SW NW	NA	NA
Future Well	400227282462	NA	40N	02E	27	NW NE	NA	NA

Ac-ft/yr = Acre-feet per year; Sec. = Section; QQ Q = Quarter-quarter of a section; WRIA = Water Resource Inventory Area; W.M. = Willamette Meridian; Datum in NAD83/WGS84; NA = Not Available.

Legal Requirements for Requested Change

The following is a list of requirements that must be met prior to authorizing the proposed change in the point of diversion to points of withdrawal, the place of use, and the number of irrigated acres.

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 BELLINGHAM HERALD* on May 13 and May 20, 2013.

Consultation with the Department of Fish and Wildlife

The Department must give notice to the Department of Fish and Wildlife (WDFW) of applications to divert, withdraw or store water. On September 10, 2013, Andrew B. Dunn of RH2 Engineering notified Mr. Steven Boessow of WDFW of the 10 pending water right change applications related to the Enfield Farms Home Fields properties. Mr. Boessow was provided with the applications and supporting documents. On March 10, 2014 a summary of the proposed decision was provided to Mr. Boessow and on April 2, 2014, he provided a letter stating that WDFW does not oppose the approval of this and the related change applications related to the Enfield Home Fields properties. The letter emphasizes the importance of fish in Bertrand Creek and in the Nooksack River downstream and acknowledges that these changes will not increase the quantity of water being used nor will it change the impacts on stream flows and fish that result from this irrigation. The letter also expresses support for the transparency to the water use by requiring metering and reflecting the actual acreage irrigated.

Consultation with the Lummi Nation and Nooksack Tribe

The Lummi Nation and Nooksack Tribe were notified of the water right change applications by Ecology. The Lummi Indian Business Council (LIBC) sent a letter dated January 29, 2013. In that letter the LIBC identified that it was concerned about the existing and future potential impacts on instream flows in Bertrand Creek. It indicated that all withdrawals within WRIA-1 have the capacity to adversely impact the rights of the Lummi Nation. The Nooksack Tribe did not provide comments.

State Environmental Policy Act (SEPA)

A water right application is subject to a 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, unless that project is for agricultural irrigation, in which case the threshold is increased to 50 cubic feet per second, so long as that irrigation project will not receive public subsidies;
(b) It is a groundwater right application for more than 2,250 gallons per minute;
(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);
(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, place of use, 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 90.03.380(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 two years, of the most recent five-year period of ongoing beneficial use of the water right.

INVESTIGATION

Site Visit/Site Description

On September 18, 2013, Mr. Andrew B. Dunn from RH2 and Mr. Tom Buroker from Ecology met with Mr. Andy Enfield and Mr. Dan Lambert from Enfield Farms and Mr. Chuck Lindsay their consultant from Associated Earth Sciences, Inc. (AESI) to perform the site visit. Before traveling to the proposed place of

use, we met at their office and discussed general and specific farm operations and the proposed transfers.

Mr. Enfield confirmed that over the past two irrigation seasons (2012 and 2013), which occurred after submittal of the change application and associated supporting documentation prepared by AESI (2013), only raspberries and blueberries have been grown on the Home Fields property. Raspberries had been recently removed from a number of the fields and wheat had been planted as part of the farm's planned crop rotation. At the time of the site visit, the wheat had sprouted and was just starting to emerge from the soil.

With respect to crop rotation, Mr. Enfield indicated that raspberries are often grown on a field for 5 to 10 years before being removed. After removal, the fields are usually planted with either potatoes or wheat for one to three seasons before being replanted in raspberries. In the past, Enfield Farms has also planted strawberries in the rotation, but it has not done that since the mid-1990s. Enfield Farms also grows blueberries on this farm and these plants can remain commercially viable for as long as 60 years. When wheat is grown, it does not need to be irrigated. When potatoes are grown, they are irrigated with traveling big gun sprinklers. When strawberries were grown, they were irrigated with traveling big gun, but they might use drip tape if planted in the future. Blueberries are irrigated both with overhead impact sprinklers and hanging drip tape.

Mr. Enfield provided RH2 with a map showing the pumphouses, mainlines, lines feeding the drip systems, and the approximately 20 irrigation zones on the property. Piping on the farm ranges from 8-inch diameter pipe to 3-inch diameter. In addition to the pumps associated with the 14 points of withdrawal/diversion, there are also 4 pumphouses that contain sand filters for particle removal, plumbing to allow for introduction of fertilizer into the irrigation system (fertigation), and some contain water flow meters. Mr. Enfield also provided RH2 a map showing the layout of the industrial packing plant area.

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. The irrigation season is weather dependent, but is typically from May through September, although this also depends on water right limitations. However, they have started irrigation in April and continued into October when weather conditions have dictated. Enfield Farms utilizes staff with soil moisture probes to determine when each field needs to be irrigated. Enfield Farms also employs a full-time irrigation specialist and a full-time agronomist that visit each acre being irrigated approximately twice a week during the irrigation season to check soil moisture and to look for system leaks. All irrigation is demand-based as opposed to simply being on a regular schedule. No irrigation was occurring during the site visit due to recent rains.

For all raspberries on this property, water is delivered through drip irrigation. The placement of the drip tape depends on which cultivar of raspberry is being grown in a particular field. For fields with the Meeker cultivar, T-tape is buried and drip irrigation is provided subsurface. This irrigation method is easier to install and more protected than hanging drip tape. However, for fields with the newer Wakefield cultivar, the roots are so aggressive they will infiltrate into and clog the drip system if it is buried. So, on fields with Wakefield raspberries, hanging drip tape is utilized. Enfield Farms is moving toward planting all fields with Wakefield raspberries and so hanging drip tape will be the water delivery method in the near future.

One older, small, field of blueberries is irrigated with fixed overhead impact sprinklers. This field had turf between the rows that would also utilize the provided irrigation water. The remaining blueberry fields were irrigated with hanging drip line.

Each proposed well, infiltration trench, and surface water diversion was visited to confirm the location and establish GPS coordinates. 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. Rows are typically spaced at 10-foot centers to allow for mechanical harvesting.

One of the two processing plants was toured to better understand water use within the facilities. Water within these facilities is used exclusively for washdown within the plant with water from the city of Lynden used for all berry-contact and domestic water. Enfield Farms operates one seasonal processing plant and one year round plant. Most of the processing plant water comes from IW-4, IW-5, IW-6, and HW-5. Originally, the plant operated under the groundwater permit exemption for industrial use but, over the years, water use has grown beyond the 5,000 gpd maximum. Washdown water from the plants is routed to a holding tank and then land applied to a neighboring property. A septic system is used for disposal of the domestic portion of the wastewater.

