



State of Washington REPORT OF EXAMINATION FOR WATER RIGHT CHANGE

File NR CG1-22264C
WR Doc ID 6555819

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

PRIORITY DATE July 1, 1974	WATER RIGHT NUMBER G1-22264C
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MAILING ADDRESS MDM Properties 816 Loomis Trail Road Lynden, WA 98264	SITE ADDRESS (IF DIFFERENT) Stein Road
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Total Quantity Authorized for Withdrawal		
WITHDRAWAL RATE	UNITS	ANNUAL QUANTITY (AF/YR)
225	GPM	99.6

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	225		GPM	99.6		04/01 - 09/30

IRRIGATED ACRES		PUBLIC WATER SYSTEM INFORMATION	
ADDITIVE	NON-ADDITIVE	WATER SYSTEM ID	CONNECTIONS
110.9	30.1		

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
Well 13G01 Horizontal Well	400113337414	BHN676	40N	01E	13	SW NE	48.9601	-122.6244
Well 13G02	400113337327	BHE779	40N	01E	13	SW NE	48.9599	-122.6245
Well 13K01	400113337327	BHN679	40N	01E	13	NW SE	48.9562	-122.6243
Well 13K02	400113337327	BHN680	40N	01E	13	NW SE	48.9561	-122.6258
Well 13K03	400113337327	BHN681	40N	01E	13	NW SE	48.9561	-122.6250
Well 13K04	400113337327	BHN682	40N	01E	13	NW SE	48.9562	-122.6236
Well 13K05	400113337327	BHN683	40N	01E	13	NW SE	48.9561	-122.6230
Future Well(s)	400113435465	NA	40N	01E	13	W ½ NE NE	-	-

Future Well(s)	400113200382	NA	40N	01E	13	SE NW	-	-
Future Well(s)	400113174314	NA	40N	01E	13	SE NW	-	-
Future Well(s)	400113185264	NA	40N	01E	13	N ½ NE SW	-	-

Datum: NAD83/WGS84

Place of Use (See Attached Map)

PARCELS (NOT LISTED FOR SERVICE AREAS)

400113185264, 400113174314, 400113200382, 400113283468, 400113307480, 400113360485, 400113337327, 400113337414, and 400113435465

LEGAL DESCRIPTION OF AUTHORIZED PLACE OF USE

W ½ NE ¼ NE ¼ Section 13, Township 40 North, Range 1 East W.M.

The N ½ N ½ NW ¼ SE ¼, and the W ½ NE ¼ of Section 13, Township 40 North, Range 1 East, W.M., EXCEPT that portion of the NW ¼ lying northwesterly of the center line of Dakota Creek, less road, situated in Whatcom County, Washington, Auditors' File #1040761.

S ½ S ½ NE ¼ NW ¼ Section 13, Township 40 North, Range 1 East W.M.

SE ¼ NW ¼ of Section 13, Township 40 North, Range 1 East, W.M., EXCEPT the portion defined as follows – E ½ N ½ S ½ SE ¼ NW ¼.

N ½ NE ¼ SW ¼ of Section 13, Township 40 North, Range 1 East W.M., EXCEPT the portion defined as follows – Beginning at SE corner of N ½ NE ¼ SW ¼ Thence west along south boundary 456.5 feet thence north parallel to east boundary 670 feet, thence east parallel to south boundary 456.5 feet, thence south 670 feet to point of beginning.

All less roads and easements.

Proposed Works

Seven existing wells (13G01, 13G02, 13K01, 13K02, 13K03, 13K04, and 13K05) 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	April 1, 2017	December 31, 2020

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 5462 and G1-22264C are authorized for a combined total of 292.3 gpm and 126.6 af/yr for the irrigation of 141 acres within the same place of use and from the same points of withdrawal. SWC 4982 overlaps with a portion of this place of use, but the water use from this water right will be accounted separately since it is for diversion from the North Fork of Dakota Creek.

Pumping from the Unlined Pond

The volume of water pumped from the unlined pond located in the SW $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$, Section 13, Township 40 North, Range 1 East, W.M. for use within the authorized place of use must not exceed the volume of water pumped into the pond from the authorized points of withdrawal. Metering data must be collected to verify this to be true.

Well Setback Requirement

Additional, replacement, and future points of withdrawal installed under this water right must be installed at least 300 feet from any wells that are not part of this right or that are not owned by the water right holder and must also be at least 300 feet from all property lines separating the water right holder's property from the property owned by other individuals.

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 on the tentative determination of the extent and validity of the water right; that there will be no impairment of existing rights; that the additional wells tap the same body of public ground water; that the annual consumptive quantity will not be exceeded; and that there will be no detriment to the public welfare.

Therefore, I ORDER approval of Application No. CG1-22264C 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.

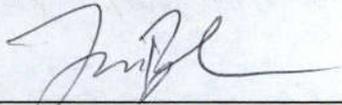
File your appeal and a copy of this Order with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.

- 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 1st day of April, 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>.

INVESTIGATOR'S REPORT

Applicant for Water Right Change: MDM Properties

Water Right Control Number: CG1-22264C

Investigators: Jim Bucknell, Andrew B. Dunn, Adam Neff (RH2 Engineering, Inc.)

BACKGROUND

This report serves as the written findings of fact concerning Water Right Application Number CG1-22264C.

Two change applications are being processed concurrently for MDM Properties (MDM) related to the Stein Road Fields. These change applications are CG1-22264C and CS1-*11410C (Surface Water Certificate (SWC) 5462). The overall goal is to have each water right include the same place of use, the same points of withdrawal, and to expand the number of irrigated acres to allow for the combined irrigation of up to 141 acres through the use of deficit irrigation so that the instantaneous rate, annual volume, and annual consumptive quantity under the water rights remain the same.

