STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION
*Change Application CS1-*10680C*
To Surface Water Certificate 5983

PRIORITY DATE	CLAIM NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
August 30, 1951			*5983*

NAME
City of Arlington

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
154 Cox Avenue	Arlington	WA	98223

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Three wells in the City of Arlington Haller Wellfield

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE FEET PER YEAR
	112	42.06

QUANTITY, TYPE OF USE, PERIOD OF USE

Municipal Water Supply

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL

Haller Wellfield: 2,900 feet north and 2,770 feet west from the SE Corner of Section 2, T.31N., R.5E., W.M.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
SE 1/4 NW 1/4	2	31N.	5E.	5	Snohomish
PARCEL NUMBER	LATITUDE		LONGITUDE	DATUM	
31050300101000	48.2029 N		122.1284 W	NAD83	

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]

Area served by the City of Arlington as described within the most recently approved Water System Plan

DESCRIPTION OF PROPOSED WORKS

The City of Arlington's water system consists of three wells in the Haller Wellfield (Wells 1, 2, and 3), the Airport Well, water treatment and disinfection facilities, distribution system piping, pumps, and meters. The system has been constructed and is in use.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Completed (infrastructure in place)	*Completed*	*Completed*

PROVISIONS

This change authorization is issued subject to all applicable State laws and regulations and to the following provisions:

1. All wells constructed in the state shall meet the "Minimum Standards for the Construction and Maintenance of Wells" (WAC 173-160) and "Water Well Construction" (RCW 18.104). In general, wells shall be located at least 100 feet from sources of contamination and at least 1,000 feet of the boundary of a solid waste landfill. Any well which is unusable, abandoned, or is an environmental, safety, or public health hazard shall be decommissioned.

2. All wells shall 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 shall remain attached to the well. If you are required to submit water measuring reports, reference this tag number.

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

4. An approved measuring device shall be installed and maintained for each diversion/withdrawal of the sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", Chapter 173-173 WAC.

   Water use data shall be recorded weekly. The maximum monthly instantaneous rate of diversion/withdrawal and the monthly total volume shall be submitted to Ecology by January 31st of the following year. Ecology is requiring submittal of monthly meter readings to collect seasonal information for water resource planning, management and compliance.

   The following information shall be included with each submittal of water use data: owner, contact name if different, mailing address, daytime phone number, Permit/Certificate/Claim No., source name, volume including units, Department of Health WFI water system number and source number(s) (for public drinking water systems), and well tag number (for ground water withdrawals). In the future, Ecology may require additional parameters to be reported or more frequent reporting. Ecology prefers web based data entry, but does accept hard copies. Ecology will provide forms and electronic data entry information.

   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".

   Department of 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.

5. This decision may indicate a Real Estate Excise Tax liability for the seller of water rights. The Department of Revenue has requested notification of potentially taxable water right related actions, and therefore will be given notice of this decision, including document copies. Please contact the state Department of Revenue to obtain specific requirements for your project. Phone: (360) 570-3265. The mailing address is: Department of Revenue, Real Estate Excise Tax, PO Box 47477, Olympia WA 98504-7477 Internet: http://dor.wa.gov/ E-mail: REETSP@DOR.WA.GOV.

6. If the criteria in RCW 90.03.386(2) are not met and a Water System Plan/Small Water System Management Program was approved after September 9, 2003, the place of use of this water right reverts to the service area described in that document. If the criteria in RCW 90.03.386(2) are not met and no Water System Plan/Small Water System Management Program has been approved after September 9, 2003, the place of use reverts to the last place of use described by The Department of Ecology in a water right authorization.

7. Prior to any new construction or alterations of a public water supply system, the State Board of Health rules require public water supply owners to obtain written approval from the Office of Drinking Water of the Washington State Department of Health. Please contact the Office of Drinking Water at Northwest Drinking Water Operations, 20435 72nd Avenue S, Suite 200, K17-12, Kent, WA 98032-2358, (253) 396-6750, prior to beginning (or modifying) your project.

8. The water right holder is required to maintain efficient water delivery systems and use of up□to□date water conservation practices consistent with RCW 90.03.005.

9. A superseding certificate shall be issued upon a showing that sufficient infrastructure is in place at the new point of withdrawal to accommodate the additional Qi and Qa that results from this decision.

FINDINGS OF FACT AND DECISION

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 the requested change under Change Application No. CS1-*10680C be approved, subject to existing rights and the provisions specified above.

You have a right to appeal this decision to the Pollution Control Hearing 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 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.

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503 Pollution Control Hearings Board 1111 Israel Road SW Suite 301 Tumwater, WA 98501	Department of Ecology Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608 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 Bellevue, Washington, this _____ day of _____, 2011.

_____
Jerry L. Liszak, Acting Section Manager
Water Resources Program
Northwest Regional Office

BACKGROUND

The City of Arlington (City) submitted change application CS1-*10680C on April 7, 2010. The City entered into a cost reimbursement agreement with the Department of Ecology to process this application for change along with two other applications for change. This report of examination was prepared by Golder Associates Inc. through Ecology's Cost-Reimbursement Program.

Description and Purpose of Requested Change

The City purchased an irrigation water right and proposes to transfer the water to the City's existing points of withdrawal at the Haller Wellfield for the purpose of year round municipal water supply within the City's water service area.