Homes located within the proposed place of use have their own private wells, some of which appear to be identified through water right claims and some of which are permit-exempt for residential use.

History of Water Use

Information on the history of water use under this water right was pieced together from a variety of sources including two affidavits, pump curves, aerial photos, Landsat imagery, irrigation guides, the site visit, and weather records.

Affidavits

Two affidavits relating to knowledge of farming and irrigation practices on the Home Fields under SWC 9177 were provided with the change application. One affidavit, by Mr. Marvin Enfield, was signed and notarized on December 27, 2012. In that affidavit, Mr. Enfield indicates that he has been familiar with the farming operations on the property associated with this water right since the mid to late 1960s. The second affidavit, by Mr. Andy Enfield, was signed and notarized on December 27, 2012. In that affidavit, Mr. Enfield indicates that he has been familiar with the farming operations on the property associated with this water right since the early 1980s. Both affidavits state that the information provided in the AESI report dated December 28, 2012, regarding the farming, irrigation, and general water use practices associated with this water right, is true and correct to the best of their knowledge.

Instantaneous Rate

SD-2 (surface diversion-2) is the current *de facto* point of diversion for surface water right SWC 9177. SD-2 has an instantaneous pumping rate of at least 520 gpm using a 7.5 HP and 40 HP Berkeley Pump. The instantaneous rate for SWC 9177 is 0.2 cfs or 90 gpm. Therefore, it is reasonable to conclude that the instantaneous rate of 90 gpm has been maintained through beneficial use from SD-2 and is available for transfer.

Irrigated Acres

SWC 9177 was issued for 20 acres of irrigation. The existing place of use of approximately 90 acres is owned by Enfield Farms, Inc., Smit Farm Inc., and James and Deborah Brockmeyer. Brockmeyer and Smit signed the change application under consideration in this report which will remove their property from

the place of use. This action effectively transfers ownership of that water right fully to Enfield Farms. The place of use for G1-*05902C(C) and SWC 9177 overlap, so the total irrigated acres within the place of use will be attributed to one of the two water rights and not double counted.

Aerial photos of the Enfield Farms Home Fields property were provided with the application packet. These aerial photos were labeled with the following dates: 1951, 1961, 1975, 07/15/1998, 07/15/2004, 07/31/2005, 09/6/2006, 06/25/2009, and 09/25/2011. The aerial photos from 1998 to present were viewed using Google Earth™.

Landsat imagery was spot-checked by RH2 for the following dates: 08/01/1986, 08/04/1987, 08/12/1990, 07/27/1996, 08/02/1998, 08/21/2005, 07/10/2007, and 07/05/2011. The Landsat imagery shows different colors of red through the irrigation season and from year to year, which suggests that crops are rotated on the farm. This is consistent with the observed aerial photos and discussion with Mr. Andy Enfield, as well as his affidavit. Vigorous plant growth shows as bright red when viewed in color infrared (band 4-3-2).

The original place of use issued for SWC 9177 covered a larger area than where water was actually authorized to be applied for irrigation. SWC 9177 was originally certificated on September 11, 1964. Review of aerial photos show that a portion of the place of use owned by Enfield Farms was still forest and was not logged until approximately 1985. However, the water right was developed and perfected on the approximately 47 acres owned by Brockmeyer and Smit.

AESI (2013) indicates there are 38 irrigable acres within the place of use owned by Enfield. Using aerial imagery from 2009, Geographic Information Systems (GIS) was used to measure the area where crops were grown and that area was calculated as 32.4 acres. Both numbers show that the combined water right maximum of 27.13 acres, authorized under SWC 9177 and G1-*05902C(C) has been irrigated within the original place of use under these water rights. Review of the aerial photos and Landsat imagery supports that this amount of acreage has been consistently farmed and irrigated since the land was cleared in approximately 1985. Therefore, a combined 27.13 acres of irrigation is available for transfer, including 20 acres from SWC 9177 and and 7.13 from G1-*05902C(C).

Annual Volume

Based on review of the aerial photos and Landsat imagery, it is determined that at least 27.13 acres has been irrigated under the two appurtenant water rights.

Historically, crops such as strawberries, wheat, potatoes, and raspberries have been grown on this property. **Table 1** lists the crops grown and irrigation method used for the most recent 5-year period of 2009 through 2013. Enfield Farms has been managing the crops grown on the northwest and southeast fields, split by the West Branch Bertrand Creek, independently over the years and they have been broken out that way in the table.

Table 1. Crops Grown and Irrigation Method Under G1-*05902C(C) and SWC 9177

	Northwest Field (approx. 6.4 acres)		Southeast Field (approx. 26 acres)	
Irrigation Season	**Crop**	**Irrigation Method**	**Crop**	**Irrigation Method**
2009	Raspberries	Trickle/Drip	Wheat	Traveling Big Gun
2010	Raspberries	Trickle/Drip	Potatoes	Traveling Big Gun
2011	Wheat	Traveling Big Gun	Raspberries	Trickle/Drip
2012	Raspberries	Trickle/Drip	Raspberries	Trickle/Drip
2013	Raspberries	Trickle/Drip	Raspberries	Trickle/Drip
• Crops grown and irrigation method provided by Mr. Andy Enfield • Crops grown confirmed through aerial photos when available.				

There are currently no water meters installed on the point of diversion. Therefore, we 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. AESI (2012) proposed averaging the crop irrigation requirements for the two closest stations (Blaine and Clearbrook) since the Home Fields are approximately equidistant between them. We agree that this is a reasonable assumption. The average of the data from the WIG (1985) suggests that, with a 2-year return interval, the crop irrigation requirement for a raspberry crop is 16.53 inches, for a potato crop is 7.62 inches, for a winter wheat crop is 4.18 inches, and for a strawberry crop is 1.99 inches. From the WIG data, it is apparent that the highest water use crop grown within the place of use 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 in Washington State. The available weather data shows that the period of May through September was on average 1.6 degrees Fahrenheit warmer from 2009 through 2013, than the average temperature from the Blaine and Clearbrook stations provided in the WIG (**Table 2**). 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 at least the last five years.

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.

Table 2. 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)

2009	58.65	61.01	2.36	10.42	8.02	-2.40
2010		59.37	0.72		14.35	3.93
2011		59.23	0.58		11.05	0.63
2012		59.91	1.26		8.64	-1.78
2013		61.90	3.25		11.70	1.28

- Irrigation season is considered to be May through September.
- Annual data is average of the Clearbrook and Blaine weather stations.
- Weather data from 2007 through 2011 was provided with the change applications (AESI, 2013) and data for the 2012 and 2013 irrigation seasons was obtained from www.wrcc.dri.edu

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 each 2 years. Similarly, the 5-year CIR values, 10-year CIR values 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 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. 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 over the past five years.

