STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION
Change of: Point of Withdrawal
WRTS File # CS4-069703CL@5

PRIORITY DATE	CLAIM NO.	PERMIT NO.	CERTIFICATE NO.
October 19, 1903	069703		

NAME
William Small

ADDRESS/STREET	CITY/STATE	ZIP CODE
4660 Entiat River Road	Entiat, WA	98822

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
A Well

TRIBUTARY OF (IF SURFACE WATERS)
N/A

MAXIMUM CUBIC FEET PER SECOND (cfs)	MAXIMUM GALLONS PER MINUTE (gpm)	MAXIMUM ACRE FEET PER YEAR (ac-ft/yr)
	63	30.1

QUANTITY, TYPE OF USE, PERIOD OF USE

63 gallons per minute, 30.1 acre-feet per year, for the irrigation of 6.3 acres from April 1 to October 31

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL

1,435 feet South and 115 feet West of the NE corner of Section 14, T. 25 N., R. 20 E.W.M.

SOURCE	PARCEL	LATTITUDE	LONGITUDE	QTR/QTR	SECTION	TOWNSHIP	RANGE
Well	252014140110	47.6675	-120.2846	SE1/4NE1/4	14	25 N.	20 E.W.M.

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED
[Attachment 1 shows location of the authorized place of use and point(s) of diversion or withdrawal]

E½E½SE¼NE¼ of Section 14, T. 25 N., R. 20 E.W.M, EXCEPT the W½NE¼NE¼SE¼NE¼ of Section 14, T. 25 N., R. 20 E.W.M.

Chelan County Assessor Parcel Nos. 252014140110, 252014140100, 252014140115

DESCRIPTION OF PROPOSED WORKS

An eight-inch diameter well drilled to a depth of 100 feet below ground surface, screened from 69 feet to 79 feet below ground surface, with a 7.5 horsepower Berkeley submersible pump supplying water to the irrigation system.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE	COMPLETE PROJECT BY THIS DATE	WATER PUT TO FULL USE BY THIS DATE
Begun	April 1, 2010	October 31, 2011

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1. Well, Well Logs, and Well Construction Standards

1.1. In accordance with chapter 173-160 WAC, wells shall not be located within certain minimum distances of potential sources of contamination. These minimum distances shall comply with local health regulations, as appropriate. In general, wells shall be located at least 100 feet from sources of contamination. Wells shall not be located within 1,000 feet of the boundary of a solid waste landfill.

1.2. All wells constructed in the state shall meet the construction requirements of chapter 173-160 WAC titled "Minimum Standards for the Construction and Maintenance of Wells" and chapter 18.104 RCW 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 shall be decommissioned.

1.3. All wells shall be tagged with a Department of Ecology (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 shall remain attached to the well. If you are required to submit water measuring reports, reference this tag number.

1.4. Required installation and maintenance of an access port as described in WAC 173-160- 291(3).

2. Measurements, Monitoring, Metering, and Reporting

2.1. An approved measuring device shall be installed and maintained for each of the sources authorized by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", chapter 173-173 WAC. http://www.ecy.wa.gov/programs/wr/measuring/measuringhome.html

2.2. Water use data shall be recorded weekly and maintained by the property owner for a minimum of five years. The maximum rate of diversion/withdrawal and the annual total volume shall be submitted to Ecology by January 31st of each calendar year.

2.3. Chapter 173-173 WAC describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition Ecology for modifications to some of the requirements. Installation, operation, and maintenance requirements are enclosed as a document entitled "Water Measurement Device Installation and Operation Requirements". http://www.ecy.wa.gov/programs/wr/measuring/measuringhome.html

3. Schedule and Inspections

Ecology personnel, upon presentation of proper credentials, shall 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.

4. Project Completion

The water right holder shall file the notice of project completion when the permanent distribution system has been constructed and the quantity of water required by the project has been put to full beneficial use. The *Certificate of Change* will reflect the extent of beneficial use within the limitations of the change authorization. Elements of the project completion inspection may include, as appropriate, the source(s), system instantaneous capacity, beneficial use(s), annual quantity, place of use (POU), and compliance with provisions.

5. Water Use Efficiency

Use of water under this authorization shall be contingent upon the water right holder's maintenance of efficient water delivery systems and use of up-to-date water conservation practices consistent with established regulation requirements and facility capabilities.

6. Non-Additive to Confirmed Claims

The water use authorized under this filing shall be considered non-additive to any water rights confirmed for said claim as a result of a general adjudication through Superior Court, should adjudication be undertaken.

Upon reviewing the investigator's report, I find all facts relevant and material to the subject application have been thoroughly investigated. Furthermore, I find the change of water right as recommended will not be detrimental to existing rights or the public welfare.

Therefore, I ORDER approval of the recommended change to a point of withdrawal under Change Application No. CS4-069703CL@5, subject to existing rights and the provisions listed above.

YOUR RIGHT TO APPEAL

You have a right to appeal this Decision to the Pollution Control Hearings Board (PCHB) within 30 days of the date of receipt of this Decision. 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 all of the following within 30 days of the date of receipt of this Decision:

- File your appeal and a copy of this Decision 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 Decision 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.

ADDRESS AND LOCATION INFORMATION	
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 Road SW, Suite 301 Tumwater WA 98501	**Pollution Control Hearings Board** PO Box 40903 Olympia WA 98504-0903

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 .

Signed at Yakima, Washington, this _____ day of _____ 2014.

_____
Mark Kemner, LHG, Section Manager
Water Resources Program/CRO

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BACKGROUND

Description and Purpose of Proposed Change

On May 23, 2008, William Small submitted to Ecology an *Application for Change/Transfer of Water Right*. The application was accepted and assigned the identifier Water Right Change Application No. CS4-069703CL@5. In the application, Mr. Small proposes a change in point of diversion (POD) to a point of withdrawal (POW) that is constructed on Mr. Small's property (Parcel No. 252014140100). Mr. Small has used the Detwiler Hanan Knapp Ditch, locally known as the "Hanan – Detwiler Ditch" (H-D Ditch), to divert his asserted portion of Claim No. 069703. Mr. Small proposes to cease all diversions from the H-D Ditch and withdrawal all irrigation water from the proposed well.

The proposed change in POD to a POW is part of the "Knapp-Wham Hanan-Detwiler Irrigation System Consolidation" project. As stated in the application, "The objectives of the project include: 1) Eliminating the Hanan-Detwiler surface water diversion and associated unlined irrigation ditch to improve instream flow conditions in the lower river, particularly during the late-summer/fall period, and 2) Enhancement of the Knapp-Wham system and surface water diversion to eliminate low flow [fish] passage issues and provide additional large pool habitat complexity within the lower Entiat River." Decommissioning the H-D Ditch by moving 11 users to the Knapp-Wham Ditch (K-W Ditch) and installing POW for the remaining five users of the H-D Ditch is expected to result in the elimination of ditch losses and increase instream flows for a portion the Entiat River.

The proposed change in POD to POW for William Small as proposed in Change Application No. CS4-069703CL@5 is the subject of this report. This report pertains solely to the portion of Claim No. 069703 asserted by William Small.

Attributes of the Claim and Proposed Change of a Portion of the Claim

Table 1. Summary of Proposed Changes to a Portion of Claim No. 069703

Attributes	*Existing*	*Proposed*
Name	Detwiler, Hanan, Knapp Ditch	William Small
Priority Date | Date of Application for Change	October 19, 1903	May 23,2008
Instantaneous Quantity	900 cfs	61 gpm
Annual Quantity	1,300 ac-ft/y	Not Stated
Source	Entiat River	A Well
Point of Diversion/Withdrawal	POD: Within the NW¼ SE¼ of Section 10, T. 25 N., R 20 E.W.M.	POW: Within the SE¼ NE¼ of Section 14, T. 25 N., R. 20 E.W.M.
Purpose of Use	Irrigation	No Change
Period of Use	April through October	No Change
Place of Use	Lands within Section 15, Section 18, and the NE¼ of Section 14, all in T. 25 N., R. 21 E.W.M.	Approximately 7.8 acres within SE¼ NE¼ of Section 14, T. 25 N., R. 20 E.W.M.