Change Application CG1-22264C is a request to add future wells to be drilled within a portion of the proposed place of use, increase the size of the place of use to match the entire Stein Road property farmed by MDM, and increase the total number of irrigated acres allowed under the water right.

EXISTING Water Right Attributes

Water Right Owner:	MDM Properties (Certificate originally under Henry Jansen)
Priority Date:	7/1/1974
Place of Use	The N ½ N ½ NW ¼ SE ¼, and the W ½ NE ¼ of Section 13, Township 40 North, Range 1 East, W.M., EXCEPT that portion of the NW ¼ lying northwesterly of the center line of Dakota Creek, less road, situated in Whatcom County, Washington, Auditors' File #1040761.

County	Waterbody	Tributary To	WRIA
Whatcom	Groundwater		1-Nooksack

Purpose	Rate	Unit	af/yr	Begin Season	End Season
Irrigation of 60 acres	225	GPM	99.6	Irrigation Season	

Source Name	Parcel	Well Tag	Twp	Rng	Sec	QQ Q	Latitude	Longitude
13G01	400113337414	BHN676	40N	01E	13	SW NE	48.9601	-122.6244
13G02	400113337327	BHE779	40N	01E	13	SW NE	48.9599	-122.6245
13K01	400113337327	BHN679	40N	01E	13	NW SE	48.9562	-122.6243
13K02	400113337327	BHN680	40N	01E	13	NW SE	48.9561	-122.6258
13K03	400113337327	BHN681	40N	01E	13	NW SE	48.9561	-122.6250
13K04	400113337327	BHN682	40N	01E	13	NW SE	48.9561	-122.6236
13K05	400113337327	BHN683	40N	01E	13	NW SE	48.9561	-122.6230

Wells 13G02, 13K02, 13K03, 13K04, and 13K05 were added as points of withdrawal through submittal of Showing of Compliance with RCW 90.44.100(3) forms to Ecology on March 30, 2015.

Sec = Section; QQ Q = Quarter-quarter of a section; Datum in NAD83/WGS84.

REQUESTED Water Right Attributes

Applicant Name:	MDM Properties
Date of Application:	3/26/2015
Place of Use:	<p>400113174314, 400113185264, 400113200382, 400113249320, 400113283468, 400113307480, 400113337327, 400113337414, 400113360485, and 400113435465.</p> <p>W ½ NE ¼ NE ¼ Section 13, Township 40 North, Range 1 East W.M.</p> <p>The N ½ N ½ NW ¼ SE ¼, and the W ½ NE ¼ of Section 13, Township 40 North, Range 1 East, W.M., EXCEPT that portion of the NW ¼ lying northwesterly of the center line of Dakota Creek, less road, situated in Whatcom County, Washington, Auditors' File #1040761.</p> <p>SE ¼ NW ¼, AND S ½ S ½ NE ¼ NW ¼, AND N ½ NE ¼ SW ¼ EXCEPT the portion defined as follows – Beginning at SE corner of N ½ NE ¼ SW ¼ Thence west along south boundary 456.5 feet thence north parallel to east boundary 670 feet, thence east parallel to south boundary 456.5 feet, thence south 670 feet to point of beginning Section 13, Township 40 North, Range 1 East W.M.</p> <p>All less roads and easements.</p>

County	Waterbody	Tributary To	WRIA
Whatcom	Groundwater		1-Nooksack

Purpose	Rate	Unit	af/yr	Begin Season	End Season
Irrigation	225	GPM	99.6	April 15	October 1

Source Name	Parcel	Well Tag	Twp	Rng	Sec	QQ Q	Latitude	Longitude
13G01	400113337414	BHN676	40N	01E	13	SW NE	48.9601	-122.6244
13G02	400113337327	BHE779	40N	01E	13	SW NE	48.9599	-122.6245
13K01	400113337327	BHN679	40N	01E	13	NW SE	48.9562	-122.6243
13K02	400113337327	BHN680	40N	01E	13	NW SE	48.9561	-122.6258
13K03	400113337327	BHN681	40N	01E	13	NW SE	48.9561	-122.6250
13K04	400113337327	BHN682	40N	01E	13	NW SE	48.9561	-122.6236
13K05	400113337327	BHN683	40N	01E	13	NW SE	48.9561	-122.6230
Future Well(s)	400113435465	NA	40N	01E	13	W ½ NE NE	-	-
Future Well(s)	400113200382	NA	40N	01E	13	SE NW	-	-
Future Well(s)	400113249320	NA	40N	01E	13	SE NW	-	-
Future Well(s)	400113174314	NA	40N	01E	13	SE NW	-	-
Future Well(s)	400113185264	NA	40N	01E	13	N ½ NE SW	-	-

Sec = Section; QQ Q = Quarter-quarter of a section; 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 changes in the point 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 *Lynden Tribune* on May 20 and 27, 2015.

Ms. Ria Berns, of the Department of Ecology's (Ecology) Northwest Regional Office, reported on September 22, 2015, that Ecology had received no protests on the two water right change applications associated with the MDM Stein Road project (CG1-22264C and CS1-*11410C).

Consultation with the Department of Fish and Wildlife

Ecology must give notice to the Washington Department of Fish and Wildlife (WDFW) of applications to divert, withdraw, or store water. On January 20, 2016 and February 1, 2016, RH2 Engineering, Inc., (RH2) sent notice of our proposed decision on two water right change applications for MDM to Mr. Steven Boessow at the WDFW. No response was received.