Ecology guidance document 1210 indicates that the efficiency of the trickle/drip micro-irrigation methods utilized by Enfield Farms to irrigate raspberries ranges between 70 percent and 95 percent, with an average of 88 percent while traveling big gun methods utilized to irrigate wheat, potatoes, and strawberries ranges from 55 percent and 75 percent with an average of 65 percent. Guidance document 1210 indicates that farmers that operate systems near the higher end of the range often exhibit the following:

- Newer system infrastructure
- Active maintenance program
- Knowledge of seasonal crop evapotranspiration rates
- Scheduling irrigation in response to crop demand
- Ground-truthing of soil moisture.

Enfield Farms is a family-owned business that has been in operation in Whatcom County for over 40 years. Their system exhibits each of these characteristics. They replace their irrigation system infrastructure on a routine schedule or when they observe signs of wear that could lead to a loss of water. They operate a research facility and routinely develop new strains of raspberries and other crops that require less water and are more resistant to disease. They are recognized experts regarding farming practices in Whatcom County. For these reasons, the efficiency of trickle/drip micro-irrigation systems used in the Enfield Farms fields is assumed to be average to high.

Since the irrigation method used for the raspberry irrigation is trickle/drip irrigation, it is assumed that the application efficiency averages 88 percent and the consumptive use averages 93 percent (Ecology Guidance 1210). The irrigation method and application efficiency used in the calculations are provided in **Table 3**.

Table 3. Total Irrigation Requirement and Consumptive Use Variables Utilized

Crop	Irrigation Method	Application Efficiency	Percent Consumptive Use
Wheat	Traveling Big Gun	65%	75%
Potatoes	Traveling Big Gun	65%	75%
Strawberries	Traveling Big Gun	65%	75%
Raspberries	Trickle/Drip	88%	93%
• Application efficiency and percent consumptive use equal to the average values provided in Ecology Guidance 1210.			

Based on the crop grown, peak irrigation use would have been in 2012 and 2013, when the full acreage was planted in raspberries and all irrigation was occurring using the trickle/drip method. Dividing the raspberry CIR of 19.34 inches by 88 percent calculates to a total irrigation requirement (TIR) of 21.98 inches (1.83 feet). Therefore, the TIR for raspberries is 1.83 feet multiplied by the authorized 27.13 acres, which is equal to 49.7 af/yr. Of that total, 16.92 af/yr is attributed to G1-*05902C(C), since it is the senior of the two rights, and 32.78 af/yr is attributed to SWC 9177.

Proposed Use

The overall goal of this water right change application is to change the water right Place of Use (POU), to increase the number of irrigated acres, and to add several additional points of withdrawal. The proposed POU for SWC 9177 is the same area as the proposed POU for Change Applications associated with nine other water rights (G1-21356C, G1-21213C, G1-*05902C(C), G1-20922C, G1-00502C, S1-*09876C, S1-*05117C, G1-030294CL, and G1-*02351C), which are also owned by Enfield Farms Inc. The primary purposes of the these Enfield Farms Change/Transfer Applications is to consolidate the water rights onto agricultural property owned by Enfield Farms and to make the existing points of withdrawal common to the water rights.

The proposed POU is comprised of 13 parcels, all owned by representatives of Enfield Farms. The proposed POU is approximately 304 acres in size and includes roughly 261 acres of irrigable land as indicated in **Table 4**.

Table 4. Parcels Requested for Inclusion in the Place of Use

Parcel No.	Parcel Owner	Gross Acres	Approximate Irrigable Acres
400221456167	M. Enfield	18.52	17.50
400221522186	Enfield Farms, Inc.	0.80	0.50
400221469097	M. Enfield	13.87	13.30
400221460037	M. Enfield	11.97	11.50
400222334134	M. Enfield	77.24	57.00
400222206332	M. Enfield	40.00	36.40
400222136219	Enfield Family LLC	65.25	60.00
402222015202	Enfield Family LLC	0.96	0.55

400222021162	M. Enfield	5.07	2.50
400222210076	Enfield Family LLC	42.94	40.00
400222065318	Enfield Family II LLC	8.77	8.50
400222077282	Enfield Family II LLC	7.78	7.50
400227282462	M. Enfield	10.49	5.75
Totals		304	261

The primary commercial crops to be grown will be raspberries and blueberries with the occasional crop rotation of potatoes, wheat, and strawberries. The berries will be irrigated using trickle/drip irrigation methods and the potatoes and wheat will be irrigated using traveling big gun irrigation. The lawns and grass in the buffer area, which is currently being irrigated under another water right, will still be irrigated using the same irrigation methods after the change. This water right change application is being proposed in conjunction with nine other water right change applications that will also include spreading their available annual quantity of water over the available irrigable land. The applicant plans to use deficit irrigation methods.

Annual Consumptive Quantity (ACQ)

A change in the place of use, point of diversion, 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 of water used under the water right (See RCW 90.03.380).

Annual Consumptive Quantity 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 two years of use within the most recent five-year period of continuous beneficial use of the water right.

The ACQ analysis for this change application will be performed on the 2009 through 2013 irrigation seasons. Based on the data available, it is reasonable to use 2012 and 2013 to represent the years when the crops grown and weather conditions would both require application of the most irrigation water. Therefore, based on this data, these two years will be used as the two highest years of use within the last five years of consecutive water use.

As was discussed in the history of water use section of this report of examination, raspberries were grown on the entire combined authorized 27.13 acres authorized during the 2012 and 2013 irrigation seasons (**Table 1**).

Table 5. Annual Consumptive Quantity Calculation

Year	Estimated CIR (inches)	Actual CIR (feet)	WR Limit (feet)	Application Efficiency (%)	Cons. Use Efficiency (%)	Actual Cons. Use (feet)	TIR (af/yr)	Cons. Use (af/yr)	Return Flow (af/yr)
2012	19.34	1.61	2.1	88	93	1.70	49.7	46.2	3.5
2013	19.34	1.61	2.1	88	93	1.70	49.7	46.2	3.5
Average							49.7	46.2	3.5

Estimated CIR = Washington irrigation guide (average of Blaine and Clearbrook stations) multiplied by 117% to account for current climatic conditions.
CIR = Crop irrigation requirement
WR Limit = Additive annual volume of 56.92 af/yr divided by 27.13 acres

Application Efficiency from Ecology GUID-1210.
af/yr = acre-feet per year
Cons. = Consumptive
Crop Grown: Raspberries
Area: 27.13 acres
Irrigation Method: Trickle/drip
Cons. Use Efficiency = Application Efficiency + 5% Total Evaporated from Ecology GUID-1210.
Actual Cons. Use = WR Limit x Cons. Use Efficiency

Table 5 shows that based on the irrigation requirement for 2012 and 2013, the consumptive use to irrigate 27.13 acres of raspberries is 46.2 af/yr, which is less than the combined water right limit of 56.92 af/yr. The annual consumptive quantity that can be carried through the change application process will be split as 16.92 af/yr to G1-*05902C(C), since it is the senior of the two rights, and 29.28 af/yr to SWC 9177.