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Legal Requirements for Proposed Change

The following is a list of requirements that must be met prior to authorizing the proposed change in Water Right Application No. CS4-069703CL@5:

- **Public Notice**
  A public notice was published in "The Wenatchee World" newspaper on December 23 and 30, 2008. No protests or comments were received by Ecology during the 30-day protest period.

- **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:
  - It is a surface water right application for more than 1 cubic feet per second (cfs), unless that project is for agricultural irrigation, in which case the threshold is increased to 50 cfs [1], so long as that irrigation project will not receive public subsidies.
  - It is a groundwater right application for more than 2,250 gallons per minute(gpm).
  - It is an application that, in combination with other water right applications for the same project, collectively exceed the amounts above.
  - 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).
  - It is part of a series of exempt actions that, together, trigger the need to do a threshold determination, as defined under chapter 197-11-305 WAC.

  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 POD, POU, and purpose of use may be changed if it would not result in harm or injury to other water rights.

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

The actual extent and validity of a water right claim can only be determined by a Superior Court in an adjudication. Any tentative determination made on the extent and validity of a claim by Ecology as part of an application for change investigation is not an adjudication of the claim.

INVESTIGATION

Information comprising this investigation was obtained during a site visit conducted on November 20, 2008. Present during the site visit were Ecology representatives Taylor Horne and Kurt Walker and applicant representative Rich Malinowski of Cascadia Conservation District.

Additional information was obtained from:

- Applicable RCW and WAC chapters.
- Conversations with Rich Malinowski of Cascadia Conservation District.
- Ecology records.
- Historical land and aerial photographs.
- Historical maps.
- Ecology's Geographic Information System (GIS) data.
- Chelan County records.
- USGS streamflow records.
- Documents listed in the References section of this report.

[1] Refer to the "Water Quantities" section of this report for a discussion of the actual, rather than claimed, instantaneous quantity of water diverted under Water Right Claim No. 069703.

History of Water Use

The H-D Ditch is located in the Entiat River valley in Water Resource Inventory Area (WRIA) 46. The ditch runs from a POD at river mile five for about three miles paralleling the Entiat River in a southeasterly direction. Water from the H-D Ditch is used to irrigate orchards and turf south of the Entiat River from river mile four to river mile one.

In 1974, in accordance with chapter 90.14 RCW, a representative of the H-D Ditch users submitted to Ecology a claim to 900 cfs, 1,300 acre-feet per year (ac-ft/yr), for the irrigation of 325 acres from April through October from the Entiat River. Claim No. 069703 asserts that water was first put to use on October 19, 1903 from a POD 1,350 feet north and 1,500 feet west from the southeast corner of Section 10, within the NW¼SE¼ of Section 10, T. 25 N., R. 20 E.W.M. This point is approximately 850 feet South and 250 feet East of the currently used H-D Ditch POD. The claimed POD location may have been inaccurately described on the claim form submitted in 1974. The POU includes numerous parcels south of the Entiat River within Sections 13, 14, 15, and 18, all in T. 23 N., R. 21 E.W.M., Chelan County.

The "Notice of Appropriation of Water" No. 6836 dated October 19, 1903 in Chelan County Auditor's General Records, Volume 41 Page 240 states that S. R. Hannan, D. C. Wolf, and Frank E. Knapp:

> "…have appropriated nine hundred (900) cubic feet of water per second of time, the same to be taken out of the Entiat River by ditch, ditches, flumes and other means at a point where the present ditch known as the Ditwyller and Hanna [sic] Ditch is now taken out of the Entiat River, said point being near the north-west corner of the southeast corner of section 10, Township 25, North of Range 20 E.W.M., which ditch runs and has been constructed in a southeasterly direction running across the south-east quarter of section 10, and a portion of the north-east quarter of the north east quarter of Section 15 and crossing Section 14 and 13 in Township 25, North of Range 20, E.W.M. and ending on the north-west quarter of the south-west quarter of Section 19, Township 25, North of Range 21, E.W.M. Chelan County State of Washington. Said water if [sic] appropriated for irrigation, stock and domestic purposes, and for mining and milling purposes and for the purposes of creating power. Notice is further given that said ditch was constructed by the undersigned and by their grantors and said water has been diverted and used upon the land belonging to the undersigned and their grantors since 1894, and has become appurtenant to said land."

A separate "Agreement" document dated May 9, 1906, defines the shares of each member of the "Detwiler & Hannan irrigation ditch" as "S. R. Hannan 2/9; D. C. Wolf 2/9; Frank Knapp 5/9". The "Agreement" also specifies that each user is responsible to maintain a portion of the ditch proportionate to each user's share.

A review of aerial photographs from 1945, 1962, 1979, 1998, 2004, 2005, and 2006 indicates that approximately 184.5 acres of irrigation has occurred within the POU during each of those years. A detailed discussion of each user's historic irrigation practices is included in the "Hanan-Detwiler Ditch Users" section of this report.

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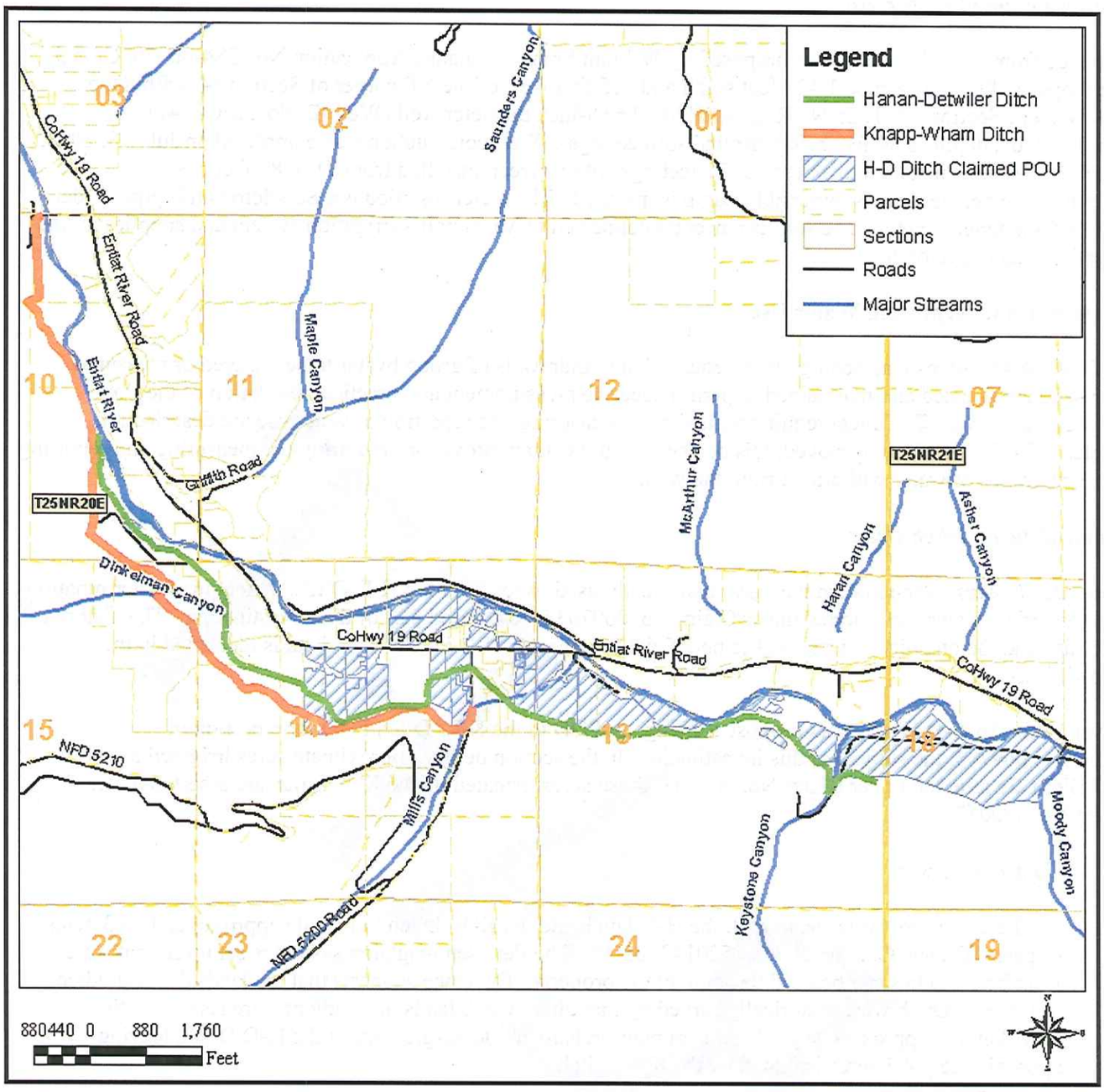

Figure 1. H-D Ditch and K-W Ditch Locations and H-D Ditch Claimed Place of Use

Hanan-Detwiler Ditch Description

A rock weir is constructed from the west bank of the Entiat River to convey water flow into a side channel at approximately Entiat River mile five. The H-D Ditch POD headworks are immediately downstream of a wooden bifurcation structure that splits side channel flows between the bypass side channel and the H-D Ditch. The approximately 1,700-foot long bypass side channel functions to dampen canal flow and provide fish habitat. A rotary drum fish screen is installed at the H-D Ditch headworks along with a fish bypass that discharges directly to the bypass side channel (Reclamation 2006).