Attributes of the Certificate and Proposed Change

Attributes of the Original Certificate

Owner Name	City of Arlington
Name on Certificate:	J. Floyd Sill
Priority Date:	August 30, 1951
Instantaneous Quantity:	0.25 cubic feet per second (cfs)
Annual Quantity:	Not Specified
Point of Withdrawal:	Gov. Lots 5 and 10 within Section 2, Township 31 North, Range 5 East
Purpose of Use:	Irrigation of 25 acres
Period of Use:	Not Specified
Place of Use:	BEGINNING at a point 990 feet East of Southwest corner of Lot 5, then North to river bank; thence southerly along said bank to point West of point of beginning; thence east to Point of Beginning, Sec. 1, Twp. 31 N, Rge. 5 E.W.M. BEGINNING at Southwest corner of Sec. 1, Twp. 31 N, Rge. 5 E.W.M., thence north 2°51'10" east along West line of section 1337.37 feet to point of beginning; thence North 79°26' east 344.74 feet; thence north 58°32'East 227.8 feet; thence North 22°30' West 63.4 feet; thence North 59°33'30" East 392.2 feet; thence South 86°10'30" West 490 feet more or less to East Line of Lot 10; thence North to Northeast corner of said Lot 10; thence West to Stillaguamish River; thence Southerly along said river to West line of section; thence south to the point of beginning, less county road.

Proposed Change

Name of Applicant:	City of Arlington
Date of Application for Change:	April 7, 2010
Points of Withdrawal:	SE¼ NW¼ of Section 2, Township 31 North, Range 5 East (Haller Wellfield)
Proposed Instantaneous Quantity:	112 gallons per minute (gpm)
Proposed Annual Quantity:	50 AF/yr
Purpose of Use:	Municipal Water Supply
Period of Use:	Continuously
Place of Use:	Area served by the City of Arlington as described within the most recently approved Water System Plan
Notice of Publication:	The Everett Herald, July 21, 2010 and July 28, 2010
Protests:	None

Legal Requirements for Proposed Change

- **Water Resources Statues and Case Law**

This application is subject to legal requirements in statute, administrative rules, and relevant case law which must be considered prior to issuance of the requested change(s). Among these legal requirements:

- The Washington State Supreme County has held that Ecology, when processing an application for a change to a water right, is required to make a tentative determination of extent and validity of the claim or right. This is necessary to establish whether the claim or right is eligible for change. *R.D. Merrill v. PCHB* and *Okanogan Wilderness League v. Town of Twisp*.
- RCW 90.03.380(1) allows for a water right that has been put to beneficial use to be changed. The point of diversion, place of use, and purpose of use may be changed if the change would not result in harm or injury to existing water rights.
- RCW 90.14.160 states that any person entitled to divert water through an appropriation authorized through a general adjudication, who abandons or voluntarily fails, without sufficient cause, to divert all or any part of said right for a period of five successive years after July 1, 1967, shall relinquish such right or portion thereof, to the state.
- A point of diversion for a surface water right may be changed to a groundwater point of withdrawal. The authority is derived from RCW 90.03.380, RCW 90.44.020-030, RCW 90.44.100 and RCW 90.54.020(9). RCW 90.03.380(1) states that a water right that has been put to beneficial use may be changed if it would not result in detriment or injury to other water rights. Additionally, moving the point of diversion to a groundwater withdrawal requires compliance with the groundwater code (RCW 90.44), including a finding that there be no

detriment to the public welfare and that the source of the existing diversion and the proposed point of withdrawal be part of the same water body.

- **Public Notice**

  Public notice of the proposed application for change was published on July 21, 2010 and July 28, 2010 in the Everett Herald. No protests were received.

- **State Environmental Policy Act (SEPA)**

  This application is exempt from the provisions of the State Environmental Policy Act (SEPA), Chapter 43.21 RCW, due to the fact that the cumulative quantity of water constitutes a withdrawal of less than 2,250 gallons per minute (gpm) of groundwater (WAC 197-11-800(4)).

INVESTIGATION

In considering this application, the investigation included, but was not limited to, research and/or review of:

- Ecology's online Water Rights Tracking System (WRTS) database
- Records of water rights in the vicinity
- Ecology's online Well Log Database
- Topographic and local area maps
- Site visit
- LANDSAT and aerial photographic images of the area for the month of July in years 2001 through 2009, inclusive
- Letter of February 1, 2010 from Lawrence A. Costich, of Schwabe, Williamson, and Wyatt to Henry and Betty Graafstra , regarding availability of water rights, file number 118547/158668
- Available regional geologic and hydrogeological information including:
  - Falk, Dean E., 2010, Fresh Water Needs for Dairy Farms, Idaho Association of Soil Conservation Districts. http://oneplan.org/Stock%5CDairyWater.asp
  - Golder Associates, 2007, Phase I Summary Technical Memorandum: City of Arlington Water Right Application G1-26641. Prepared for the Washington State Department of Ecology.
  - Golder Associates, 2011, Phase I Summary Technical Memorandum: City of Arlington Water Right Applications CS1-10681C, CS1-18929C, and CG1-02115C. Prepared for the Washington State Department of Ecology.. February 1.
  - Pacific Groundwater Group, January 2007. City of Arlington Hydrogeologic Conceptual Model Summary Report, prepared for the City of Arlington.
  - Newcomb, R.C., 1952, Ground-Water Resources of Snohomish County, Washington, U.S. Geological Survey Water-Supply Paper 1135.
  - RH2 Engineering Inc., 2010, City of Arlington Comprehensive Water System Plan, November.
  - Thomas, B.E., J.M. Wilkinson and S.S. Embrey, 1997. The Ground-Water System and Ground-Water Quality in Western Snohomish County, Washington. USGS Water Resources Investigations Report 96-4312.
  - USDA-ARS Washington Irrigation Guide, Appendix B. 1992. Available online at http://www.wa.nrcs.usda.gov/technical/ENG/irrigation_guide/index.html.