Since deficit irrigation has been proposed, only the consumptive use can be carried through the change application process to guarantee that the annual consumptive quantity calculated will not be exceeded due to the change.

The proposed use requests to increase the number of irrigated acres. In his affidavit (dated December 27, 2012), Mr. Andy Enfield acknowledged that if the change is approved, Enfield Farms 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.

Period of Use

The water right record for SWC 9177 identifies the period of use for irrigation as being from April 15th to October 1st. The change application has not requested a change to the period of use and it will remain as originally issued.

Other Rights Appurtenant to the Place of Use

Relying on Ecology's Water Resources Explorer (accessed in December 2013), we have identified the following 2 water rights as being appurtenant to the original place of use.

Certificate G1-*05902C(A)
- Name: James and Deborah Brockmeyer
- Instantaneous Rate: 46.25 gpm
- Annual Quantity: 16.07 af/yr
- Purpose: Domestic Supply and Irrigation of 7.23 acres
- Source: Groundwater

Certificate G1-*05902C(B)
- Name: Glenn and Cherry Smit
- Instantaneous Rate: 58.93 gpm
- Annual Quantity: 22.61 af/yr
- Purpose: Irrigation of 10.64 acres
- Source: Groundwater

Both of these rights are outside of the proposed place of use. The original water right, GWC 3986, was administratively split between Brockmeyer, Smit, and Enfield. G1-*05902C(A) and G1-*05902C(B) are not being proposed for change and will remain in place as agreed to by Brockmeyer, Smit, and Enfield. This water right, SWC 9177, was not administratively split because the landowners agreed that Enfield would receive the entire water right.

Relying on Ecology's Water Resources Explorer (accessed in December 2013), we have identified the following 2 water rights as being appurtenant to both the original and proposed place of use.

Permit S1-28116P
- Name: City of Lynden
- Instantaneous Rate: 0.57 cfs
- Annual Quantity: 70 af/yr
- Purpose: Domestic Supply
- Source: Nooksack River

Water Right Claim G1-090542CL
- Name: Blanche Brockmeyer – (Earl Brockmeyer)
- Quantity of Water Claimed: NA
- Annual Quantity Claimed: NA
- Irrigation Acres Claimed: NA
- Date of First Putting Water to Use: NA
- Purpose for Which Water is Used: Domestic, Stockwatering, and Irrigation (lawn and garden)

Both of these water rights are for domestic use, and associated stockwatering and lawn and garden irrigation, and are not related to the agricultural irrigation occurring under the water right being changed. In addition to the 10 water right change applications currently being processed for Enfield Farms, the following 12 water rights are appurtenant to the proposed place of use.

Water Right Claim G1-020987CL
- Name: Grant Chilton
- Quantity of Water Claimed: 20 gpm
- Annual Quantity Claimed: 16 af/yr
- Date of First Putting Water to Use: June 1949
- Purpose for Which Water is Used: Domestic

Water Right Claim G1-002744CL
- Name: Winfred Maberry
- Quantity of Water Claimed: 20 gpm
- Annual Quantity Claimed: 2 af/yr
- Date of First Putting Water to Use: 1945
- Purpose for Which Water is Used: Domestic

Water Right Claim G1-030293CL
- Name: Charles Gray
- Quantity of Water Claimed: 10 gpm
- Annual Quantity Claimed: 2 af/yr

Date of First Putting Water to Use: June 1952
Purpose for Which Water is Used: Domestic

Water Right Claim G1-033405CL
Name: Robert and Lorette Bauman
Quantity of Water Claimed: 10 gpm
Annual Quantity Claimed: 1 af/yr
Date of First Putting Water to Use: Prior to 1892
Purpose for Which Water is Used: Domestic, Garden/Lawn, Livestock

Water Right Claim G1-033406CL
Name: Robert and Lorette Bauman
Quantity of Water Claimed: 10 gpm
Annual Quantity Claimed: 1 af/yr
Date of First Putting Water to Use: Prior to 1892
Purpose for Which Water is Used: Domestic, Garden/Lawn, Livestock

Water Right Claim S1-034684CL
Name: Mike Harmon
Quantity of Water Claimed: NA
Annual Quantity Claimed: NA
Irrigation Acres Claimed: NA
Date of First Putting Water to Use: NA
Purpose for Which Water is Used: Irrigation (lawn and garden)
Source: West Bertrand Creek or Bertrand Slough

Water Right Claim G1-034685CL
Name: Mike Harmon
Quantity of Water Claimed: NA
Annual Quantity Claimed: NA
Date of First Putting Water to Use: NA
Purpose for Which Water is Used: Domestic

Water Right Claim G1-074659CL
Name: J. B. Wakefield
Quantity of Water Claimed: NA
Annual Quantity Claimed: NA
Irrigation Acres Claimed: NA
Date of First Putting Water to Use: NA
Purpose for Which Water is Used: Domestic and Irrigation (lawn and garden)

Water Right Claim G1-080973CL
Name: Juan and Virginia Perez
Quantity of Water Claimed: NA
Annual Quantity Claimed: NA
Irrigation Acres Claimed: NA
Date of First Putting Water to Use: NA
Purpose for Which Water is Used: Domestic

Water Right Claim G1-090542CL
Name: Blanche Brockmeyer – (Earl Brockmeyer)
Quantity of Water Claimed: NA
Annual Quantity Claimed: NA
Irrigation Acres Claimed: NA
Date of First Putting Water to Use: NA
Purpose for Which Water is Used: Domestic, Stockwatering, and Irrigation (lawn and garden)

Water Right Claim G1-301104CL
Name: Marvin Enfield
Quantity of Water Claimed: 100 gpm
Annual Quantity Claimed: 25 af/yr
Irrigation Acres Claimed: 5
Date of First Putting Water to Use: May 1925
Purpose for Which Water is Used: Irrigation, Domestic, and Ag accessory

Water Right Claim G1-301118CL
Name: Marvin Enfield
Quantity of Water Claimed: 200 gpm
Annual Quantity Claimed: 80 af/yr
Irrigation Acres Claimed: 20
Date of First Putting Water to Use: August 1938
Purpose for Which Water is Used: Irrigation

Water right claim G1-301104CL submitted by Marvin Enfield appears to identify irrigation water use that is covered by ground water certificate GWC 1300-A (G1-*02351C) and also industrial and domestic use that is covered under the groundwater permit-exemption. In a December 31, 2013, email, Enfield Farms confirmed that this was correct. Therefore, all beneficial use will be assigned to the groundwater certificate and permit-exemption and the quantities under the claim will not be considered to be additive.