The H-D Ditch is approximately three miles long, running in a southeasterly direction for the first mile and turning eastward for the remaining length. The H-D Ditch is predominately an open, unlined earthen ditch; several short piped sections exist where the ditch crosses roads and traverses residential parcels. There are 16 users that have historically used water from the H-D Ditch, listed in the "Hanan–Detwiler Ditch Users" section of this report. The H-D Ditch crosses multiple parcels owned by both ditch users and non-users, terminating on the Keystone Ranch, owned by Gale and Dale Foreman. Excess water is released into a spillway that crosses the Keystone Ranch (Chelan Co. Parcel No.252118230050) and converges with the Entiat River at approximate river mile 1.5, in the NW¼ of the SE¼ of Section 18, T. 25 N., R. 21 E.W.M.

At a point approximately 1.6 miles down the H-D Ditch on the Summerfield property (Chelan Co. Parcel No. 252014130050), a natural spring named Crystal Spring enters the ditch. Flow monitoring during the 2008 irrigation season indicated that flow into the H-D Ditch varies, ranging from approximately 1.1 cfs in mid-April to 0.5 cfs in July to no flow in October (CCD 2008). Crystal Spring has historically contributed to flows in the H-D Ditch since construction, and the flows are released into the Entiat River along with excess water from the H-D Ditch. Crystal Spring is not claimed as a source of water on Claim No. 069703.

Proposed Point of Withdrawal

A change from a POD to a POW is proposed by William Small in Change Application No. CS4-069703CL@5. The proposed POW is located 1,435 feet south and 115 feet west of the NE corner of Section 14, within the SE¼ NE¼ of Section 14, T. 25 N., R. 20 E.W.M. The 8-inch diameter well (Well ID No. AEG324) was completed to a depth of 84 feet below ground surface (bgs). Well construction was completed on July 18, 2008. A welded casing is installed to a depth of 71 feet bgs with a screen installed from 71 to 81 feet bgs. A 7.5 horsepower Berkeley submersible pump is installed. The meter installed is a SeaMetrics full pipe model WMP-104 magnetic meter. The well is currently connected to Mr. Small's irrigation system and supplies all the irrigation water used on the parcel.

Measuring and Reporting Water Use

RCW 90.44.450 states that Ecology may require that withdrawals of groundwater to be metered or measured. It must be constructed and maintained to permit accurate measurement and practical regulation of the flow of water withdrawn. Technical requirements for the measuring and reporting of water use are described in chapter 173-173 WAC. If approved, this decision would contain provisions requiring the measuring and reporting of the quantities of water withdrawn from the well.

Hanan-Detwiler Ditch Users

There are 16 users on the system that have historically used water from the H-D Ditch. A tentative determination of all historical water use asserted under Claim No. 069703 is a required part of this investigation. The history of water use and the quantity of water put to beneficial use on each H-D Ditch user's land is identified in the following section.

Eleven of the 16 H-D Ditch users propose a change in POD to the K-W Ditch POD for a portion of Claim No. 069703, the subject of this investigation. In the section below, approximate acres irrigated by the H-D Ditch are asserted under Claim No. 069703; those acres irrigated by the K-W Ditch are asserted under Claim No. 300062:

Conrad Petersen

Mr. Petersen uses water from both the H-D Ditch and the K-W Ditch to irrigate approximately 9.3 acres of pears (Chelan Co. Parcel No. 252014240150). The Petersen irrigation system is set up so that water from both ditches can be used throughout the property. Evidence suggests that the lands down-gradient of the H-D Ditch were historically served by that ditch, while lands up-gradient were served by the K-W Ditch. Approximately 4.8 acres of pear orchard are down-gradient of the H-D Ditch, leaving approximately 4.5 acres irrigated by the K-W Ditch.

The H-D Ditch turnout consists of a 5 horsepower (hp) Sterling electric motor with a Pacific pump. Mr. Petersen operates irrigation cycles seven days a week with 12 hour sets. Historical aerial photography suggests irrigation of orchard occurred on the parcel in 1945, 1962, 1979, 1998, 2004, 2005, and 2006.

Belvin Gollaher

Mr. Gollaher historically has used water from the K-W Ditch and the H-D Ditch to irrigate approximately 8.8 acres of orchard on his parcel (Chelan Co. Parcel No. 252014240100). Historical evidence suggests that the lands down-gradient of the H-D Ditch were historically served by that ditch, while lands up-gradient were served by the K-W Ditch. Approximately 7.2 acres of orchard are down-gradient of the H-D Ditch, leaving approximately 1.6 acres irrigated by the K-W Ditch.

A Quit Claim Deed for the parcel dated August 28, 2006, listing the Grantor as Entiat Valley Orchards and the Grantee as Gollaher Family, LLC, references "a one-thirtieth share and interest in the Knapp-Wham Irrigation Ditch, subject to the proportionate annual maintenance fees and other conditions of said water right; together with an undivided one-seventy-second share and interest in the Detweller-Hannan Irrigation Ditch and water right." The reference to the two ditches in the Quit Claim Deed suggests that water from both the K-W Ditch and the H-D Ditch has been beneficially used on the orchard land.

The H-D Ditch turnout consisted of a 7.5 hp Baldor electric motor and pump. Recently, Mr. Gollaher has upgraded his irrigation system and began diverting water from the K-W Ditch. Five-days a week, 12 hour sets are used to irrigate. Historical aerial photography suggests irrigation of orchard occurred on the parcel in 1945, 1962, 1979, 1998, 2004, 2005, and 2006.

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Martin Petersen

Mr. Petersen uses water from both the H-D Ditch and the K-W Ditch to irrigate approximately 7.9 acres of orchard on the parcel (Chelan Co. Parcel No. 252014240050). The Petersen irrigation system is set up so that water from both ditches can be used throughout the property. The H-D Ditch turnout consists of a 15 hp motor and pump. Seven days a week, 12 hour irrigation sets are used. Historical aerial photography suggests irrigation of orchard occurred on the parcel in 1945, 1962, 1979, 1998, 2004, 2005, and 2006.

Lance Hansen

Mr. Hansen historically has used water from the H-D Ditch to irrigate approximately 7.6 acres of orchard on his parcel (Chelan Co. Parcel No. 252014130200). Recently, he has modified his irrigation system to divert water solely from the K-W Ditch. Historical aerial photography suggests irrigation of orchard occurred on the parcel in 1945, 1962, 1979, 1998, 2004, 2005, and 2006.

Phil Harrison

Mr. Harrison historically used water from both the H-D Ditch and the K-W Ditch to irrigate his parcels (Chelan Co. Parcel Nos. 252014120050 and 252014110060). Recently Mr. Harrison modified his irrigation system to divert water solely from the K-W Ditch. A signed statement from Conrad Petersen, owner of the parcel until 2005 and current manager of the orchard, indicates that the Harrison parcel was originally part of the Frank Knapp homestead:

> "The Knapp Homestead cleared the parcel in 1906 to provide pasture for its stock (cattle, sheep, and horses) operation. This prompted irrigation of the property using impact sprinklers. The clearing left islands of trees in the pasture to provide shade to the animals. In 1906 there were several apple trees planted on the upstream side of the property that did not fair well due to amount of sand in the soil. The pasture transitioned into the Kellogg Mill Pond in 1914 and continued to operate as the mill pond until 1915. I have provided a historic photo depicting the cleared area and the Mill Dam. In 1921 Frank Knapp passed and the property was sold to Davenport Realtors. I purchased the property in 1975 and planted 14 pear trees which are depicted in the attached picture. The property has since been actively planted with pear trees."