Tentative Evaluation of Extent and Validity of the Water Right Proposed for Change

The perfected quantity of the right is the maximum amount that has historically been applied to beneficial use under the right.
The history of water use is documented in an affidavit included in the 2010 Schwabe, Williamson, and Wyatt (2010) letter. Certificate 5983 (the subject of this change application) and the land appurtenant to it were purchased by Henry Graafstra in 1959. Graafstra purchased Certificate 10024 (the subject of a concurrent change application) and the appurtenant land in the 1970's. The two certificates were used to operate a dairy farm from 1959 until 2006.

Review of materials provided by the City for these two water rights indicates that there have been several de facto changes to the point of diversion, place of use, and purpose of use since the water rights were certificated. The dairy owner indicates he implemented these changes through his farm plan in response to regulations requiring him to comply with the Clean Water Act (Schwabe, Williamson, and Wyatt 2010). The water rights continued to be associated with agricultural use while the dairy farm was operational. The de facto changes include:

- The original point of diversion for Certificate 5983 was within Government Lots 5 and 10, Section 1, T31N/R5E. The original point of diversion for Certificate 10024 was within Government Lot 7, Section 1, T31N/R5E. The point of diversion was changed to a point of withdrawal (a well) in Government Lots 5 or 10, Section 1, T31N/R5E, sometime in the 1970s.
- The two water right certificates are appurtenant to 85 acres of land, 25 acres for Certificate 5983 and 60 acres for Certificate 10024. Water was also used for irrigation of adjacent leased lands.
- Certificate 5983 is for 0.25 cfs for irrigation of 25 acres. Certificate 10024 is for 0.58 cfs and 120 AF/yr for irrigation of 60 acres (over the irrigation season) and 0.02 cfs and 5 AF over the entire year for stock watering. The total Qa under both rights is 175 AF/yr, with 5 AF/yr for stock watering and 170 AF for irrigation.

Information provided by the City (Schwabe, Williamson, and Wyatt 2010) indicates that the purpose of use has changed from that originally stated on the certificates at some time after 1985 when the manure lagoon was constructed:

- Irrigation: 93.25 AF/yr for irrigation (81.25 AF/yr for grass silage and 12 AF/yr for corn) of 85 acres owned and 17.87 AF/yr for acres leased to grow row crops for cattle feed. The total irrigation diversion was estimated to be 111.12 AF/yr. The 17.87 AF/yr estimated for use on off-site leased land was used on leased lands an only a partial source of water to those acres, and actual quantities of use have not been well established. For this reason, they have not been included as an additional quantity of beneficial use. Some of the water was diverted outside of the irrigation season. Certificate 5983 does not specify a period of use.
- Stock watering: 52.81 AF
- Domestic Use, Dairy, and Animal Operations: 19.83 AF/yr including 1.09 AF for domestic use, 1.12 AF for animal operations, 17.62 AF for milk and ice cream production.

- The total water use claimed is 183.76 AF/yr, slightly more than the combined total of 175 AF/yr authorized by certificates 5983 and 10024.

According to Graafstra's affidavit, the irrigated acreage included 65 acres of grass pasture land, and 18 acres of corn silage land. Using the Washington State Irrigation Guide for Everett, about 1.25 feet of water are needed annually for pasture/turf. Thus the water required for the irrigation of 65 acres of pasture is about 81.25 AF. The irrigation requirement for field corn is 0.67 feet of water. For 18 acres of corn, 12 AF are required for annual irrigation.

Graafstra estimated stockwatering use to be 100 gallons per day per milk cow and 16 gallons per day to water dry cows and heifers, for a total of 52.81 AF/yr. The 100 gallons per day was based on stockwatering in five Arizona dairies and likely overestimates water requirements for dairy cows in western Washington. Based on information for Idaho summarized by Falk (2010), approximately 50 gallons per milk cow and 16 gallons per day per dry cows and heifers are considered to be more reasonable for the Arlington area. Graafstra's affidavit indicates that 450 milk cows on average were tended, resulting in an estimated use of 25.20 AF/yr. An additional 45 dry cows, 30 springing heifers, and 95 yearly heifers were tended, with associated water use estimated to be 3.05 AF/yr. The estimate of 19.83 AF/yr of water use for milk and ice cream production, animal operation, and domestic use appear to be reasonable.