State Environmental Policy Act

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 90.44.100 allows Ecology to amend a groundwater certificate 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 2) change the manner or place of use of the water if the following conditions apply:

- (a) The additional or replacement well taps the same body of public groundwater as the original well (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 (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 (RCW 90.44.100(2)(c)).
- (d) Other existing rights shall not be impaired (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 estimated or actual annual amount of water diverted pursuant to the water right, reduced by the estimated annual amount of return flows, averaged over the two years of greatest use within the most recent five-year period of continuous beneficial use of the water right.

INVESTIGATION

Site Visit/Site Description

On September 16, 2015, Mr. Andrew B. Dunn and Mr. Jim Bucknell from RH2 and Ms. Ria Berns from Ecology met with Mr. Marty Maberry and Mr. Allen Brown from MDM Properties and Mr. Chuck Lindsay and Ms. Katherine Beeler, their consultants from Associated Earth Sciences, Inc. to perform the site visit. Before travelling to the proposed place of use, we met at the MDM company office and discussed general and specific farm operations and the proposed transfer.

Mr. Brown indicated that water is pumped from the surface water diversion (SWC 5462) and the wells (G1-22264C) to the pond. There are two separate lines, one coming from the surface water diversion and the second coming from the wells, which feed the pond. The pond is unlined and has neither a natural inlet, nor outlet. From the pond, the water is pumped through a treatment plant and then distributed to the irrigation system.

Mr. Brown provided a map showing the location of the distribution system leading from the pond to the fields and also the zones across the farm. The farm includes 5 irrigation zones in its present configuration. Distribution piping on the farm ranges from 6-inch diameter mains to 4-inch to 2-inch

diameter sub-mains. Mr. Brown said they like to maintain 40 to 60 pounds per square inch (psi) of pressure at the sand filters and about 8-10 psi at the valves leading to the driplines. In addition to the pumps associated with the 8 points of withdrawal/diversion, there is 1 pump house located near the pond that contains sand filters for particle removal and plumbing to allow for introduction of fertilizer into the irrigation system (fertigation). Most of the points of withdrawal do not have flow meters installed with the only exception being the horizontal well 13G02 (Unique ID BHE779), which has a 4-inch McCrometer McPropeller flow meter (Model MF104, Serial Number 12-04095-04) that read 45,433,300 gallons at the time of the site visit.

With respect to crop rotation, Mr. Maberry indicated that they plan to grow primarily raspberries and blueberries with occasional rotation of potatoes. Raspberries are often grown on a field for 6 to 10 years before being removed. Blueberries can be grown for many decades before they need to be removed. For all raspberries and blueberries on this property, water is delivered through drip irrigation. The blueberries are typically irrigated with hanging drip tape and the raspberries are typically irrigated with buried drip tape. They are experimenting with pulsing the water delivery as a potential means of increasing their water use efficiency. When potatoes are grown, they are typically irrigated with travelling big gun sprinklers by the potato grower, but they are planning to experiment with using drip lines on this crop in the future.

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. 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 and it being late in the irrigation season.

Each well and the surface water diversion were visited to confirm the location provided in the change application. Depth to water measurements were taken at all wells during the site visit by AESI staff using an electronic water level probe. The measurements obtained are discussed in the hydrogeology section of this investigation. The pump had been removed from Dakota Creek and stored for the winter. The applicant said that Dakota Creek has historically flowed sufficiently to allow uninterrupted use during the low flow months, including the summer of 2015.

The homes located within the proposed place of use receive their water from private wells.

History of Water Use

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

Affidavits

One notarized affidavit relating to knowledge of farming and irrigation practices on the original place of use under water right G1-22264C was provided by Mr. Marty Maberry. In the affidavit, dated March 20, 2015, Mr. Maberry indicates that he has been familiar with the farming and irrigation operations on this property since the mid-1980s. He also indicates that the information contained within the March 24, 2015, Associated Earth Sciences, Inc. (AESI) report included with the application packet is true and correct to the best of his knowledge.

Instantaneous Rate

The wells that are currently authorized as points of withdrawal under this water right include 13G01, 13G02, 13K01, 13K02, 13K03, 13K04, and 13K05. The installed pumping capacity of each well is included in **Table 1**.

Table 1. Installed Well Pumping Capacity

Well	Pump Make	Pump Model	Pump HP	Pump Type	Total Dynamic Head (ft)	Pumping Rate (gpm)
13G01	Grundfos	25S10-7	1	Submersible	140	20
13G02	Berkeley	6T225	7.5	Submersible	105	220
13K01	Grundfos	80S30-3	3	Submersible	119	60
13K02	Grundfos	135S50-3	5	Submersible	140	75
13K03	Grundfos	135S50-3	5	Submersible	140	75
13K04	Grundfos	40S15-5	1.5	Submersible	104	40
13K05	NA ¹	0 ¹				
					Total	490+

¹No pump currently installed in Well 13K05, although the reported well capacity is 20 gpm (AESI, 2015).

The information in **Table 1** was obtained from AESI (2015 and follow-up email dated November 13, 2015), and associated pump curves. The combined pumping rate of the seven existing points of withdrawal is approximately 510 gpm. This pumping rate is in excess of the 225 gpm authorized under this water right.

Therefore, the instantaneous rate of 225 gpm has been maintained through beneficial use from the points of withdrawal and is available for transfer.