Historical aerial photographs taken in 1945, 1962, and 1979 show what appear to be a mixture of vegetative cover and uncovered land. It is possible these photos depict the pasture and "islands of trees" mentioned in Conrad Petersen's statement. Historical aerial photographs taken in 1998, 2004, 2005, and 2006 indicate the parcel was planted with rows of orchard. The apparent irrigated lands on the Harrison property include approximately 15.9 acres of orchard and 2.3 acres of turf.

Susan Summerfield

An April 6, 2009 an affidavit signed by Michael Summerfield asserts that water from the H-D Ditch has historically been used to irrigate approximately 7.5 acres of orchard and approximately 6.6 acres of pasture and turf on the Summerfield parcel (Parcel No. 252014130050):

> "The following letter is to clarify your questions regarding my 18.5 ac Parcel (252014130050). The Knapp Homestead cleared the parcel in 1906 to provide pasture for its stock (cattle, sheep, and horses) operation. This prompted irrigation of the property using impact sprinklers and small trenches. The Hannan-Detwiler Ditch was used for irrigation of the fields. The fields above the ditch were provided water through the use of RAM Pumps, a type of suction pump that initiated flow. Several of the long-time landowners in the valley will attest to this method of irrigation."

Historical aerial photography suggests irrigation of orchard and turf occurred on the parcel in 1945, 1962, 1979, 1998, 2004, 2005, and 2006.

Ronald Mullek

Mr. Mullek has historically used water from the H-D Ditch to irrigate approximately 1.8 acres of turf on his parcel (Chelan Co. Parcel No. 252014110070). Mr. Mullek shares a turnout from the H-D Ditch with Mr. Harris, consisting of a 3 hp Century motor and pump. Historical aerial photography suggests irrigation of orchard occurred on the parcel in 1945, 1962, 1979, 1998, 2004, 2005, and 2006.

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Ed Harris

Mr. Harris has historically used water from the H-D Ditch to irrigate approximately 3 acres of orchard on his parcel (Chelan Co. Parcel No. 252014110200). Mr. Harris shares a turnout with Mr. Mullek. Historical aerial photography suggests irrigation of orchard occurred on the parcel in 1945, 1962, 1979, 1998, 2004, 2005, and 2006.

Peter Dauer

Mr. Dauer historically has used water from the H-D Ditch to irrigate approximately 0.7 acres of turf on his parcel (Chelan Co. Parcel No. 252014140105). Mr. Dauer, Mr. Peter, Mr. Bill Small, and Ms. Banks share the same turnout from the H-D Ditch, consisting of a 10 hp motor and pump. Historical aerial photography suggests irrigation of orchard occurred on the parcel in 1945, 1962, 1979, 1998, 2004, 2005, and 2006.

Joseph Peter

Mr. Peter has historically used water from the H-D Ditch to irrigated approximately 1.2 acres of turf on his parcel (Chelan Co. Parcel No. 252014110250). Historical aerial photography suggests irrigation of orchard occurred on the parcel in 1945, 1962, 1979, 1998, 2004, 2005, and 2006.

A Warranty Deed for the parcel dated August 20, 1963 contains language regarding the use of H-D Ditch water on the parcel: "TOGETHER with five-sixteenths of one share in the Knapp-Hannan Irrigation Ditch, reserving to grantors the right to use of existing pipeline across sold premises (not exclusive) for the carrying of one-eighth of one share of water for irrigation purposes of other lands of grantors for which grantors are to pay their pro rata share of all costs of maintenance of said pipeline, repair or replacement of the same." The "Knapp-Hanan Irrigation Ditch" is another name by which historical documents reference the H-D Ditch. The Warranty Deed language suggests that water from the H-D Ditch has been beneficially used on the parcel.

Tanya Banks

Ms. Banks has historically used water from the H-D Ditch to irrigate approximately 0.5 acres of turf on her parcels (Chelan Co. Parcel Nos. 252013220100 and 252014110300). Historical aerial photography suggests irrigation of orchard occurred on the parcel in 1945, 1962, 1979, 1998, 2004, 2005, and 2006.

Five of the 16 H-D Ditch users have submitted separate applications for change to Ecology, each proposing to change from the H-D Ditch POD to POWs, as described below. William Small's Change Application No. CS4-069703CL@5, the subject of this report, is a part of this group. The four additional applications for change are the subjects of separate reports of examination.

William Small

Mr. Small has historically used H-D Ditch water to irrigate approximately 6.3 acres of orchard on his farm (Chelan Co. Parcel Nos.252014140100, 252014140115, and 252014140110). Aerial photography suggests irrigation of orchards on Mr. Small's property.

Michael Grubbs

Mr. Grubbs has historically used H-D Ditch water to irrigate approximately 13.6 acres of orchard on his property (Chelan Co. Parcel No.252013230200). In Change Application No. CS4-069703CL@3, Mr. Grubbs proposes changing from the H-D Ditch POD to a well on his parcel, eliminating all diversions from the H-D Ditch.

Betty Tyler

Ms. Tyler has historically used H-D Ditch water for the irrigation of approximately 0.7 acres of turf on her property (Chelan Co. Parcel No.252010440100). In Change Application No. CS4-069703CL@2, Ms. Tyler proposes changing from the H-D Ditch POD to a well on her property, eliminating her diversion from the H-D Ditch and allowing her to withdraw water for irrigation purposes from the POW.

Small Brothers Orchards, Inc.

Small Brothers Orchards Inc., represented by Jim Small, has historically used water from the H-D Ditch to irrigate approximately 23 acres of orchard on three parcels (Chelan Co. Parcel Nos. 252013230150,

252013230100, and 252013240100). In Change Application No. CS4-069703CL@1, Small Brothers Orchards, Inc. proposes changing from the H-D Ditch POD to two wells on the Small Brothers Orchards, Inc. land, eliminating all diversions from the H-D Ditch.

Keystone Ranch

Keystone Ranch, represented by Gail and Dale Foreman, has historically used H-D Ditch water to irrigate approximately 73.9 acres of orchard on the property (Chelan Co. Parcel No.252118230050). In Change Application No. CS4-069703@4, Keystone Ranch proposes changing from the H-D Ditch POD to an existing downstream POD and two wells in the orchard, eliminating all diversions from the H-D Ditch POD.

Proposed Use

Claim No. 069703 asserts a water right used for irrigation purposes. The Notice of Appropriation dated October 19, 1903 states the water is used for "irrigation, stock and domestic purposes, and for mining and milling purposes and for the purpose of creating power." The site investigation and conversations with applicants indicate that over recent history water has been used for irrigation purposes exclusively. No power generating facilities exist within the place of use, nor do any of the users conduct mining, milling, or stockwatering with the water purveyed by the H-D Ditch. All residences within the place of use withdraw domestic water from wells, rather than the H-D Ditch. No change in purpose of use is proposed in Change Application No. CS4-069703CL@5.

Reasonable Use and Efficiency

The Washington State Supreme Court in *Ecology v. Grimes* has previously ruled on "reasonable" use of water. The question of reasonable use of water is germane to this application as the request is to change from a historic and relatively inefficient irrigation system to a new, far more efficient irrigation system. For example, the amounts of water reasonable for irrigating lands by way of an unlined earthen ditch and flood irrigation are greater than the amounts of water reasonably necessary for irrigating lands by pumping water through an enclosed pipe and then distributing it on the field with a center pivot sprinkler system. The use of water in excess of what is reasonable for the proposed beneficial use would constitute waste, which is prohibited by Chapter 90.03.005 RCW.