Water right claim G1-301118CL submitted by Marvin Enfield appears to be a duplication of water right claim G1-030294CL submitted by Charles Gray, and which is one of the water rights being changed by Enfield Farms. In a December 31, 2013, email, Enfield Farms confirmed that this was correct. For this reason, water right claim G1-301118CL has been tentatively determined to not represent an additional water right beyond what may have been established and maintained through beneficial use under G1-030294CL.

The remainder of the water right claims identified appear to be for residential domestic, stockwatering, and lawn and garden irrigation use as opposed to agricultural irrigation. Therefore, these additional water rights within the proposed place of use are not pertinent when reviewing beneficial use under the water rights being changed since the uses are different.

Hydrologic/Hydrogeologic Evaluation

A separate hydrogeologic memorandum was prepared by Andrew B. Dunn, L.G., L.HG., focusing on the same body of public groundwater test and impairment (RH2 Engineering Technical Memorandum,

January 15, 2014). A summary of that memorandum is presented here and more detail can be obtained from the memorandum, located in the water right file. The change under consideration in this report is from a surface diversion SD-2 (**Figure 1**) to the proposed groundwater withdrawals.

The points of withdrawal, points of diversion, and place of use involved in these water right changes lie near the southwestern extent of the geographic feature commonly referred to as the Lynden Terrace. The Lynden Terrace is a slightly elevated but gently sloping region located in northern Whatcom County to the north of the Nooksack River Lowland

All of the existing and proposed points of withdrawal and diversion fall within the Bertrand subbasin as defined by the Water Resources Inventory Area (WRIA) 1 Initiating Governments, 2002), except for a small portion of the parcels located in Section 21, Township 40 North, Range 2 East, W.M. that lie within the South Fork Dakota subbasin (**Figure 1**). All wells, infiltration trenches, and horizontal wells are completed within the Sumas outwash aquifer. The Sumas outwash aquifer at this location is composed of sand that ranges from 20 to 50 feet thick. Deeper sediments (Everson Glaciomarine Drift) are fine-grained and do not yield water in sufficient quantities, or of high enough quality, to be used for irrigation supply. Recharge to the Sumas outwash aquifer is almost exclusively through vertical infiltration of precipitation. The water table is from 5 to 20 feet below ground surface in the late summer and fluctuates by approximately 3 to 4 feet over the course of the year due to changes in recharge and groundwater use. The Sumas outwash aquifer is directly connected to the many ditches and tributaries associated with Bertrand Creek.

While groundwater in the Sumas outwash aquifer flows generally from north to south toward the Nooksack River, local conditions cause it to deviate from this north to south flow pattern to converge on the mainstem and tributaries of Bertrand Creek (**Figure 2**). The groundwater elevations and interpreted groundwater level contours and flow directions measured during the site visit match well with the earlier work done by Cox and Kahle (1999).

Pumping impacts on surface water bodies

Most, but not all, of the proposed points of withdrawal tap the aquifer in an area where the water pumped would naturally discharge into the West Branch Bertrand Creek. The dividing line on the Home Fields property, based upon groundwater flow contours and directions, has been determined to be a line running north-south through the center of Section 22, Township 40 North, Range 2 East W.M. (**Figure 1**). For this reason it has been determined that there are two bodies of public groundwater beneath the Home Fields place of use (West Branch Bertrand and Mainstem Bertrand) and proposed points of withdrawal must stay within the same body of public groundwater as the original point of diversion.