Irrigated Acres

Aerial photos from (AESI, 2015) were reviewed for 1976 and 1987. In addition, Google Earth™ was used to review photos from 1998 through 2015.

The aerial photo from 1976 was taken when the original report of examination was being prepared, which describes 60 acres of irrigation and indicates that the irrigation system was in place. This aerial photo shows pasture/grass within much of the place of use except for forested areas near the southeastern corner of the place of use. Grass appears to cover approximately 70 acres. The 1987 aerial photo shows additional structures in the northern place of use. A grass runway is visible on the property running south-southwest to north-northeast, the forested areas remain, and the remaining land in the place of use looks to be cultivated and in agricultural production. By 1998, a water tank had been added near the buildings on the northern place of use, the runway is visible, forested areas remain, and approximately 12 acres of grass are being grown on the northern place of use and approximately 54 acres of raspberries are grown elsewhere. By 2004, the forested areas have been cleared and there are approximately 60 acres of raspberries and 7 acres of pasture/grass. Starting in 2005, it appears that irrigation of the pasture/grass in the north has ceased and irrigation is focused on the 60 acres of raspberries. In 2011, the number of raspberries being irrigated was reduced to 59 acres due to the exclusion of an area north of the runway. This irrigation pattern continued through 2015.

A portion of the existing place of use is not owned by MDM properties. However, Mr. William E. Shagren and Mr. Craig Shagren both signed the change application as land owners within the existing place of use. Their properties are also included within the proposed place of use.

Based on the evidence available, it is tentatively determined that only 59 acres of the original 60 acres of irrigation authorized under the water right have been maintained through beneficial use.

Annual Volume

There is currently only one water meter on the farm and it is located on the horizontal well 13G02. Therefore, RH2 relied on the current Washington Irrigation Guide (WIG, 1985), older irrigation guides (1982 and 1969), weather data, and Water Resources Guidance GUID-1210 to estimate the 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 (2015) proposed to use the crop irrigation requirements for raspberries from the Blaine station (Blaine CIR = 17.48 inches) since the farm is located approximately 2 miles from the Blaine station. RH2 agrees that this is a reasonable assumption.

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 result of these changes has been significantly warmer and drier irrigation seasons in Whatcom County. For example, the available weather data shows that the period of May through September was on average almost 3 degrees Fahrenheit warmer from 2011 through 2015, than the average temperature from the Blaine station 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 CIR for these crops over at least the last 5 years and, therefore, the amount of irrigation water that has actually been used during that period.

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 in that irrigation guide), the crop irrigation requirement will increase as the return period increases.

Table 2. Weather Comparison of WIG Averages to Actual Data

Irrigation Season	Temperature (degrees F)			Precipitation (inches)		
	WIG Average	Actual	Difference (Actual - WIG)	WIG Average	Actual	Difference (Actual - WIG)
2015	58.46	63.07	4.61	8.84	5.49	-3.35
2014		62.68	4.22		12.71	3.87
2013		62.07	3.61		9.69	0.85
2012		60.08	1.62		7.45	-1.39
2011		59.37	0.91		9.71	0.87
Average			2.99			0.17

Notes:
 Irrigation season is considered to be May through September.
 Annual data is from the Blaine weather station.
 Data obtained from the Western Regional Climate Center (<http://www.wrcc.dri.edu/summary/Climsmwa.html>).
 WIG data is from the 1985 publication.

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 the 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 in that irrigation guide) 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 (17.48 inches) by 17 percent results in a 20.45 inch CIR for raspberries. RH2 has assumed that increasing the WIG values to represent the anticipated 10-year return interval for each 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% and 95%, with an average of 88%. 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.

MDM is a family-owned business that has been in operation in Whatcom County for many 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 MDM fields is assumed to be average to high.

The total irrigation requirement that was originally allocated was 19.92 inches over 60 acres. **Table 3** lays out month-by-month calculations for the irrigation of 59 acres of raspberries. The instantaneous rate authorized by this water right limits the volume that can be pumped such that it is not physically possible to meet the seasonal peak calculated to be required by raspberries in July because the instantaneous rate of 225 gpm is not enough to satisfy the CIR for the 59 acres irrigated. For this reason, the July application efficiency (Ea %) was set to 100 percent. The other monthly Ea % values were assigned so that the total water pumped did not exceed the water right limit of 99.6 afy. **Table 3** lays out the monthly calculations. Based on this analysis, the tentative determination is that the full 99.6 afy has been maintained through beneficial use.

Table 3. Tentative Determination Analysis

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	3.28	0.27	59.0	16.1	98%	0.28	16.44	30.83	16.44	100%	16.44
June	30	4.21	4.93	0.41	59.0	24.2	99%	0.42	24.59	29.83	24.59	100%	24.59
July	31	5.69	6.27	0.52	59.0	30.8	100%	0.52	30.82	30.83	30.82	100%	30.82
August	31	3.83	4.48	0.37	59.0	22.0	99%	0.38	22.25	30.83	22.25	100%	22.25
September	30	0.94	1.10	0.09	59.0	5.4	98%	0.09	5.52	29.83	5.52	100%	5.52
	153	17.47	20.05	1.67	59.0	98.6			99.6	152.1	99.6		99.6

¹ Adjusted for drought at 117% of WIG at the Blaine station for raspberries, except July CIR is equal to pumping at water right limit for this month.

² Based on 225 gpm 24/7 for specific month

³ Maximum calculated maintained Qa for G1-22264C

⁴ CU % is the percent consumptive use, which is 5 % higher than the Ea, per Guidance 1210, with a cap of 100 percent.