During the late 19th century, lands were first irrigated in the Entiat River basin through the use of gravity-fed irrigation systems. Flood and rill irrigation were the primary methods of on-farm irrigation during this time period. As the availability of electricity spread in the 20th century, an increasing number of electric pumps were used to provide irrigation water. Today, the customary form of on-farm irrigation in the Entiat River consists of electric pumps delivering water to a combination of under-tree or over-tree impact sprinklers, or micro-spray undertree sprinklers. During the site visit, the applicants' were observed using a combination of these types of on-farm irrigation systems. The age of applicants' irrigation systems varies, depending on how recently new fruit trees were planted and irrigation upgrades occurred. Ecology Water Resources Guidance 1210 lists the range of efficiencies for the irrigation systems used by the applicants. A discussion of on-farm irrigation efficiency is included in *Annual Quantity (Qa)* section of this report.

Water Quantities

No records of the Qa or instantaneous quantity (Qi) of water diverted are available for the H-D Ditch POD. Additionally, turnouts from the H-D Ditch have never been metered; therefore, there is limited historical record of the instantaneous or annual quantities of water beneficially used by individual users.

The H-D Ditch is physically incapable of diverting the instantaneous diversion rate of 900 cfs as asserted by Claim No. 069703 and the 1903 Notice of Appropriation of Water. Flow measurements taken at Ardinvoir (USGS Gauge No. 12452800) indicate that flows in the Entiat River at the H-D Ditch POD do not exceed 900 cfs for a portion of the irrigation season.

As part of the change investigation process, a tentative determination of the extent and validity of the entire water right claim must be conducted to ensure the water right is not enlarged by the proposed change.[2] First, the instantaneous quantity and the annual quantity of water diverted under the entire claim must be established; these are the total water quantities used by all users of the H-D Ditch. Then, the instantaneous and annual quantities for the portion of Claim No. 069703 asserted by William Small must be identified; these are the water quantities proposed for change in Change Application No. CS4-069703CL@5– the subject of this report. Lastly, the remaining quantities of water must be identified that are appurtenant to the parcels owned by the H-D Ditch users that propose changing to a different POD – proposed in Change Application No. CS4-069703CL – and the

[2] RCW 90.03.380; Okanogan Wilderness v. Town of Twisp, 133 Wn.2d 769, 947 P.2d 732 (1997); R.D. Merrill Co. v. Pollution Bd., 137 Wn.2d 118, 969 P.2d 459 (1999).

H-D Ditch users that propose changing to POWs – proposed in Change Application Nos. CS4-069703CL@1 through @5. The findings of change investigations for each application will be the subject of separate reports.

Instantaneous Quantity (Qi)

Several studies were conducted on the H-D Ditch during the design of the project:

- *2003 Entiat River Gain Loss Study* –Measurements were conducted on September 25-28, 2002, at various locations on the Entiat River and the Mad River, a tributary of the Entiat River. The objective of the study was to determine the surface water contributions and losses to the mainstems of both rivers and to identify reaches where surface water/groundwater interchanges were taking place. A measurement taken at the H-D Ditch POD indicated that 2.51 cfs was diverted; a measurement of the H-D Ditch fish bypass indicated that 0.29 cfs was used for bypass flow. Diversions into the H-D Ditch system were calculated as 2.22 cfs at the time of measurement.

- *2006 Predesign Memorandum* – In September 2006, the United States Bureau of Reclamation(USBR) released a Predesign Memorandum for the Knapp-Wham/ Hanan-Detwiler Consolidation Project. As part of that memorandum, the total amount of water turned out from the H-D Ditch system was calculated at 3.36 cfs, based on acreage and use. It is not clear in the memorandum whether this calculation was based on physical gauging or a paper calculation using water duty and irrigated acreage. Two "system measurements" are included in the report; however, the H-D POD diversion rate was not measured.

- *2008 Cascadia Conservation District (CCD) data* – CCD Field staff conducted several measurements of the H-D Ditch throughout the 2008 irrigation season to estimate ditch losses due to in-ground seepage. During the five measurements all turnouts from the H-D Ditch were stopped. Ditch flow at H-D Ditch fish screen was recorded during each measurement; flows varied throughout the season between a low of 1.41 cfs and a high of 2.09 cfs.

At the time of the 2008 H-D Ditch measurement, several of the H-D Ditch users had modified their irrigation systems and begun diverting water solely from the K-W Ditch. In effect, these users (Conrad Petersen, Mark Petersen, Belvin Gollaher, and Michael Hansen) conducted unauthorized, or *de facto*, changes from the H-D Ditch POD to the K-W Ditch POD. The 2008 H-D Ditch measurements may not have indicated the maximum rate of instantaneous diversion because these four users were irrigating their combined 26.7 acres of orchard with water diverted at the K-W Ditch POD. Irrigation is defined in statute as a beneficial use of water (RCW 90.54.020(1)).

Ecology Water Resources Program Policy No. 1120 states that in situations where *de facto* water right changes have occurred Ecology considers whether the unauthorized use of water is considered a beneficial use of water. The tentative determination of the validity and extent of a water right may find the portion, or entirety, of a right put to unauthorized use eligible for change if the water has been put to beneficial use, and other statutory requirements have been fulfilled.

The H-D Ditch flow data listed above does not adequately represent the total maximum instantaneous rate of diversion of the H-D Ditch; flow data was not continuously collected over multiple irrigation seasons and several users have conducted *de facto* changes in POD. Thus, the measurements of the instantaneous rate of diversion of the H-D Ditch POD are likely lower than the historically established instantaneous rate of diversion.

Based on historical data listed above and an evaluation of customary irrigation practices in the Entiat River valley[3], a reasonable maximum Qi at the H-D POD is 4.1 cfs; this is an estimate of the maximum instantaneous diversion of water during peak irrigation season based on the total irrigated acreage and crop type irrigated by the users of the H-D Ditch. The 4.1 cfs Qi corresponds to an instantaneous water duty of 10 gallons per minute per acre.

For this investigation, it is necessary to quantify the Qi each user has historically put to beneficial use, to ensure the future use will not exceed the historical use. Proportionally dividing the maximum Qi based on the two user groups, based on irrigated acreage, results in use of 1.49 cfs by the 11 users proposing to change to the K-W Ditch POD and 2.61 cfs by the proposed POW users. Each asserted portion of the claim consists of annual and instantaneous quantities.

The proposal by William Small to change to a POW asserts an interest in a portion of Claim No. 069703 consisting of 61 gpm, an unspecified annual quantity, as proposed in Change Application No. 069703CL@5. Using the figure of 10 gpm per ac calculated above results in a maximum instantaneous quantity of 63 gpm.

[3] Described in the Reasonable Use and Efficiency section of this report.

Annual Quantity (Qa)

Part of this investigation includes quantifying the historical annual beneficial use of the water right proposed for change. In the absence of water meter records, an investigator may use aerial photographs, irrigation system capacity, and crop irrigation requirements (CIRs) to make a tentative determination of beneficial use of the waterright, based on types of activities for which the water was used and limited by reasonable use of water.[4] Amid a dearth of reliable water pumping data, CIR data from chapter 173-546 WAC is often used to make a tentative determination of the annual quantity of water used. The per-acre CIR for fruit trees in the Entiat region is 37.27 acre-inches per year (ac-in/yr), or 3.11 ac-ft/yr; the CIR for turf grass is 31.68 ac-in/yr, or 2.64 ac-ft/yr.

All 16 historic H-D Ditch users irrigate a total of approximately 170.7 acres of orchard and 13.8 acres of turf, a total of 184.5 acres of irrigation. Solid-set undertree and overtree sprinklers predominantly are used to irrigate the parcels. A 65-percent application efficiency rate is reasonable based on the age and condition of this type of irrigation system, and this rate is included in the calculation of the total irrigation requirement (TIR). The TIR f or the orchard is calculated by dividing the CIR by the 65-percent application efficiency of the irrigation systems. The TIR for the H-D Ditch orchards calculates to be 4.78 acre-feet per acre (ac-ft/ac), or 815.9 ac-ft/yr for 170.7 acres of orchard. The TIR for the turf calculates to be 4.06 ac-ft/ac, or 56.0 ac-ft/yr for 13.8 acres of turf. The total TIR for the 16 H-D Ditch users sums to be 872 ac-ft/yr (acreage and Qa quantities are rounded up to one decimal place to represent a practically measureable quantity).

The following tables show the historical beneficial use of water among the H-D Ditch users; Table 2 shows the 11 users that propose changing to the K-W Ditch POD (the subject of the investigation for Change Application No. CS4-069703CL) and Table 3 shows the five users that propose changing to separate POWs, including William Small, and a total of all irrigation under Claim No. 069703.