The Schwabe, Williamson, and Wyatt (2010) letter included attachments documenting electrical consumption and water use. The flowmeter and electric meter on the pump were read weekly for about one month in the late spring of 2006. Over this period, approximately 1,077,992 gallons were pumped using 245 KWH of electricity. Thus, about 4,400 gallons are pumped per KWH:

Date	Flow Meter (gallons)	Gallons	Electric Meter Total (KWH)	KWH	Gallons/KWH
5/16/2006	3,367,666		29,466		
5/24/2006	3,762,550	394,884	29,544	78	5,063
6/1/2006	4,027,555	265,005	29,609	65	4,077
6/7/2006	4,217,917	190,362	29,656	47	4,050
6/13/2006	4,445,658	227,741	29,711	55	4,141
Total	-	**1,077,992**	-	**245**	**4,400**

The last five years of operation of the water right were 2001 to 2006. A new electric meter was installed on the power feed to the pump on May 3, 2004 to replace a faulty meter that appeared to under-record the electrical consumption at the well. Therefore, water use information is only available for part of 2004, all of 2005, and part of 2006. From May 3, 2004 through October 6, 2006, the meter recorded 30,897 KWH of electricity used based on meter readings made approximately every two months. Using the gallons/KWH factor calculated above of 4,400 gallons/KWH, this suggests about 136 million gallons were pumped over that period (886 days or 2.43 years). This is equivalent to about 172 AF/yr pumped under this right and Certificate 10024. Certificate 10024 is for 125 AF/yr. If a relatively high efficiency of 75% is applied to the portion of the right associated with irrigation that was estimated by the applicant, the metering data supports approximately 148 AF/yr of beneficial use.

The total estimate for all beneficial water use for water pumped under this right and Certificate 10024 based on Ecology's analysis is 141.33 AF/yr (93.25 AF/yr for irrigation, 28.25 AF/yr for stock watering, and 19.83 AF/yr for domestic use, dairy, and animal operations). Consideration to the 94% efficiency of the Arlington's water distribution system, as noted in the Appenidix F of the Water System Plan (2010) results in a combined withdrawal amount for the two transfers 147.22 AF/yr for this change to provide equivalent consumptive use for the transfer. Proration of the amount of this water attributable to this change application (Certificate 5983) yields a transferable quantity to the City of Arlington of 42.06 AF/yr.

Proposed Use

The proposed use is municipal water supply for the City of Arlington.

- ***Beneficial Use***

  According to RCW 43.27A.020, RCW 90.14.031, and RCW 90.54.020, municipal water supply is considered a beneficial use.

- ***Water Demand***

  The City's average and peak day demands are forecast to increase (RH2 2010). The 2010 Water System Plan (RH2 2010) identified source capacity deficiencies at the Haller Wellfield. Transfer of this water right to the Haller Wellfield will help the City meet current and projected future demands and increase the reliability of their water supply.

- ***Development Schedule***

The City's water system is fully developed and undergoes periodic upgrades and maintenance as needed to maintain a safe, reliable supply of water.

Other Rights Appurtenant to the Place of Use

The City of Arlington holds four water right certificates and one water right claim for its sources of municipal supply. The City's existing rights are summarized in the following table:

Water Right Tracking #	Certificate #	Priority Date	Qi (cert)	Qi Additive	Qi Non-Additive	Qa (cert)	Qa Additive	Qa Non-Additive	Ecology Source
G1-*07495C	GWC 5170	2/12/1965	200	200		320	320		Airport Well
G1-*07494C	GWC 5169	2/12/1965	1,700		1,700	1,344		1,344	Haller Wellfield
S1-*01194C	SWC 194	10/10/1924	2,244.15	2,244.15		3,619.84	3,619.84		Haller Wellfield
G1-24900C		9/17/1986	380	380		386		376	Airport Well
G1-300889CLA		1931	135	135		72.18	72.18		Haller Wellfield
Totals			**4,659.15**	**2,959.15**	**1,700**	**5,742.02**	**4,012.02**	**1,720**	

Note: provided by Doug Wood, Ecology NWRO.

The Haller Wellfield includes three wells (Wells 1, 2, and 3). The instantaneous pumping capacity of each well is 570 gpm, for an instantaneous wellfield capacity of 1,710 gpm. The instantaneous capacity of the water treatment plant is also 1,710 gpm.

The City also submitted two applications for change along with this application for change:

- Application for change CS1-18929C seeks to transfer 269 gpm (0.60 cfs) and 125 af/year from an irrigation and stockwatering right to the City for the purpose of municipal water supply
- Application for change CG1-02115C seeks to transfer 90 gpm and 34.67 af/year from an irrigation right to the City for the purpose of municipal water supply

These two change applications are being processed concurrently with this application.

Site Visit

A site visit was made on January 11, 2011 to the existing points of withdrawal and diversion and the proposed points of withdrawal by Michael Klisch (Golder), Doug Wood (Ecology), and Mike Wolanek (City of Arlington). The original point of diversion associated with this right was the South Fork of the Stillaguamish River. Suction lines were placed into the river at the points of diversion to supply the wheel line irrigation system. Sometime in the 1970's, the property owner installed a well to replace this surface water diversion and the diversion associated with Certificate 18929C and discontinued use of the diversions. The original diversions were not visible. Both the original and current points of diversion and withdrawal, respectively, are upstream of the proposed point of withdrawal.