⁵ Consumptive quantity

Average Ea% = 99.0%

Proposed Use

The primary goals of Change Application CG1-22264C are to allow for the addition of future wells to be drilled within the place of use, change the place of use to include all properties associated with the Stein Road Fields, and increase the number of irrigated acres allowed under the two water rights to a combined 141 acres. This application is tied to a change application for the following water right:

- SWC 5462 (Tracking number S1-*11410C)

The applicant wishes to expand the place of use allowed under both rights to the same place of use and include all wells as points of withdrawal under each right, such that water from the water right could be pumped from any well and used anywhere within the proposed place of use.

As discussed in the next section, the quantity of water allowed for the expansion of acreage will be the average consumptive quantity as calculated based on the average of the 2 highest years of use in the last 5 years of continuous beneficial use, minus return flows. The applicant intends to use deficit irrigation. Therefore, MDM intends to apply water at less than the optimum amount required by the plants as a means of maximizing the efficiency of its water use on the fields, rather than maximizing its per-plant output. This irrigation technique will allow MDM to stay within the limits of its water right as authorized by Ecology.

Proposed Place of Use

The following parcels are currently included in the proposed place of use (Table 4).

Table 4. Parcels in the Proposed Place of Use

Geo Tax Parcel No.	Parcel Owner	Gross Acres	Irrigable Acres
400113337327	Maberry Land Holdings, LLC	42.23	40.5
400113200382	Maberry Packing, Inc.	29.55	27.5
400113185264	Maberry Packing, Inc.	22.95	22.0
400113337414	Maberry Land Holdings, LLC	22.38	21.0
400113435465	Maberry Land Holdings, LLC	19.79	17.5
400113174314	Maberry Land Holdings, LLC	5.00	2.0
400113283468	William Shagren	2.26	0.5
400113307480	William Shagren	2.67	1.5
400113360485	William Shagren	11.17	8.5
Totals		163.0	141.0

Mr. William Shagren signed the change application since he is a land owner within the existing and proposed place of use.

When the change application was originally filed, Parcel No. 400113249320 was identified as being within the proposed place of use. However, a phone call on February 1, 2016 from the applicant's representative (Mr. Chuck Lindsay, AESI) indicated that they would no longer like to include this parcel in the proposed place of use. For this reason that parcel has been excluded.

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 Place of Use

Irrigation Season	Crop	Acres
2011	Raspberries	59
2012	Raspberries	59
2013	Raspberries	59
2014	Raspberries	59
2015	Raspberries	59

The ACQ analysis for this change application will be performed on the 2011 through 2015 irrigation seasons (**Tables 2 and 5**). Based on the data available, it appears that 2012 and 2015 represent the years when weather conditions and the crops 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.

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. However, the annual quantity estimate previously discussed indicates that it is reasonable to assume that the full 99.6 afy has been used on the property for irrigation of 59 acres of raspberries during 2012 and 2015.

Based on the calculated average application efficiency of 99 percent and a consumptive use of 100 percent (consistent with Guidance 1210), the consumptive use is 99.6 afy and there is no calculated return flow (**Table 3**).

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 (99.6 afy) can be carried through the water right change. In his affidavit (dated March 20, 2015), Mr. Marty Maberry acknowledged that if the change is approved, MDM 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 G1-22264C identifies the period of use for irrigation as during the irrigation season. The change application CG1-22264C requests that the period of use be more specifically identified as April 1 through September 30. On the site visit, Mr. Maberry indicated that this is a reasonable definition of the irrigation season. Therefore, the period of use will be clarified as being April 1 through September 30, as requested by the applicant.

Other Rights Appurtenant to the Place of Use

Relying on Ecology's Water Resources Explorer (accessed December 8, 2015), no water rights were identified as being appurtenant to the existing place of use. Therefore, all agricultural irrigation within the existing place of use will be attributed to water right certificate G1-22264C.

Besides the other water right being changed (SWC 5462), there is one water right certificate and two water right claims whose mapped place of use is at least partially appurtenant with the proposed place of use. These water rights are described below:

Certificate SWC 4982

Name: Guy A. Jansen
Priority Date: September 11, 1951
Instantaneous Rate: 0.18 cfs
Annual Volume: Not Specified
Purpose: Irrigation of 18 acres
Source: North Fork Dakota Creek (SD-1 diversion)

Certificate SWC 4982 is for irrigation partially within the proposed place of use. The point of diversion for this water right is also where MDM has been diverting SWC 5462. This water right will continue to be used within its place of use. Any use under this right will be able to be tracked after this change is complete because it will be the only water right authorized to take water directly from the North Fork Dakota Creek for use within the proposed place of use.

Water Right Claim G1-149610CL

Name: Lawrence and Mary M. Rauch
Quantity of Water Claimed: 18 gpm
Annual Quantity Claimed: 2 af/yr
Irrigation Acres Claimed: None
Date of First Putting Water to Use: August 1921
Purpose for Which Water is Used: Domestic and Livestock

This claim likely represents beneficial use by one or more of the homes located in the E ½ NE ¼ NE ¼ Section 13, Township 40 North, Range 1 East W.M., which fall outside of the proposed place of use.

Water Right Claim G1-145964CL

Name: William N. Ewing
Quantity of Water Claimed: 13 gpm
Annual Quantity Claimed: 1 af/yr
Date of First Putting Water to Use: June 1968 for them
Purpose for Which Water is Used: Domestic

This claim likely represents beneficial use by the home located on Parcel No. 400113243232, which falls outside of the proposed place of use.

