



State of Washington

CG2-27079  
4472638

Report of Examination for Water Right Change

Purpose  Place of Use  Point of Diversion/Withdrawal   
 Season  Add Irrigation Acres  Well Consolidation

PRIORITY DATE  
March 23, 1987

WATER RIGHT NUMBER  
CG2-27079

MAILING ADDRESS  
FIRGROVE MUTUAL WATER CO INC  
10408 - 144TH ST E  
PUYALLUP WA 98374-1958

SITE ADDRESS (IF DIFFERENT)

Quantity Authorized for Withdrawal or Diversion

DIVERSION OR WITHDRAWAL RATE	UNITS	ANNUAL QUANTITY (AF/YR)
100	GPM	23.40

Purpose

PURPOSE	WITHDRAWAL OR DIVERSION RATE		UNITS	ANNUAL QUANTITY (AF/YR)		PERIOD OF USE
	ADDITIVE	NON-ADDITIVE		ADDITIVE	NON-ADDITIVE	
Multiple Domestic	100		GPM	23.40		May 1 to Oct 1

ADDITIVE	IRRIGATED ACRES		PUBLIC WATER SYSTEM INFORMATION	
	ADDITIVE	NON-ADDITIVE	WATER SYSTEM ID	CONNECTIONS
			25200	

Source Location

COUNTY	WATERBODY	TRIBUTARY TO	WATER RESOURCE INVENTORY AREA
Pierce	Groundwater		12 -Chambers/Clover

SOURCE FACILITY/DEVICE	PARCEL	WELL TAG	TWN	RNG	SEC	QQ Q	LATITUDE	LONGITUDE
Firgrove Well 20	0419166007	ABE-834	19N	04 E	16	SW NW	47.13614	-122.313902

Datum: NAD83/WGS84

**Place of Use (See Attached Map)**

**PARCELS (NOT LISTED FOR SERVICE AREAS)**

**LEGAL DESCRIPTION OF AUTHORIZED PLACE OF USE**

The place of use (POU) of this water right is the service area described in the most recent Water System Plan/Small Water System Management Program approved by the Washington State Department of Health, so long as the water system is and remains in compliance with the criteria in RCW 90.03.386(2). RCW 90.03.386 may have the effect of revising the place of use of this water right.

**Proposed Works**

An existing 16-inch well, reduced to a 12-inch casing, drilled to a depth of 450 feet, with an 8-inch slotted diameter screen located between the depths of 398 feet and 449.5 feet, connected to the Firgrove Distribution system for the supply of water to municipal water supply customers.

**Development Schedule**

BEGIN PROJECT	COMPLETE PROJECT	PUT WATER TO FULL USE
Started	Completed	January 1, 2018

**Measurement of Water Use**

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

**Provisions**

**Wells, Well Logs and Well Construction Standards**

All wells constructed in the state shall meet the construction requirements of WAC 173-160 titled "Minimum Standards for the Construction and Maintenance of Wells" and RCW 18.104 titled "Water Well Construction". Any well which is unusable, abandoned, or whose use has been permanently discontinued, or which is in such disrepair that its continued use is impractical or is an environmental, safety or public health hazard shall be decommissioned.

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.

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

**Measurements, Monitoring, Metering and Reporting**

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

Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times, to the records of water use that are kept to meet the above conditions, and to inspect at reasonable times any measuring device used to meet the above conditions.

Reported water use data shall be submitted via the Internet. To set up an Internet reporting account, access <https://fortress.wa.gov/ecy/wrx/wrx/Meteringx/>. If you do not have Internet access, contact the Region for forms to submit your data.

WAC 173-173 describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition the Department of Ecology for modifications to some of the requirements.

**Water Level Measurements**

In order to maintain a sustainable supply of water, pumping must be managed so that static water levels do not progressively decline from year to year. Water levels shall be measured and recorded monthly, using a consistent methodology. The length of the pumping period or recovery period prior to each measurement shall be constant, and shall be included in the record. Data for the previous year shall be submitted by January 31 to the Department of Ecology.