The well is a dug well that is completed with 60-inch-diameter concrete casing. The depth of the well is 22 feet below ground. There is no well log on file for the well. The well was previously equipped with two pumps which have been removed. One pump fed the early irrigation system which consisted of distribution pipe and hand lines across the floodplain. The second pump fed the uphill dairy system, from which some water subsequently drained to the manure lagoon. The lagoon doubled as an irrigation reservoir beginning with its construction in about 1983. There is electrical service to a pole near the well location.

There was no evidence of former irrigation equipment in the field except for the 6-inch line from the well, which was partially exposed adjacent to the well. In the former dairy area, a former water treatment building was partially standing. The building included several pressure tanks and other tanks for chlorination. Most of the piping for the system had been removed.

Hydrologic/Hydrogeologic Evaluation

The hydrogeology of the Arlington area has been described in Newcomb (1953), Thomas and others (1997), and Pacific Groundwater Group (2007). The City of Arlington is located at the confluence of the North and South Forks of the Stillaguamish River (WRIA 5). Thomas and others (2007) delineated the hydrogeologic units in the vicinity of Arlington. The geologic units are summarized in the following table:

Epoch	Hydrogeologic Unit	Typical Thickness (feet)	Maximum Thickness (feet)	Lithology	Hydrogeology
Holocene	Bog/Peat/Marsh Deposits	3	10	Peat, organic-rich mud	Thin and discontinuous, not an aquifer or aquitard
	Alluvium	40	120	Fluvial and beach deposits of fine to coarse sand with lenses of silt and gravel	Unconfined aquifer
Pleistocene	Recessional Outwash	40	250	Sand and gravel, grades to silt	Unconfined aquifer or perched groundwater
	Till	70	250	Compact unsorted sand and gravel in silt and clay matrix	Aquitard with occasional thin confined aquifers

Epoch	Hydrogeologic Unit	Typical Thickness (feet)	Maximum Thickness (feet)	Lithology	Hydrogeology
	Advance Outwash	120	350	Fine sand, grades to gravel or silt	Unconfined to confined aquifer
	Transitional Beds	100	400	Sand to silty clay	Aquitard with occasional thin confined aquifers
	Undifferentiated Sediments	500	1,000	Glacial drift and interglacial deposits of sand and gravel with some silt	Confined aquifer and aquitards
Eocene	Bedrock	Unknown	Unknown	Varying sedimentary and volcanic lithologies	Small amounts of confined water in fractures, with some potential for porous flow in sandstone units

Note:
Modified from Thomas and others (2007), Table 3.

The City's Haller Wellfield is located immediately downstream of the confluence of the North and South Forks of the Stillaguamish River, about 50 feet south of the main stem Stillaguamish River. The Haller Well Field includes shallow three wells completed in the unconfined alluvial aquifer adjacent to the main stem Stillaguamish River at depths ranging from 34 to 36 feet below ground surface. The unconfined alluvial aquifer is present in the valleys of the North and South Forks of the Stillaguamish and the main stem Stillaguamish River. The existing point of withdrawal well is also a shallow well completed to a depth of 22 feet below ground in unconfined alluvial materials adjacent to the South Fork Stillaguamish River.

The Haller Well Field area is underlain by unconsolidated alluvial sand and gravel. The depth to the underlying Tertiary bedrock is uncertain. Bedrock was interpreted by Pacific Groundwater Group (2007) to be at a depth of about 40 feet below ground in the wellfield area. However, it is possible that alluvial materials include large boulders that, such as glacial erratic, that due to the difficult drilling conditions, may have been misinterpreted as "bedrock" at the time of drilling as the wells were not advanced beyond the "bedrock" (Mike Wolanek, City of Arlington, personal communication 2011). The alluvial aquifer is moderately to highly permeable, with hydraulic conductivities ranging from about 3.6 to 3,200 ft/d, and a median hydraulic conductivity of 88 ft/d (Thomas and others 2007).

Pumping tests in the Haller Well Field show that the alluvial aquifer is in direct hydraulic continuity with the main stem and South Fork Stillaguamish River (WWR 2010), and the wellfield is considered to be groundwater under the direct influence of surface water by the Washington Department of Health.

Minimum instream flows for WRIA 5 were established in 2005 under WAC 173-505-050 for the main stem Stillaguamish River and tributaries. The following table summarizes instream flow requirements for the main stem Stillaguamish River from the mouth at Port Susan to the confluence of the North and South Forks. The control point for this reach of the river is Ecology gaging station #05A070 at River Mile 11.2 (near Silvana).