Water Right Claim G1-145428CL

Name: Forrest Dunkin
Quantity of Water Claimed: Not specified
Annual Quantity Claimed: Not specified
Date of First Putting Water to Use: Not specified
Purpose for Which Water is Used: Domestic and Irrigation (lawn and garden)

The place of use for the claim is Parcel No. 400113185264, which is now owned by MDM. The use is likely for the home on that parcel.

Based on the information contained in this section, all irrigation within the existing place of use has been attributed to G1-22264C.

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, January 15, 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 this water right change lie on the northeastern corner of the Custer Trough where it slopes up to the Lynden Terrace and south of the Boundary Uplands.

The original POWs for G1-22264C are within the South Fork Dakota Creek surface water subbasin (as defined by the WRIA 1 watershed planning group in 2002), while the existing point of diversion (POD) for S1-*11410C is within the North Fork Dakota Creek surface water subbasin. The proposed POU and POW areas are split between the North and South Forks Dakota Creek (**Figure 1**).

The Sumas aquifer, the primary source of fresh groundwater, is typically composed of stratified sand and gravel outwash and the coarse-grained alluvium of the Nooksack River. The aquifer can also contain some fine-grained ice-contact deposits, lacustrine silt and clay, and peat. The Sumas aquifer material is typically coarser toward the Canadian border and finer to the southwest. The aquifer is typically about 40 feet thick, but within the Dakota Creek area is only 15 to 30 feet thick. Groundwater flow in this location generally flows toward the southwest (**Figure 2**).

The Sumas outwash aquifer is primarily recharged from precipitation infiltrating through the deposit to the water table. For the portion of the aquifer at the project area, the primary recharge area is northeast near the headwaters of the North Fork of Dakota Creek. After reaching the water table, the water travels laterally southwest toward the project area. The POU appears to be entirely within the North Fork Dakota Creek groundwater subbasin (**Figure 2**).

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 (13K01, 13K02, 13K03, 13K04, 13K05, 13G01, and 13G02), MDM has requested the ability to add additional wells in the future within two areas of the proposed place of use (Parcels 400113185264, 400113174314, 400113200382, and 400113435465). When the change application was originally filed, Parcel No. 400113249320 was also identified as a future well location. However, a phone call on February 1, 2016 from the applicant's representative (Mr. Chuck Lindsay, AESI) indicated that they would no longer like to include this parcel as a site of future wells. For this reason that parcel has been excluded. Since exact locations for the future wells have not been specified, analysis for impact was 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. There are several existing water rights documenting POWs mapped within the proposed future POW area.

Interference drawdown was calculated using the average transmissivity, 451 ft²/day, for the area which was determined using pump data from 20 nearby wells logs. The storage coefficient was estimated to be 0.2 since it is an unconfined aquifer. Using these aquifer properties, several different pumping rates were modeled to determine the effects on neighboring wells.

The worst-case scenario for impacts to neighboring wells occurs when the wells are pumped at a lower pumping rate (43 gpm), just low enough to keep the well from running dry, then pumping it continuously for the duration of the irrigation season (April 15 to October 1 equals 168 days), flattening the drawdown curve and increasing the impacts further out. In this scenario, the drawdown calculated within the well, 19.9 feet, represents approximately all of the available drawdown within the aquifer. Within 200 feet, the drawdown decreases to 4.46 feet, which is on par with high seasonal fluctuation of the water table for this aquifer (Cox and Kahle, 1999).