Table 2: H-D Ditch POD to K-W Ditch POD Changes

H-D User	*Crop*	*Acres*	*Qa (ac-ft/yr)*	*Qi (cfs)*
Banks	Turf	0.5	2.0	*
Conrad Petersen	Orchard	4.8	22.9	*
Dauer	Turf	0.7	2.8	*
Gollaher Family	Orchard	7.2	34.4	*
Hansen	Orchard	7.6	36.3	*
Harris	Orchard	3.0	14.3	*
Harrison	Orchard	15.9	76.0	*
	Turf	2.3	9.3	*
Martin Petersen	Orchard	7.9	37.8	*
Mullek	Turf	1.8	7.3	*
Peter	Turf	1.2	4.9	*
Summerfield	Orchard	7.5	35.9	*
	Turf	6.6	26.8	*
Sum		**67.0**	**310.8**	**1.49 cfs[5]**

Table 3 H-D Ditch POD to POW Changes

H-D User	*Crop*	*Acres*	*Qa (ac-ft/yr)*	*Qi[9] (gpm)*
Michael Grubbs	Orchard	13.6	65.0	133
Keystone Ranch [10]	Orchard	73.9	353.2	700
Small Bros Orchards, Inc.	Orchard	23.0	109.9	216
William Small	Orchard	6.3	30.1	63
Tyler	Turf	0.7	2.8	7
Sum		**117.5**	**561.2**	**1156.4 gpm**
Table 1 & 2 Sum[11]		***184.5***	***872***	***4.07 cfs***

[4] Ecology Water Resource Program Policies 1210, 1120, and 1200; see Ecology v. Grimes, 121 Wn.2d 459, 852 P.2d 1044 (1993)
[5] Table 2 – The 11 H-D Ditch users propose s combined diversion at the K-W Ditch POD. If approved, Ecology would likely regulate the instantaneous rate of diversion for all 11 users at the K-W Ditch POD, rather than each user's turnout from the K-W Ditch.
[9] Table 3- The specific instantaneous withdrawal rates (Qi) proposed in Change Application No. CS4-069703CL@1 through @5 are used when they do not exceed the historic average water duty of 10 gallons per minute per acre. If approved, the change authorizations for POWs would likely be in gallons per minute, following the convention for groundwater withdrawals.
[10] Change Application No. CS4-069703CL@4 was amended to propose a change to two POWs and a POD.

[11] Table 3- Acreage and Qa quantities are rounded up to one decimal place to represent a measureable quantity.

An annual quantity of water proposed for change was not identified in Change Application No. CS4-069703CL@5. As part of this investigation, a calculation was conducted based on estimates of historic beneficial use of water for 6.3 acres of orchard irrigation. Using the CIR and irrigation efficiency parameters described above, a reasonable TIR is 30.1 ac-ft/yr for the William Small property.

Development Scheduling

The POW is currently connected to Mr. Small's irrigation and used to irrigate the orchard. The H-D Ditch has not been operated from the 2010 irrigation season onward. The development schedule listed on the first page of this report accommodates the planned construction schedule.

Other Rights Appurtenant to the Place of Use

WRC129912 – Conrad Petersen

The place of use of this claim appears to include a portion of Mr. Small's property. On February 25, 1975, Ecology assigned Claim identifier number WRC129912 to a claim submitted by Conrad Petersen asserting a groundwater right for 80 gpm, 30 ac-ft/yr, for the irrigation of 7 acres and continuous domestic and irrigation from a well located within the SW¼ NE¼ of Section 14, T. 25 N., R. 20 E.W.M. The claimed date of first putting water to use is May 1911. No use of this claim for irrigation purposes appears to have occurred on Mr. Small's property, as all irrigation water has been supplied by the H-D Ditch. Domestic water supply for the residence on Mr. Small's property may be supplied under this claim.

WRC300062- Knapp-Wham Ditch

On December 18, 1997, a representative of the K-W Ditch users submitted to Ecology a claim asserting a surface water right to 300 cfs, 2,000 ac-ft/yr, from the Entiat River for the irrigation of 320 and domestic supply for 27 homes, stockwatering, mining, milling, and power production from April 1 to October 15. The claimed date of first putting the water to use is October 1903. A portion of the place of use of this claim includes the Small property. Operated in its inception by Frank E. Knapp and Gilbert T. L. Wham, in time 15 turnouts and 17 users were established along the 2.35 mile length of the ditch. The K-W Ditch POD diverts water from a side channel of the Entiat River. No use of K-W Ditch water for irrigation purposes appears to have occurred on Mr. Small's property, as all irrigation water has been supplied by the H-D Ditch.

Hydrologic/Hydrogeologic Evaluation

The following are excerpts from a technical memorandum titled "*Hydrogeologic Technical Analysis for Water Right Change Application Nos. CS4-069703CL@1, CS4-069703CL@2, CS4-069703CL@3, CS4-069703CL@4, and CS4-069703CL@5, Chelan County, Washington*" written by Kurt Walker and reviewed by Thomas Mackie. The full technical memorandum is available at Ecology's Central Regional Office in Yakima:

> *Site Geology near the Subject Wells*
> The site specific geology description is based on geologic mapping (Tabor et al., 2007), well logs, topographic maps, air photos, and site observations. The metamorphic Chelan Mountain terrane and the granitic Entiat pluton form the bedrock floor in the Entiat River Valley from roughly river mile 7 to the confluence with the Columbia River. The subject area (river miles 2-5) is located along the right bank (looking downstream) of the Entiat River. With the exception of the Betty Tyler well, the subject wells are drilled to bedrock then completed into the unconsolidated fluvial valley fill sediments. The project well logs record that boulders, cobbles, gravel, and sand were encountered with the sands and gravels comprising the majority of the material. The thickness of the unconsolidated valley sediments varies with the topography of the underlying bedrock, but is generally less than 80 feet. The Betty Tyler well was drilled to 47 feet below ground surface (bgs) without encountering bedrock, however the other project wells contacted bedrock between 38 and 79 feet bgs.
>
> **Well Location and Summary:**
> Didricksen (2008), well logs, and other application documents were used to summarize the well and pump characteristics (see Table 2.) The project wells were drilled and tested between May and August of 2008. Each of the wells were drilled to bedrock (except the Betty Tyler well), constructed with an 8-inch casing, and completed into the valley fill aquifer. Ten-foot long 80-slot stainless steel screens were placed near the bottom of the wells after which they were developed and tested using a step draw-down method. Well performance information, provided by the applicant, was used to better understand the aquifer characteristics and select the most appropriate pump for each location. While the Keystone 1 well does not currently have a pump installed and the Betty Tyler well has a 1hp submersible pump, the remaining wells are outfitted with 7.5 hp submersible pumps capable of delivering approximately 100 gpm at 200 feet of head.

William Small Well

The William Small well has the highest production (200 gpm) of the project wells. 200 gpm is more than enough water to supply the 6.3 acres that the water right claim asserts, but the information is useful when assessing the aquifer characteristics and capabilities. A 7.5 hp submersible pump is installed, but the instantaneous rate of withdrawal (Qi) will be limited to 63 gpm to be consistent with delivery of water from the H-D Ditch. The William Small well is located near three domestic wells. The potential for impairment of those ground water users is addressed below.

Potential for Impairment of Ground Water Users:
An evaluation of well logs, aerial photographs, and personal communications were used to identify wells near the project wells which may experience composite drawdown as a result of this change. The Keystone 1 and 2, Small Brothers 1 and 2, and Betty Tyler wells are located much closer to the Entiat River than any identified non-project wells. Proximity of these project wells to the River, aquifer characteristics, and hydraulic communication between the valley fill aquifer and the Entiat River will likely limit potential interference with other wells in the area. Because the project wells are located so close to the Entiat River, their pumping drawdown cone is expected to encounter a recharge boundary and stabilize before it extends out to any identified non-project wells. This is not the case for the remaining project wells.