Month	Day	Instream flow (cfs)
January	1-31	2,200
February	1-29	2,000
March	1-15	2,000
	16-31	2,000
April	1-30	2,000
May	1-31	2,000
June	1-15	2,000
	15-30	2,000
July	1-15	2,000
	15-31	2,000
August	1-15	1,700
	15-31	1,700
September	1-15	1,700
	15-30	1,700
October	1-15	1,700
	15-31	1,700
November	1-15	2,200
	15-30	2,200
December	1-31	2,200

Under WAC 173-505-070, the main stem Stillaguamish River from the mouth to the confluence of the North and South Forks at River Mile 17.8 has water available above instream flow requirements over the period October 16 to June 30. Under WAC 1173-505-100, the total consumptive withdrawals from the existing and future water rights in the Stillaguamish River basin during open periods shall not exceed a total of 300 cubic feet per second (cfs) as measured at Ecology station #05A070 at river mile (RM) 11.2 (WAC 173-505-100(2)). Of that 300 cfs, the maximum allocation that may be taken from the South Fork of the Stillaguamish River from RM 17.9 (confluence with the North Fork) to RM 34.9 is 150 cfs during open period from November 1 to June 15 as measured at Ecology station #05B090. Ecology also reserved one cfs of water for future stockwatering (WAC 173-505-080) and five cfs at River Mile 11.2 for future permit-exempt groundwater use (WAC 173-505-090). The five cfs reservation includes a maximum of two cfs from the North Fork Stillaguamish River (River Mile 6.5) and 1.5 cfs from the South Fork Stillaguamish River (River Mile 6.5). Because the water right

proposed for transfer has a priority date of September 4, 1951, it is senior to the instream flow regulations and is therefore not subject to interruption.

Impairment Considerations

The wells in the Haller Wellfield are completed in a highly permeable unconfined alluvial aquifer that is in direct hydraulic communication with the main stem Stillaguamish River. There will be no impairment to the main stem Stillaguamish River minimum instream flow by moving the point of withdrawal of a water right utilizing the same source that is senior to the minimum flow established in WAC 173-505-070.

The Haller Wellfield wells have been in operation for many years indicating that water is physically available. There have been no reports of interference to other wells or water right holders since the wells have been in operation. Testing completed by Pacific Groundwater Group in 2002 in Well 1R (referenced in the Report of Examination for CG1-300889CL(A)@1) showed there was about 6.5 feet of drawdown in Well 1R when the well was pumped at 570 gpm over a 4-hour period, with rapid recovery to pre-test levels following pump shutdown. Approximately 9 inches of drawdown were observed at the end of the test in Well 1, located about 25 feet from Well 1R, confirming little drawdown is expected outside the immediate wellfield area.

A search of the well log database indicted that there were 11 wells on file within about 0.5 miles of the Haller Wellfield. Other wells may be present that do not have logs filed with Ecology. With the exception of one well which is completed in bedrock (McMahan) all of the wells are completed in the alluvial aquifer. No impairment to these wells is expected based on the observed drawdown during the 2002 testing, the high aquifer transmissivity, and the good hydraulic connection to the river.

Well Owner	Well Depth (feet bgs)	Date Completed	Completion Aquifer	Location
ASSOCIATED SAND & GRAVEL	64		Alluvial	T31/R5E-2NWNE
ASSOCIATED SAND AND GRAVEL	26	03/10/69	Alluvial	T31/R5E-2NWNE
C D HAMMER	19		Alluvial	T31/R5E-2NESW
CITY OF ARLINGTON	38	05/08/02	Alluvial	T31/R5E-2SENW
CITY OF ARLINGTON	36		Alluvial	T31/R5E-2SENW
CITY OF ARLINGTON	36		Alluvial	T31/R5E-2SENW
DENNIS DEARINGER	74	08/12/98	Alluvial	T31/R5E-2NENW
HENRY MILLER	40	04/10/99	Alluvial	T31/R5E-2SENW
LEE FLATO	37	08/09/91	Alluvial	T31/R5E-2SWSW
LYNN GRANSTROM	50	09/16/02	Alluvial	T31/R5E-2NESE
MIKE HANLOCK	30	04/03/81	Alluvial	T31/R5E-2SWNE
PETE VECHL	38	07/12/00	Alluvial	T31/R5E-2SENW
TOM MC MAHAN	211	06/25/92	Bedrock	T31/R5E-2NWSE

The Water Rights Application Tracking System database was queried to located water rights and claims within a 0.5 mile radius of the Haller Wellfield. Twelve water right claims for groundwater, one surface water certificate, and two groundwater certificates are within 0.5 miles of the subject application for change (excluding rights held by the City of Arlington). At least one groundwater certificate and one groundwater claim can be tied to available well logs. Some of the well logs may be associated with water rights or claims filed under a different name or are exempt from the application process. No impairment to these rights is expected based on the observed drawdown during the 2002 testing, the high aquifer transmissivity, and the good hydraulic connection to the river.