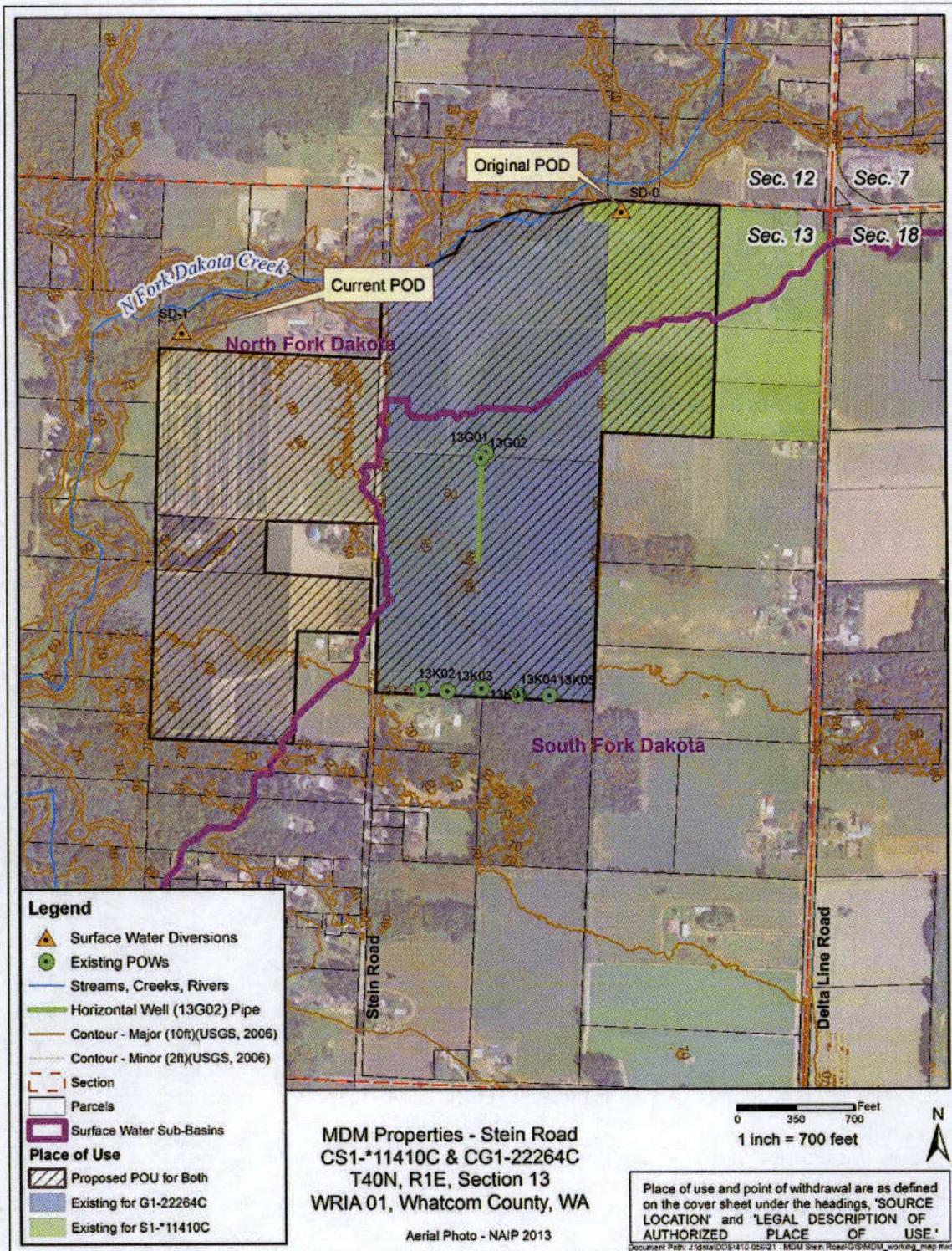


Figure 1. Original and Proposed Place of Use, Original Points of Withdrawal

WRIA 1 subbasin boundaries delineated through the WRIA 1 Watershed Management Project, 2002.)

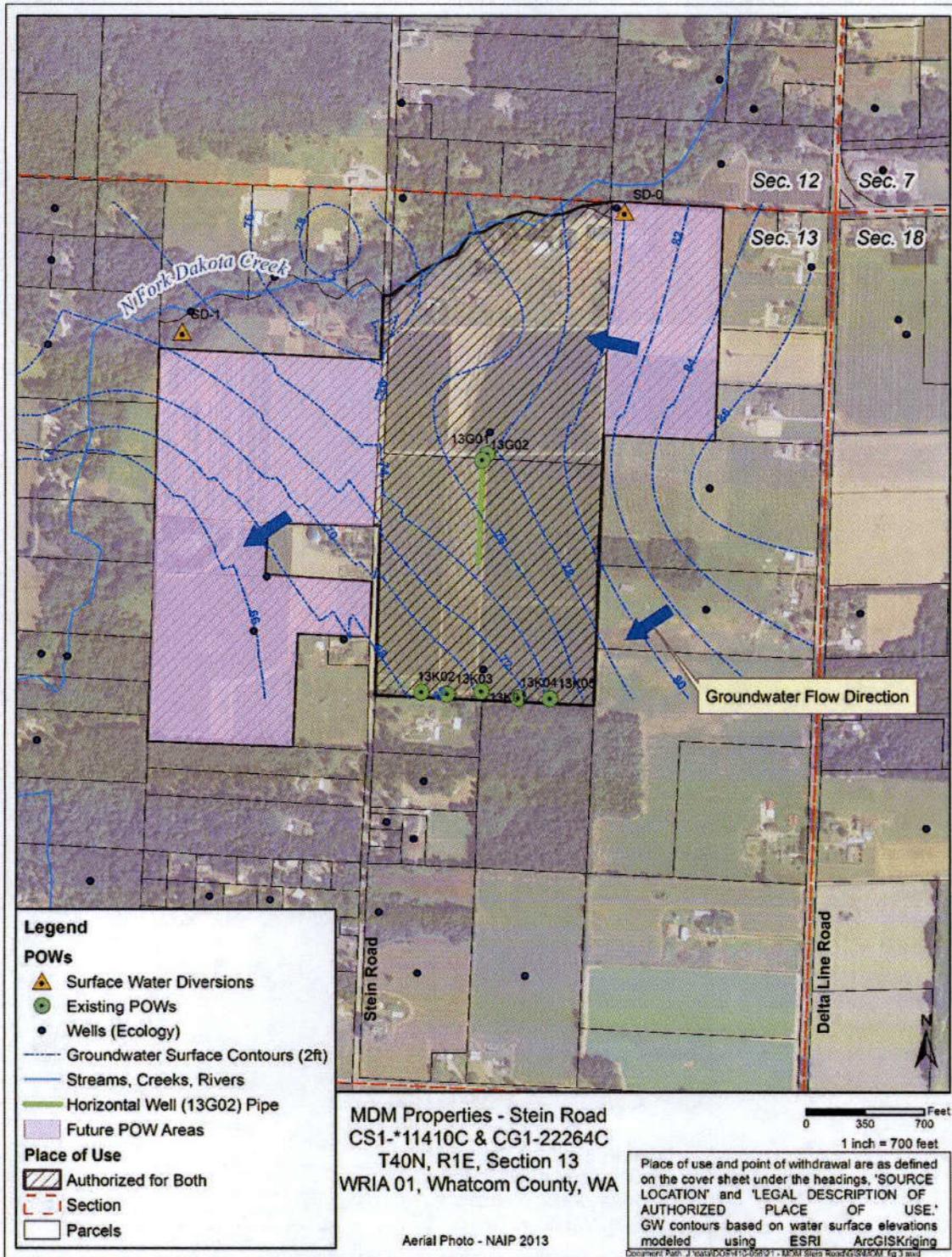


Figure 2. Potentiometric Surface Map and Future POW Areas

(Figure shows the project area with approximate groundwater contours with elevation in feet. Flow direction arrows were added for clarity.)