Three domestic wells are located within 300 feet of the William Small well, and the Michael Grubbs well is located approximately 280 feet from a different domestic well. Property owners Joseph Peter (Peter), Peter Dauer (Dauer), and Tanya Banks (Banks) have domestic wells near the William Small project well. While only the Dauer well has an associated well log which confirms that it is completed in the subject aquifer, the Peter and Banks wells are assumed to be completed into the subject aquifer and not into bedrock for evaluation purposes. Using GPS coordinates, air photos, and personal communication, the domestic wells are approximately 315 feet (Peter), 190 feet (Dauer), and 130 feet (Banks) away from the William Small well. Property owner Daniel Benefield uses a well that is located within the Small Brothers Orchard property and is approximately 280 feet away from the Michael Grubbs well. Since there is no log for the Benefield well, it will likewise be assumed to be completed into the subject aquifer for evaluation purposes.

An evaluation using the Theis non-equilibrium equation coupled with image well theory and estimated aquifer parameters discussed above was performed to assess possible pumping interference at the nearby domestic wells as a result of the change. The evaluation was based on scenario in which the project well was pumped at the maximum Qi for 60 days. After 60 days of pumping, the drawdown cone is expected to have reached the River and stabilized. Results indicate (see Table 3) that pumping at the maximum authorized Qi is unlikely to draw down the water table more than 3 feet at the Benefield well site, and is expected to induce less drawdown at the other well locations. Because pumping at the maximum Qi would exhaust the Qa in approximately 110 days, pumping at the maximum Qi is expected be used only periodically to meet peak crop demand. As a result, composite drawdown/well interference, which may be observed, is not expected to be significant. Therefore, withdrawals from the proposed wells are not anticipated to result in the impairment of any ground water users (see Appendix A.)

Table 3[12]
Potential for Impact to Domestic Wells

Domestic Well Name	Nearest Project Well	Distance to Project Well (ft)	Estimated Drawdown (ft)
Peter	William Small	315	1.5
Dauer		190	1.6
Banks		13	2.2
Benefield	Michael Grubbs[2]	280	2.9

[1] Evaluation based on pumping 61 gpm for 60 days.
[2] Evaluation based on pumping 133 gpm for 60 days.

Same Source Consideration:
To change from a POD to a POW, the well must be in direct hydraulic continuity with the original surface water source. Direct hydraulic continuity exists when, as a result of pumping the proposed well, additional water from the original surface water source will flow into and recharge the aquifer where it can eventually be captured as ground water. Additionally, the proposed well must be located and constructed such that within a short time after pumping starts, the majority of the pumped water should be derived from, or replaced by, the surface water source; and within a short time after pumping stops, the ground water that has been removed from aquifer storage should be replaced by infiltration from the surface water source. This requirement ensures that the POW can be managed in the same manner as the POD. An analytical

[12] Table 1 and 2 are included in the full text of the technical memorandum.

model was used to evaluate the hydraulic relationship between the original source of water and the proposed well.

The Well Pumping Depletion Model (WPDM) (Western Water Consulting, 2001) was used to estimate the amount and timing of pumping-induced stream flow depletion from the proposed wells. The rate and timing of stream depletion are dependent on the properties of the subject aquifer and the distance between the pumping well and the stream. In general, the greater the distance between the pumping well and the stream, the greater the time period is between pumping and stream flow impact. The aquifer characteristics and well properties described above were used to define the WPDM parameters.
The maximum pumping rate and a transmissivity of 10,000 gallon per day per feet was used to assess the rate and timing of stream depletion of the Entiat River for each of the change applications. The model results are listed below in Table 4. After pumping ceases, stream depletion is expected to decrease by more than 50% within one day near many of the project wells. Stream depletion is predicted to dissipate more slowly in the vicinity of the Grubbs and William Small wells because they are located further away from the Entiat River. While post-pumping effects will continue to impact the River, residual stream depletion is expected to dissipate well before the next irrigation season. As a result, the proposed wells are considered to be in direct hydraulic continuity with the Entiat River, and the proposed wells can be effectively managed in the same manner as the historic POD.

Table 4
Stream Depletion Model Results

Name	Distance to the Entiat River (ft)	Pumping Rate (gpm)	Dyas to 50% *Reduction in Stream Depletion
Small Brothers 1	35	216	< 1
Small Brothers 2	20	216	< 1
Betty Tyler	145	2	3
Michael Grubbs	420	133	10
Keystone 1	35	30	< 1
Keystone 2	50	115	< 1
William Small	500	61	12

*Reduction in Stream Depletion = pumping rate - amount of continued stream depletion. Results based on Schroeder (1987) with a transmissivity of 10,000 gpd/ft.

Impairment Considerations

RCW 90.03.380 provides that a perfected water right may be changed in several ways, provided that the change will not impair the right of another water right holder. When investigating a change in POD to a POW location, the potential for impairment of surface water and groundwater users in the nearby area must be considered including the potential of impairment of instream flow rights.

Impairment may result from an action that:

- adversely impacts the physical availability of water for a beneficial use that is entitled to protection, including earlier filed applications, or
- prevents the beneficial use of the water to which a water right holder is entitled, or
- adversely affects the flow of a surface water course at a time when the flows are at or below instream flows levels established by rule, or
- degrades the quality of a groundwater source such that an existing user of that source is prevented from the beneficial use of water.[13]

Instream Flow

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.

[13] See Water Resource Program Policy 1200 (POL-1200) and Chapter 173-150 WAC

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).

Adopted on September 3, 2005, chapter 173-546 WAC established a minimum instream flow for the three stream management units in the Entiat River Basin WRIA 46. Both the historic H-D Ditch POD and proposed POWs are located within the Lower Entiat stream management unit that extends from the confluence of the Entiat and Columbia Rivers to Entiat river mile 16.2. The October 19, 1903 claimed date of first water use of Claim No. 069703 predates the September 3, 2005 priority date of the minimum instream flow; therefore, the diversion asserted under the claim is not subject to curtailment when minimum instream flow levels are not met.

Existing Water Rights

There is no history of curtailment of water rights due to unavailability of water in the Entiat Basin. As stated in the hydrogeologic technical memorandum, it is anticipated that no impairment to any groundwater users will result from the operation of the William Small well.

Any diversion asserted under Claim No. 069703 is subject to curtailment based on the priority system, whereby senior rights must be satisfied before a junior right may divert water. In order to preserve the integrity of the priority system if the change in POD to a POW is approved, water use at the POW must be managed in the same manner as the originally claimed POD. If a situation occurs in which the priority system mandates that the diversions under Claim No. 069703 must be curtailed, the asserted withdrawal under the portion of Claim No. 069703 at the newly authorized POW must be curtailed until all senior water rights are fulfilled.

Public Interest Considerations

The addition of a point of withdrawal to a water right must not have a detrimental effect upon the public interest. A public interest investigation includes analyzing harm to fish and wildlife, effects on endangered or threatened species, impacts to wetlands, recreation, water quality, and any other concerns expressed by commenting and protesting parties.

In general, removing PODs and instream structures from a river has a positive impact on aquatic habitat. Diversions and instream pumps require frequent servicing that involves entering the river to repair structures, remove silt and debris from screens, and maintain pushup dams. Replacing a POD with a POW alleviates the need for repeated construction in the river and the associated disturbances from increased silt loading and streambank modifications.

Fisheries and Habitat Impacts

In a letter to Ecology dated March 4, 2008, Washington Department of Fish and Wildlife (WDFW) Instream Flow Biologist Paul La Riviere describes the impacts and benefits of the proposed change in POD and addition of POWs:

> "The project will consolidate two major irrigation systems in the lower Entiat River. Despite an upstream POD move (0.8 miles) the loss of flow in the mainstem will be offset by an increase in flow in the 1,200-ft side channel, non-consumptive (NCU) water savings in the primary reach (estimate is between two and six cfs for 3.26 miles), and additional instream habitat structures (rock weirs, large woody debris placed along the mainstem and in the side channel) that will improve some habitat and the hydro-geologic conditions of the stream" (Page 2).
>
> "The WDFW Water Team supports the funding of the POD consolidation project provided that the [maintenance of] the side channel habitat features is a long-term priority for the cooperating landowner and project managers. We feel this is essential. […] Flow restoration and maintenance, especially during the winter period, may be the most productive outcome for fish life of the project. The restoration of floodplain functions by operating and maintaining the H-D Ditch side channel as a natural habitat helps to address major deficiencies that were consequences of the 1948 and 1970 stream re-alignment activities" (Page 4).