File Number	Certificate Number	Person	Document Type	Priority Date	Purpose of Use	Qi	Unit of Measure	Qa	Location	Source
G1-153724CL		MILLER HENRY C	Claim S		NR		GPM		T31N/R5E-	
G1-135771CL		VAN SLAGEREN TOM	Claim L		ST,DG		GPM		T31N/R5E-	WELL
G1-124942CL		LEWIS ORWILL P	Claim S		IR,DG		GPM		T31N/R5E-	
G1-123457CL		WILSON MARVIN W	Claim L		ST,IR		GPM		T31N/R5E-	WELL
G1-119434CL		VALLEY GEM FARMS	Claim L		ST,DG		GPM		T31N/R5E-	WELL
G1-111124CL		HAMMER CURTIS D	Claim S		ST,DG		GPM		T31N/R5E-	
G1-093046CL		GROENDYK JOHN	Claim S		IR,DG		GPM		T31N/R5E-	
G1-091257CL		RICKARD JOHN C	Claim S		IR,DG		GPM		T31N/R5E-	
G1-050157CL		KROEZE JOHN	Claim S		DG		GPM		T31N/R5E-	WELL
G1-035541CL		DESPRES CLARA M	Claim L		DG		GPM		T31N/R5E-	WELL
G1-035723CL		BREEKVELDT BERT	Claim S		DG		GPM		T31N/R5E-	
G1-025841CL		KLEIN PAUL	Claim L		DG		GPM		T31N/R5E-	
S1-008945CL		SOPER FRANCES M. M.	Claim L		DG		CFS		T31N/R5E-	
S1-*11473AWC	06447A	KROEZE J	Cert	6/23/1952	IR	0.32	CFS		T31N/R5E-	UNNAMED SLOUGH
S1-*01194C	194	Puget Sound Power &	Cert	10/10/1924	DM	5	CFS		T31N/R5E-	STILLAGUA

File Number	Certificate Number	Person	Document Type	Priority Date	Purpose of Use	Qi	Unit of Measure	Qa	Location	Source
		Light Co							SE/NW	MISH RIVER
G1-*09495C	6379	Associated Sand & Gravel Co Inc	Cert	6/4/1968	CI	150	GPM	36	T31N/R5E-	WELL
G1-*07494C	5169	Arlington City	Cert	2/12/1965	MU	1700	GPM	1344	T31N/R5E-	WELL
G1-*02442C	2968	HAMMER C D	Cert	4/9/1952	IR	156	GPM	30	T31N/R5E-	WELL
CG1-*02115C	1488	Arlington City	ChgApp	3/23/2010	MU	90	GPM	34.67	T31N/R5E-SE/NW	WELL 1
CS1-*18929C	10024	Arlington City	ChgApp	4/7/2010	MU	0.6	GPM		T31N/R5E-SE/NW	Haller well field
CS1-*10680C	5983	Arlington City	ChgApp	4/7/2010	MU	0.25	GPM		T31N/R5E-SE/NW	Haller well field

Because the proposed change will move the point of withdrawal downstream, there is a net benefit to flows in the main stem and South Fork Stillaguamish River between the proposed and existing points of withdrawal.

Enlargement

No enlargement will result from approval of this change. The City of Arlington is receiving a transferred quantity based on a tentative determination of extent and validity. Only water that was previously put to beneficial use is transferred, and only that amount is authorized to be withdrawn (by this authorization) from the wells in the Haller Wellfield.

Public Interest Considerations

Factors considered for evaluating whether the proposed change is in the public interest included but were not limited to: potential impacts to exempt wells, existing water rights, permits, and claims holders, other water right change applications, potential impact to groundwater and surface water resources, and beneficial use of the resource. No detriment to the public interest was identified during the investigation of the subject application. The available information show other wells in the area are not expected to be impaired by the proposed change, and the proposed change will provide a net benefit to flows in the main stem and South Fork Stillaguamish River between the proposed and existing points of withdrawal.

CONCLUSIONS

In accordance with state law, the following considerations were addressed as part of the process of evaluating this change request:

- The potential for enlargement of the original right,
- The potential for impairment of other rights,
- Consideration of the public interest and welfare,
- Physical availability of water,
- Whether the new point of withdrawal would tap the same body of public groundwater as the original well, and
- Protests or Letters of Concern.

Potential for Enlargement

The annual quantity and maximum instantaneous quantity will not be enlarged by this change.

Impairment of Other Rights

No impairment of other rights is expected because the alluvial aquifer is highly permeable with a direct hydraulic connection with the main stem and South Fork of the Stillaguamish River. Interference drawdown from pumping the Haller Wellfield in areas outside the immediate wellfield is expected to be negligible. There are no reports of impairment by other groundwater or surface water users since the wellfield has been in operation. Review of materials provided by the City indicated that a de facto change to the original point of diversion was made by the dairy owner sometime in the 1970s to address requirements of the Clean Water Act. The dairy owner indicates he implemented these changes through his farm plan in response to regulations requiring him to comply with the Clean Water Act (Schwabe, Williamson, and Wyatt 2010). The point of diversion was changed to a nearby point of withdrawal (a well). The existing point of withdrawal and the Haller Wellfield are in the same body of groundwater in direct communication with the main stem and South Fork of the Stillaguamish River. Because the water right proposed for transfer has a priority date of August 30, 1951, it is senior to the instream flow regulations adopted in 2005 and is therefore not subject to interruption when flows are not met. No impairment to instream flows are expected from approval of this water right.

Public Interest

No detriment to the public interest was identified during the investigation of this application for change. Municipal water supply is a beneficial use under RCW 43.27A.020, RCW 90.14.031, and RCW 90.54.020.

Availability of Water

Availability of water from the source was determined when the original permit was issued. Physical availability of water from the Haller Wellfield has been established through operation of the field for over 100 years with no reports during that time of decreased water availability.

Same Body of Groundwater

The existing and proposed points of withdrawals are both in the alluvial aquifer which is in direct continuity with the main stem and South Fork Stillaguamish River.

Protests or Letters of Concern

Public notice of the proposed application for change was published on July 21, 2010 and July 28, 2010 in the Everett Herald. No protests were received.