Same Body of Public Groundwater

In order for the requested additional future POWs to be added to the groundwater right, all POWs must tap the same body of public groundwater. RH2's Adam Neff, L.G., concluded that the existing and potential well locations within the proposed future POW area, as shown in **Figure 2**, tap the same body of public groundwater, based on the following facts:

1. The original, existing, and proposed POWs are currently tapping or will tap the shallow Sumas outwash aquifer.
2. The original and proposed POWs are located within the North Fork Dakota Creek groundwater subbasin.
3. Groundwater flow for the area is to the southwest, based on the nearby well logs, USGS elevation data, and on-site well measurements during the site visit. No major groundwater flow divides exist near the site.

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).

All surface water impacts associated with this water right are within the Dakota Creek watershed. No impacts will be on any of the surface water bodies with minimum instream flows established in WAC 173-501-030(2). Therefore, the change will not cause any impairment of minimum instream flows.

Impairment, Qualifying Ground Water Withdrawal Facilities, and Well Interference

Based on information provided by AESI (2015), and the results and modeled extrapolations from the hydrogeologic analysis, the existing POWs are likely currently being pumped at or near the maximum rates hydraulically possible (without dewatering the wells). Therefore, future impacts from pumping the existing POWs will not be greater than current impacts.

All additional POWs installed in the future may be installed within the areas identified in **Figure 2**, but with a 300-foot setback from all the area boundaries and existing wells not owned by MDM (at the time of well drilling) to ensure that impacts to neighboring rights do not cause impairment. It is the owner of the new well's responsibility to thoroughly investigate and locate all wells (include permit-exempt wells) within the proposed future well area in order to ensure adherence to this 300-foot setback requirement.

On December 8, 2015, Ecology was asked if it had received any complaints from well owners near the Stein Road Farm related to declining water levels, excessive seasonal drawdowns, and wells pumping air. On December 9, 2015, Ms. Kasey Cykler, Ecology WRIA 1 Watermaster, responded that Ecology had not received any complaints specific to this area.

Public Interest Considerations

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

Consideration of Protests and Comments

This application was not protested by any party.

Conclusions

The water right is tentatively determined to be valid and eligible for change and the proposed points of withdrawal are from the same body of ground water as the original points of withdrawal and the changes requested will not impair existing rights nor be detrimental to the public welfare. Given that no formal protests were received and WDFW did not provide comments, the change should be approved as recommended below.

**Table 6. Summary of Recommended Water Right Change Decisions,
MDM, Stein Road**

Water Right	Qi (gpm)	Qa (af/yr)	Irrigated Acres (additive/non-additive)	Place of Use	Points of Withdrawal
SWC 5462	67.3	27.0	30.1 / 110.9	Stein Road	13G01, 13G02, 13K01, 13K02, 13K03, 13K04, 13K05, and future wells
G1-22264C	225	99.6	110.9 / 30.1		
Total	292.3	126.6	141.0		

RECOMMENDATIONS

Based on the investigation and conclusions included in this ROE, RH2 recommends that 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.

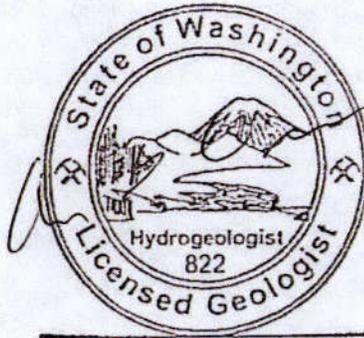
Purpose of Use and Authorized Quantities

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:

- 225 gpm (additive)
- 99.6 af/yr (additive)
- Irrigation of 141 acres in total – 110.9 acres (additive) and 30.1 acres (non-additive)
- April 1 through September 30

Points of Withdrawal

SOURCE FACILITY/DEVICE	PARCEL	WELL TAG	TWP	RNG	SEC	QQ Q	LATITUDE	LONGITUDE
Well 13G01	400113337414	BHN676	40N	01E	13	SW NE	48.9601	-122.6244
Horizontal Well 13G02	400113337327	BHE779	40N	01E	13	SW NE	48.9599	-122.6245
Well 13K01	400113337327	BHN679	40N	01E	13	NW SE	48.9562	-122.6243

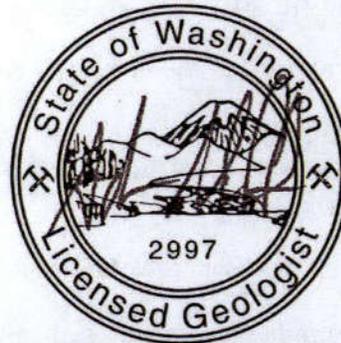


ANDREW B. DUNN

Report by: Andrew B. Dunn

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

3/29/2016
Date

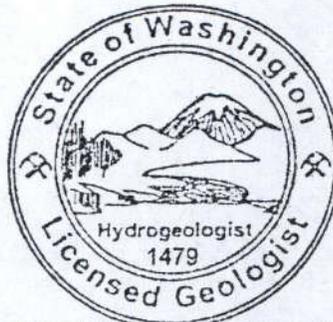


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Report by: Adam Neff

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3/29/2016
Date



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3/29/2016
Date

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ATTACHMENT