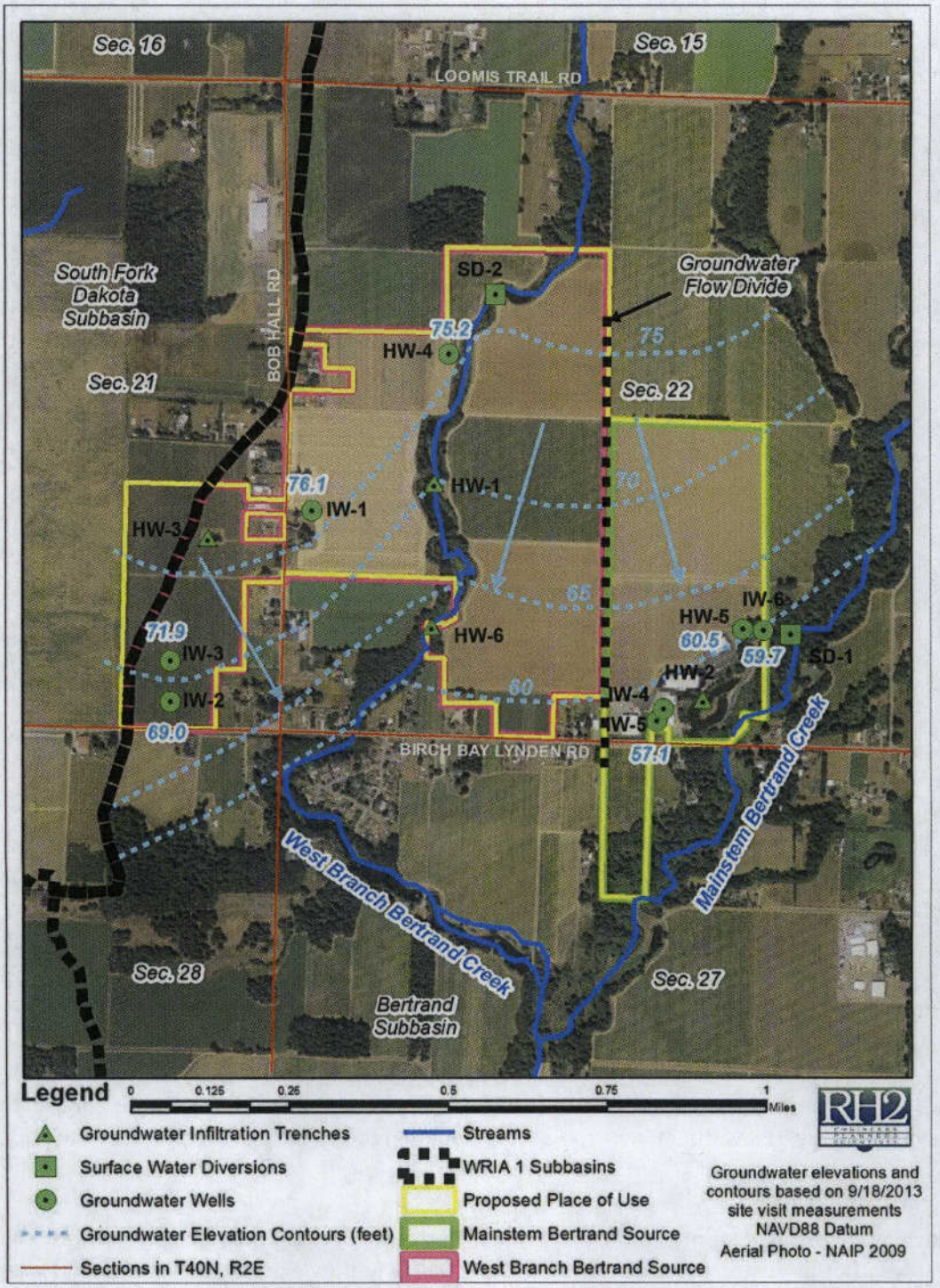

Figure 1. Original and Proposed Points of Withdrawal with Groundwater Flow.

(Groundwater elevations and flow directions based on September 18, 2013, water level measurements. WRIA 1 subbasin boundaries delineated through the WRIA 1 Watershed Management Project, 2002.)

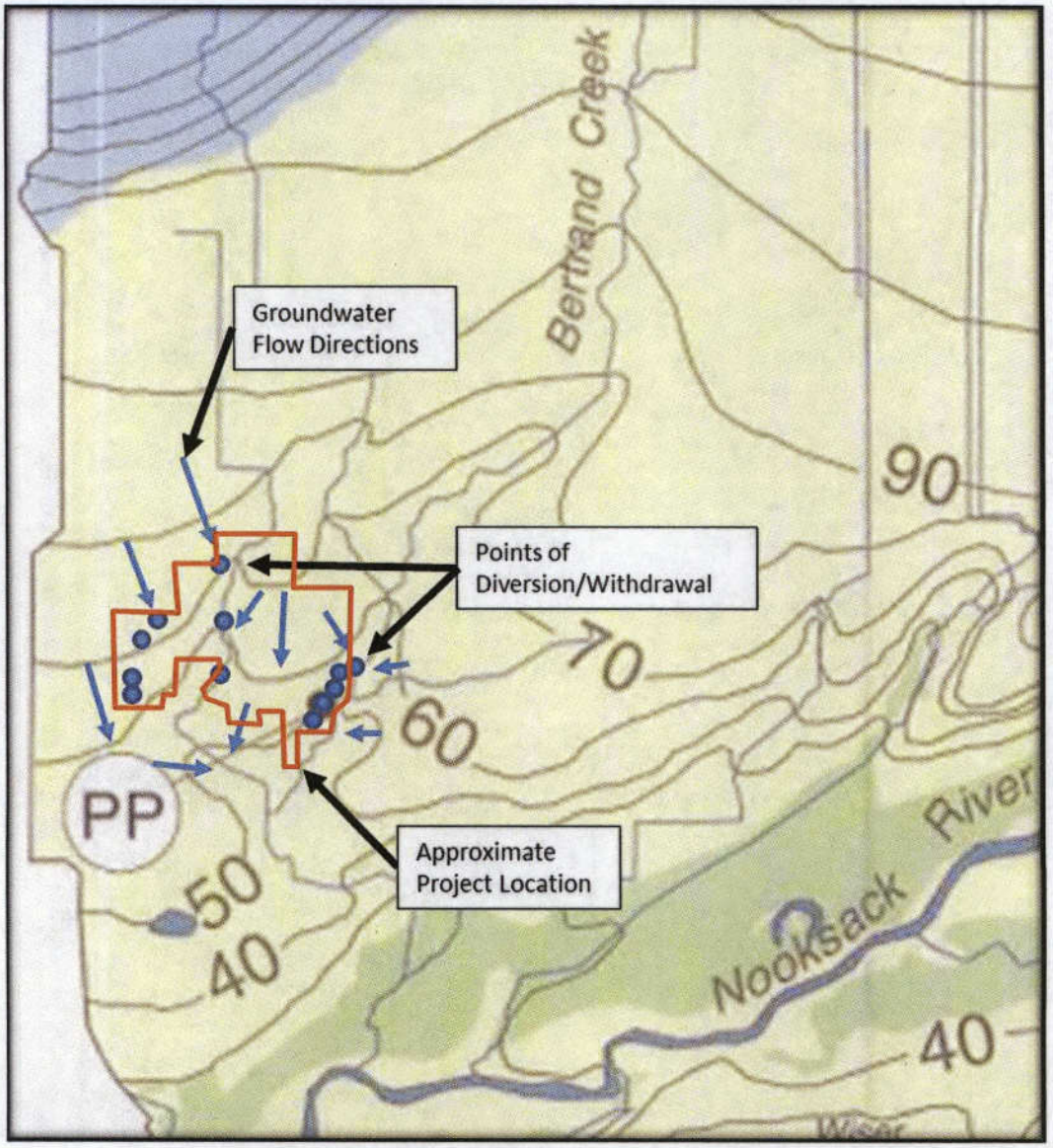

Figure 2. Potentiometric Surface Map from Cox and Kahle (1999)

(Figure shows approximate location of the Enfield Farms project with groundwater contours with elevation in feet. Flow direction arrows were added in the vicinity of the project for clarity.)

Same Source of Supply

The original point of diversion is on West Branch Bertrand Creek. Therefore, this water right must continue to withdraw water from points of withdrawal (whether existing or future) that are located within this same source of supply. Based on the groundwater contours available, the boundary between the Mainstem and West Branch Bertrand Creek sources on the Home Fields property is a line running north-south through the center of Section 22, Township 40 North, Range 2 East W.M. (**Figure 1**).

In order for the requested additional points of withdrawal to be added to each water right, all points of withdrawal must tap the same source of supply. RH2 has concluded that only the existing and proposed wells located within the West Branch Bertrand Creek source on the Home Fields property tap the same body of public groundwater based on the following facts.

1. All of the existing and potential future points of withdrawal are currently tapping or will tap the shallow Sumas outwash aquifer.
2. Groundwater flow for the area is toward the West Branch Bertrand Creek.
3. No groundwater flow divides or flow boundaries exist between any of the existing or proposed future points of withdrawal, falling within the West Branch Bertrand Creek source.
4. The maximum distance between any of the existing or potential future proposed wells is 1 mile.
5. The original point of diversion for this right is from the West Branch Bertrand Creek. The proposed future points of withdrawal are within the West Branch Bertrand Creek source area.