RECOMMENDATIONS

Based on the above investigation and conclusions, I recommend that the request for change to Certificate 5983 be authorized, 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

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.

112 gpm, 42.06 acre-ft/yr for municipal water supply. The combined transferable quality for Certificates 5983 and 10024 shall not exceed 147.22 AF.

Point of Withdrawal

SE¼, NW¼, Section 2, Township 31 North, Range 5 East W.M.

Place of Use

As described on Page 1 of this Report of Examination.

REPORT BY_____ DATE_____

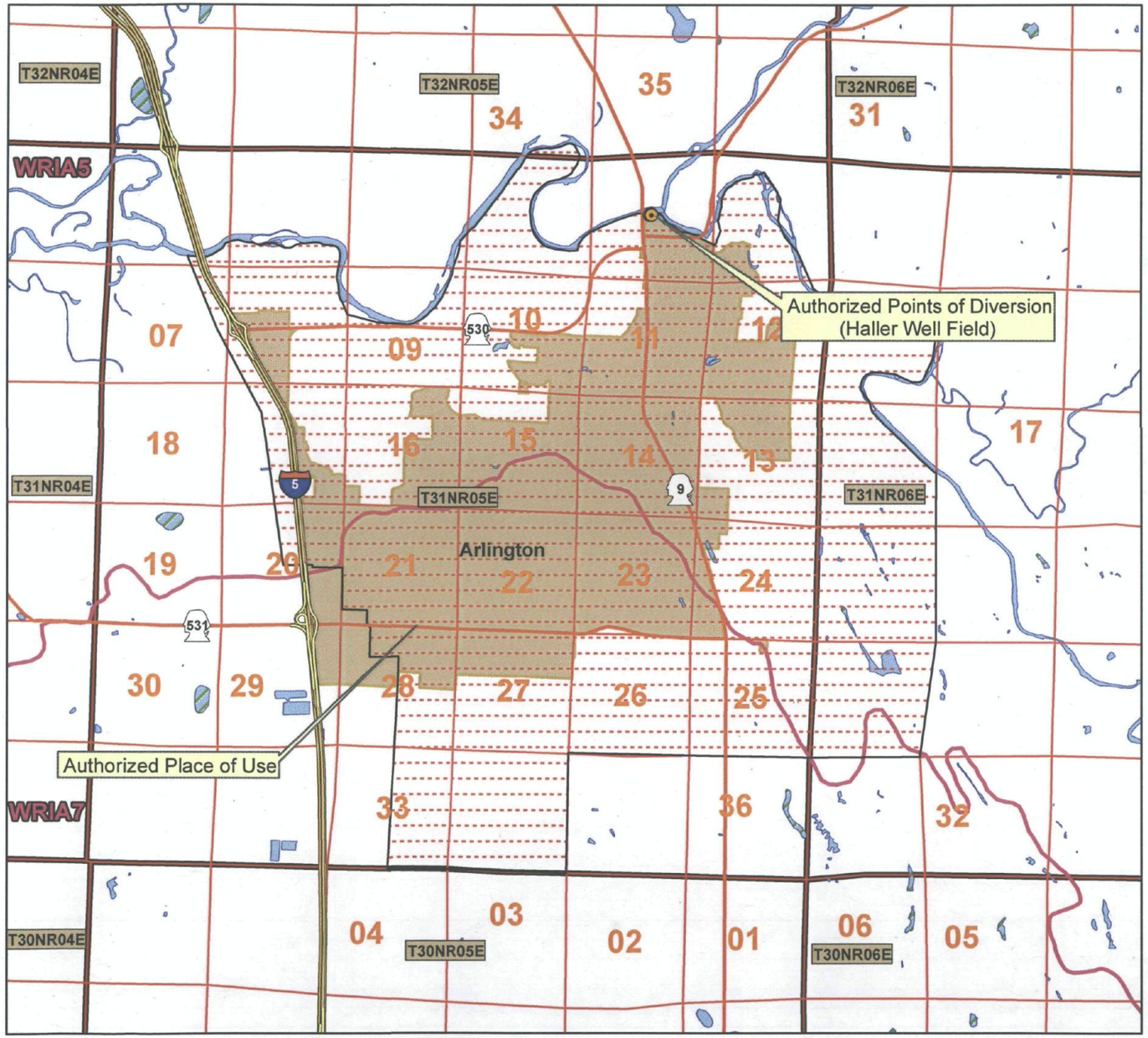
Carl Einberger, L.Hg.
Senior Consultant, Water Resources
Golder Associates Inc.

REVIEWED BY_____ DATE_____

Douglas H. Wood, LHG
Water Resources
Department of Ecology

City of Arlington
Water Right Number CS1-*10680C
Sec.02, T 31N, R 05E W.M.
WRIA 5 - Snohomish County

DEPARTMENT OF ECOLOGY
State of Washington



Legend

- County
- WRIA
- Highways
- Townships
- cities
- Sections
- Authorized Point of Withdrawal
- Authorized Place of Use

Place of use and point(s) of diversion/withdrawal are as defined on the cover sheet under the headings, 'LOCATION OF DIVERSION/WITHDRAWAL' and 'LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED.'

Attachment 1