WDFW identified an additional benefit of the project as the elimination of annual instream POD maintenance and the associated habitat disturbance, resulting in a likely reduction in juvenile fish mortality, redd disturbance, and sediment impactsWDFW did not identify any adverse impacts to fish rearing or recreational activities associated with the proposed change in POD.

CONCLUSIONS

Based on careful consideration of the information presented in this report, the author makes the following conclusions regarding the proposed changes in Change Application No. CS4-069703CL@5:

- The portion of Claim No. 069703 that has been put to beneficial use by the applicant and is available for change is 63 gpm, 30.1 ac-ft/yr, for the irrigation of approximately 6.3 acres from April 1 through October 31.
- The subject water right claim will not be enlarged by approving a change in POD. The quantity of water diverted at the authorized POW is limited to the quantity of water historically put to beneficial use, as listed on the cover page of this report.
- The proposed POW withdraws water from the same source of water as the originally claimed POD.
- The proposed changes will not impair existing water rights.

RECOMMENDATIONS

Based on the above investigation and conclusions, I recommend that the request for change to William Small's portion of Claim No. 069703 be approved in the amounts and within the limitations listed below and subject to the provisions beginning on Page 2, et seq.

Purpose of Use and Authorized Quantities

I recommend that 63 gpm, 30.1 ac-ft/yr, for the irrigation of approximately 6.3 acres April 1 through October 31 are available for change to a point of withdrawal. 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.

Point of Withdrawal

1,435 feet South and 115 feet West of the NE corner of Section 14, within the SE ¼ NE ¼ of Section 14 T. 25 N., R. 20 E.W.M. Ecology well tag No. AEG-324

Place of Use

6.3 acers lying within the E½E½SE¼NE¼ of Section 14, T. 25 N., R. 20 E.W.M, EXCEPT the W½NE¼NE¼SE¼NE¼ of Section 14, T. 25 N., R. 20 E.W.M.
Chelan County Assessor Parcel Nos. 252014140110, 252014140100, 252014140115.

Report by: _____ _____
Dave Holland Date
Water Resources Program

REFERENCES

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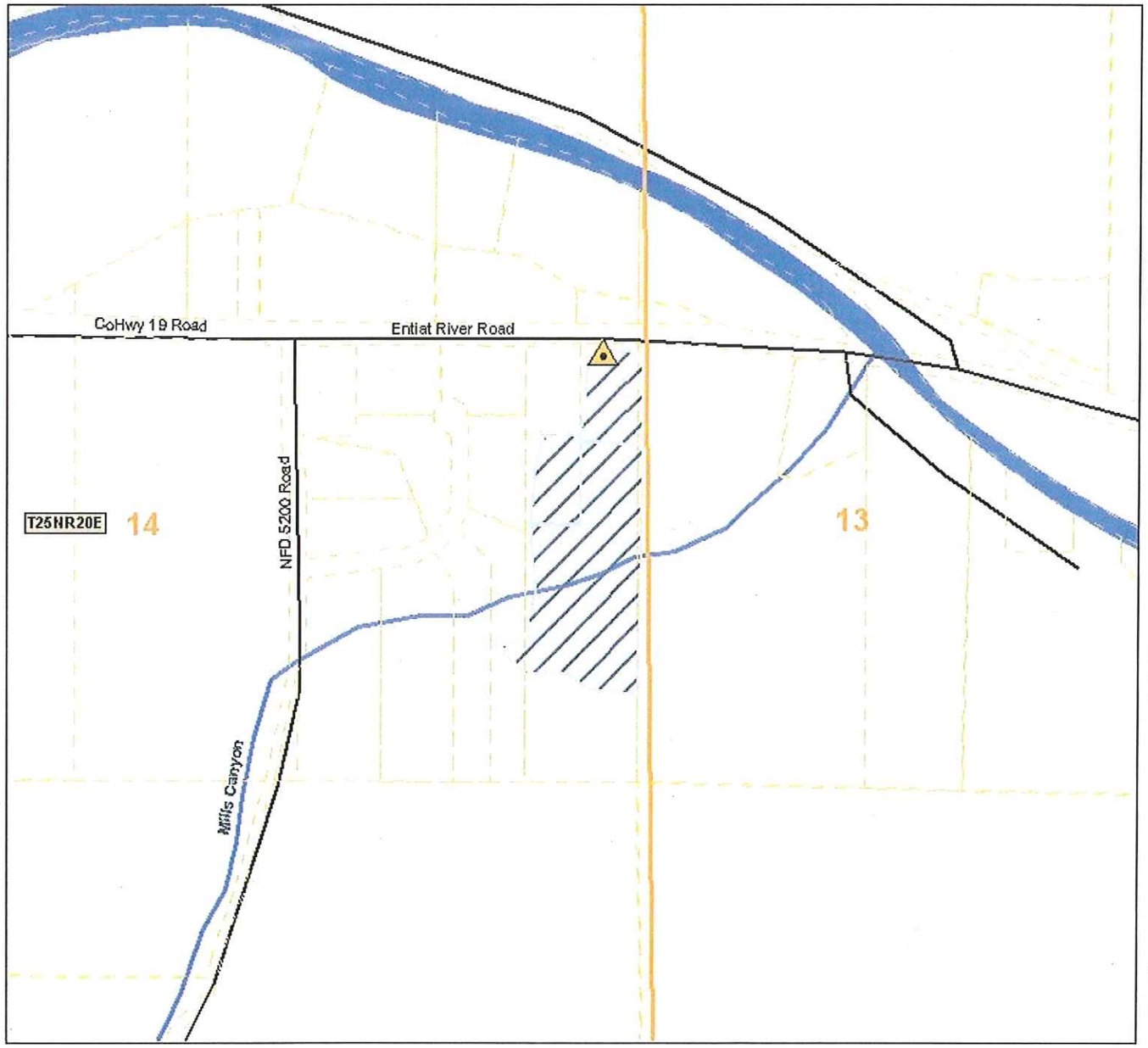
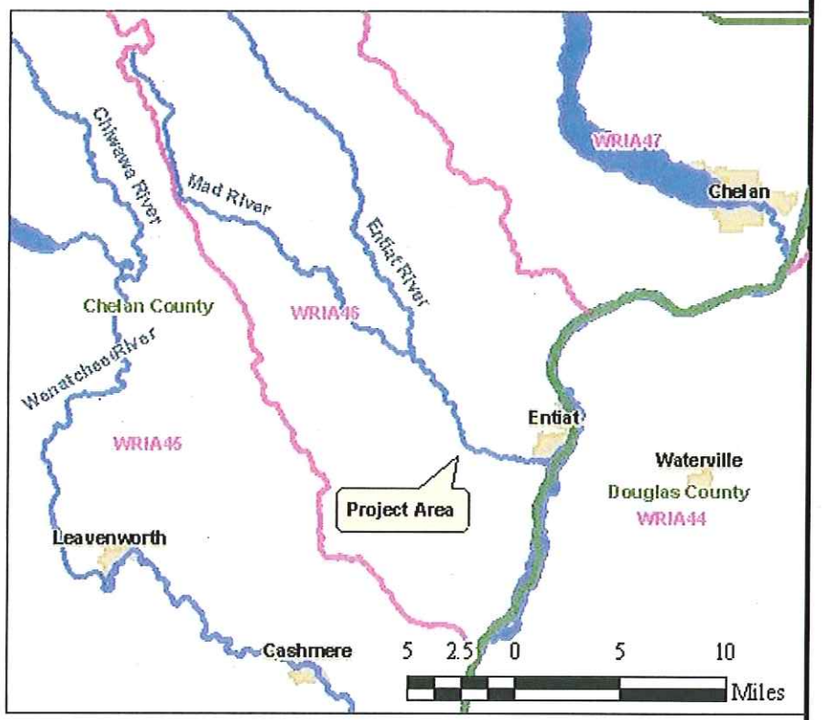
DRAFT

William Small
Water Right Claim No. 069703
Sec. 14, T. 25 N., R 20 E.W.M.
WRIA 46 - Chelan County





Legend

- County
- WRIA
- cities
- Local Roads
- Townships
- Sections
- Parcels
- Point of Withdrawal
- Authorized Place of Use

Comments:
Place of Use and Point of Withdrawal are as defined on the cover sheet.

Attachment 1