Pumping impacts on neighboring wells

Nearby water rights were reviewed to determine the approximate distance between them and the existing and proposed wells located within the West Branch Bertrand Creek source for purposes of calculating the anticipated interference drawdown in the neighboring wells. In addition to the existing on-site wells (IW-1, IW-2, IW-3, HW-1, HW-3, HW-4, and HW-6), Enfield Farms has requested the ability to add additional wells in the future on the remaining parcels within the proposed place of use that do not currently have wells on them. Since exact locations for the future wells have not been specified, analysis for impact will be done assuming that the wells are located on the edge of the parcel boundaries 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. The closest wells identified in water right documents are at a distance of approximately 435 feet from an existing Enfield Farms point of withdrawal.

Interference drawdown was calculated using a transmissivity estimate of 15,000 gpd/ft, based on Culhane (1993), and assuming a saturated aquifer thickness of 25 feet. The storage coefficient was estimated to be 0.2 since the aquifer is unconfined. A pumping rate of between 100 and 400 gpm was used and calculations were made based on different pumping durations and distances between the pumping and neighboring wells.

The theoretical radius of influence, which varies solely by pumping duration when aquifer properties are the same, is calculated to be a maximum of just over 2,000 feet if a well operates continuously for the longest irrigation season identified under the rights (April 1 through October 1). The largest calculated drawdown at a distance of 500 feet from the well was 4.3 feet of drawdown (17 percent of aquifer saturated thickness) after pumping a well at 200 gpm for 183 days straight. It is much more likely that each point of withdrawal will be pumped intermittently depending on crop demand and will be cycled on and off over time to maintain water level in the wells and to more efficiently serve different zones within the farm. Drawdown impacts will be most pronounced in the immediate vicinity of the pumping well and will not propagate very far into the aquifer from the pumping well. Given the distance of the neighboring wells from the existing Enfield Farms' wells, there will be no impairment of existing rights due to the proposed changes.

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, 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).

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

Impairment, Qualifying Ground Water 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 ground water withdrawal facilities are defined as those wells which in the opinion of the Department 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.

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.

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.

On September 10, 2013, Ecology was asked if it had received any complaints from well owners near the Home Fields Farm related to declining water levels, excessive seasonal drawdowns, and wells pumping air. On September 11, 2013, Ms. Kasey Cykler, Ecology WRIA 1 Watermaster, responded that Ecology had not received any complaints in that area. On September 24, 2013, Mr. Buck Smith, Ecology Senior Hydrogeologist, responded that he was also not aware of any complaints in that area.

Public Interest Considerations

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

Consideration of Protests and Comments

The January 29, 2013, protest letter from the Lummi Indian Business Council indicates that all of the change applications are for points of withdrawal located within the WRIA 1/Bertrand Creek/Nooksack River watershed. The protest is based on concerns over current and future potential impacts on instream flows. However, these are change applications and not applications for new (consumptive) water use. Because the quantities of water involved will remain unchanged and because each of the sources pumps from the same body of public water, no additional or new impacts are associated with the changes being recommended for approval. The pumping of water from any of the subject wells will not change stream flows from current conditions.

On April 2, 2014, WDFW provided a letter stating they do not oppose the approval of this and the related change applications related the Enfield Home Fields properties. The letter emphasizes the importance of fish in Bertrand Creek and in the Nooksack River downstream and acknowledges that these changes will not increase the quantity of water being used nor will it change the impacts on stream flows and fish that result from this irrigation. The letter also expresses support for the transparency to the water use by requiring metering and reflecting the actual acreage irrigated.

Therefore, the protest and comments do not justify denial of the change application.

Conclusions

The change requested will not impair existing rights nor be detrimental to the public welfare. Given that comments from the Lummi Indian Business Council have been addressed and WDFW has stated that it does not oppose the approval of this and the related applications, the change should be approved as recommended below.

Summary

Table 6 contains a summary of all of the Enfield Farms – Home Fields water rights, after the current batch of change applications are processed. From this table it can been seen that there will be 277 af/yr of water available to irrigate 261 acres, which is equal to a total of 1.06 feet or 12.7 inches. This depth is lower than the crop irrigation requirement and that is because only the consumptive portion was able to be carried through the change application process for the future irrigation use.

Table 6. Summary of Recommended Water Right Change Decisions, Enfield Farms, Home Fields

Water Right	Qi (gpm)	Total Qa (af/yr)	Additive Irrigated Acres	Industrial Use (af/yr)	Irrigation Use (af/yr)	Season of Use	Place of Use	Points of Withdrawal
G1-030294CL (Gray)	200	30.6	28.9	0	30.6	05/01 – 09/01	Home Fields	IW-1, IW-2, IW-3, HW-1, HW-3, HW-4, HW-6, and future wells in West Branch Bertrand Body of Public Groundwater
G1-21213C (Chilton)	180	9 NA	0	0	9 NA	04/15 – 10/01		
G1-00502C (Chilton)	250	67	63.1	0	67	06/15 – 09/15		
G1-21356C (Perez)	50	12	11.3	0	12	04/15 – 10/01		
SWC 4435 (Wakefield)	45	14.5	13.7	0	14.5	04/15 – 10/01		
GWC 3986 Record C (Enfield Family LLC)	54.82	16.92	15.9	0	16.92	04/15 – 10/01		
SWC 9177 (Brockmeyer)	90	29.28 + 16.92 NA	27.6	0	29.28 + 16.92 NA	04/15 – 10/01		
G1-20922C (Bauman)	100	20.4	19.2	0	20.4	04/15 – 10/01		
GWC 1300 (Maberry)	320	16.4 + 86.3 NA	0	16.4	86.3 NA	04/15 – 10/01		IW-4, IW-5, IW-6, HW-2, HW-5, and future wells in Mainstem Bertrand Body of Public Groundwater
SWC 1384 (Brown)	300	86.3	81.3	0	86.3	04/15 – 10/01		SD-1 (Mainstem Bertrand Creek)
Total	1,589.82	293.4	261	16.4	277.00			

NA = Non-additive

Table 7. Summary of Cumulative Peak Instantaneous Rate of Water Rights in Table 2 Based on Period of Use, Enfield Farms, Home Fields

Date Range	Combined Pumping Rate (gpm)
January 1 through April 14	0
April 15 through April 30	1,139.82
May 1 through June 14	1,339.82
June 15 through September 14	1,589.82
September 15 through October 1	1,339.82
October 2 through December 31	0

RECOMMENDATIONS

Based on the above investigation and conclusions included in this ROE, I recommend this request for a water right change be 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:

90 gpm
29.28 af/yr
Irrigation of 27.6 acres (additive) and 233.4 acres (non-additive)
April 15 to October 1

Points of Withdrawal

IW-1 - NW¼ SW¼, Section 22, Township 40 North, Range 2 E.W.M.
IW-2 - SE¼ SE¼, Section 21, Township 40 North, Range 2 E.W.M.
IW-3 - SE¼ SE¼, Section 21, Township 40 North, Range 2 E.W.M.
HW-1 - NW¼ SW¼, Section 22, Township 40 North, Range 2 E.W.M.
HW-3 - NE¼ SE¼, Section 21, Township 40 North, Range 2 E.W.M.
HW-4 - SW¼ NW¼, Section 22, Township 40 North, Range 2 E.W.M.
HW-6 - SE¼ SW¼, Section 22, Township 40 North, Range 2 E.W.M.
Future wells may be located within the following parcels (as they existed at the time of report issuance) identified as falling within the West Branch Bertrand Source located within the E ½ SE ¼, Section 21 and the W ½, Section 22, of Township 40 North, Range 2 East, W.M., as shown on the **Attachment**:

- 400221456127 (only that portion located within the Bertrand subbasin)
- 400221460037 (only that portion located within the Bertrand subbasin)
- 400221469097 (only that portion located within the Bertrand subbasin)
- 400221514028
- 400221522186
- 400221524086
- 400222015202
- 400222021162
- 400222065318 (only that portion located within the Bertrand subbasin)
- 400222077282
- 400222136219
- 400222200400
- 400222206332
- 400222210076

Place of Use

As described on Page 2 of this Report of Examination.

Report by: _____ December 31, 2014

Tom Buroker – Water Resources Program Date

J. R. "BUCK" SMITH

Reviewed by: Buck Smith 12/31/14

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

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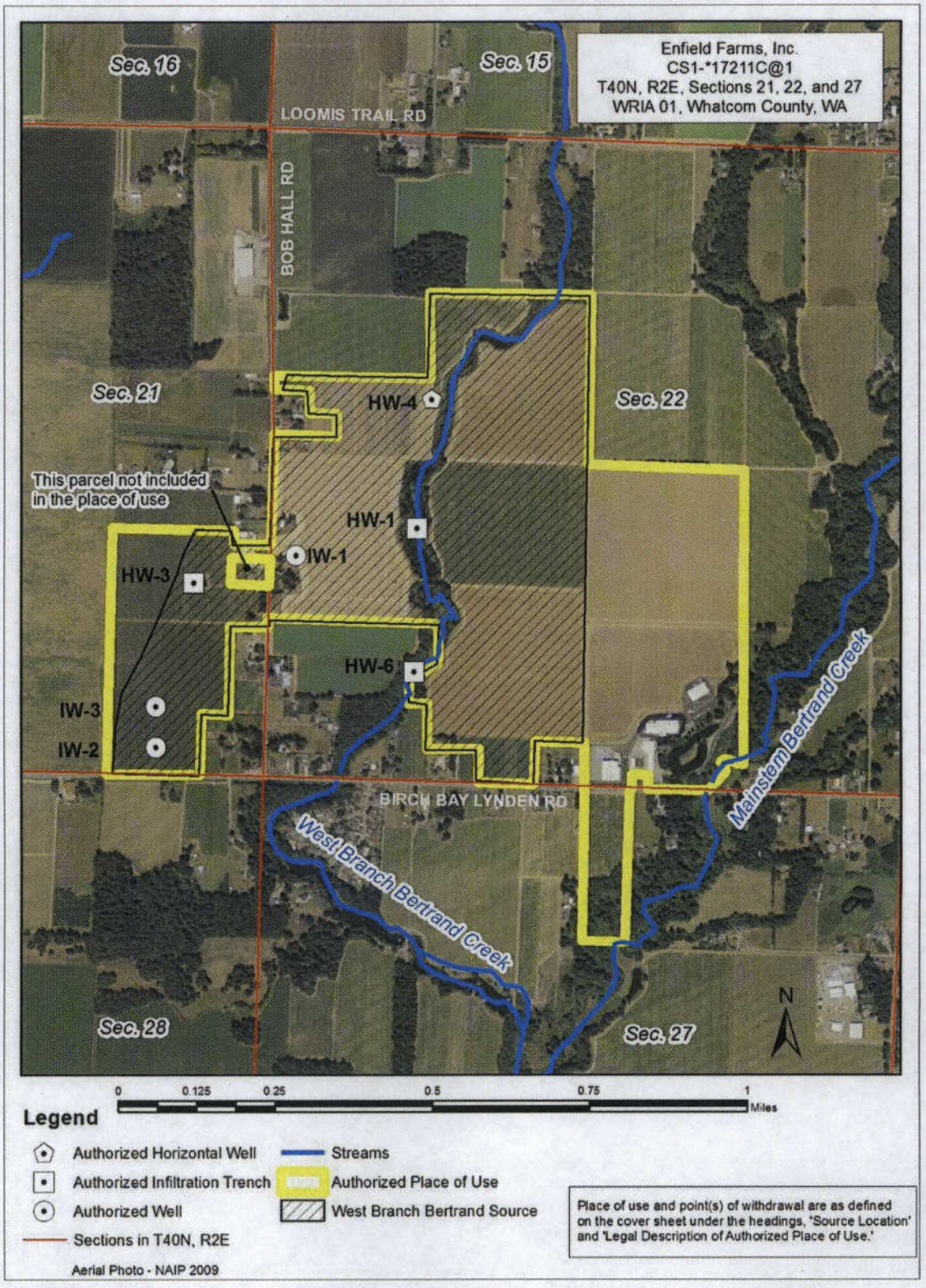
ATTACHMENT


Enfield Farms, Inc.
CS1-*17211C@1
T40N, R2E, Sections 21, 22, and 27
WRIA 01, Whatcom County, WA
Sec. 16
Sec. 15
LOOMIS TRAIL RD
BOB HALL RD
Sec. 21
Sec. 22
HW-4
This parcel not included in the place of use
HW-1
IW-1
HW-3
HW-6
IW-3
IW-2
BIRCH BAY LYNDEN RD
West Branch Bertrand Creek
Mainstem Bertrand Creek
Sec. 28
Sec. 27
N
0
0.125
0.25
0.5
0.75
1
Miles
Legend
Authorized Horizontal Well
Authorized Infiltration Trench
Authorized Well
Sections in T40N, R2E
Streams
Authorized Place of Use
West Branch Bertrand Source
Aerial Photo - NAIP 2009
Place of use and point(s) of withdrawal are as defined on the cover sheet under the headings, 'Source Location' and 'Legal Description of Authorized Place of Use.'