Static water levels data shall be submitted in digital format and shall include the following elements:

Unique Well ID Number

Measurement date and time

Measurement method (air line, electric tape, pressure transducer, etc.)

Well status (pumping, recently pumped, etc.)

Water level accuracy (to nearest foot, tenth of foot, etc.)

Description of the measuring point (top of casing, sounding tube, etc.)

Measuring point elevation above or below land surface to the nearest 0.1 foot

Land surface elevation at the well head to the nearest foot.

Static water level below measuring point to the nearest 0.1 foot.

**Department of Health Requirements**

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 Southwest Drinking Water Operations, 243 Israel Road S.E., PO Box 47823, Tumwater, WA 98504-7823, (360) 236-3030.

**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.

**Proof of Appropriation**

The water right holder shall file the notice of Proof of Appropriation of water (under which the certificate of water right is issued) when the permanent distribution system has been constructed and the quantity of water required by the project has been put to full beneficial use. The certificate will reflect the extent of the project perfected within the limitations of the superseding permit. Elements of a proof inspection may include, as appropriate, the source(s), system instantaneous capacity, beneficial use(s), annual quantity, place of use, and satisfaction of provisions.

**Schedule and Inspections**

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.

**Real Estate Excise Tax**

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

**Findings of Facts**

Upon reviewing the investigator's report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I 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 to point(s) of withdrawal, place of use and purpose under Change Application No. CG2-27079C subject to existing rights and the provisions specified above.

You have a right to appeal this decision. To appeal this you must:

- File your appeal with the Pollution Control Hearings Board within 30 days of the "date of receipt" of this document. Filing means actual receipt by the Board during regular office hours.

- Serve your appeal on the Department of Ecology within 30 days of the “date of receipt” of this document. Service may be accomplished by any of the procedures identified in WAC 371-08-305(10). “Date of receipt” is defined at RCW 43.21B.001(2).

Be sure to do the following:

- Include a copy of this document that you are appealing with your *Notice of Appeal*.
- Serve and file your appeal in paper form; electronic copies are not accepted.

**1. To file your appeal with the Pollution Control Hearings Board**

Mail appeal to:

OR

Deliver your appeal in person to:

The Pollution Control Hearings Board  
PO Box 40903  
Olympia WA 98504-0903

The Pollution Control Hearings Board  
4224 – 6th Ave SE Rowe Six, Bldg 2  
Lacey WA 98503

**2. To serve your appeal on the Department of Ecology**

Mail appeal to:

OR

Deliver your appeal in person to:

The Department of Ecology  
Appeals & Application for Relief Coordinator  
P.O. Box 47608  
Olympia WA 98504-7608

The Department of Ecology  
Appeals & Application for Relief Coordinator  
300 Desmond Dr SE  
Lacey WA 98503

**3. And send a copy of your appeal to:**

Thomas Loranger  
Section Manager  
Water Resources Program -- Department of Ecology  
Southwest Region  
P.O. Box 47775  
Lacey WA 98504-7775

*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 Lacey, Washington, this 9<sup>th</sup> day of June 2010.

  
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Thomas Loranger  
Water Resources Section Manager  
Southwest Region

**INVESTIGATOR'S REPORT**

Mike Gallagher, Department of Ecology  
Water Right Control Number CG2-27079

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**BACKGROUND**

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Description and Purpose of Proposed Change

Firgrove Mutual Water Company seeks to change the point of withdrawal of the Meridian Greens Water Right (CG2-27079) to Well 20 of the Firgrove Mutual Water District.

Firgrove Mutual Water District also seeks to change the purpose of use of water right G2-27027C from Irrigation (May 1 – Oct. 1) to Multiple Domestic Supply (Seasonal).

Attributes of the Existing Water Right and Proposed Change

Attributes	Existing	Proposed
<b>Name</b>	Meridian Greens Inc	Firgrove Mutual Water Co Inc
<b>Priority Date</b>	03/23/1987	
<b>Change Application Date</b>		12/17/07
<b>Instantaneous Quantity</b>	100 gpm	100 gpm
<b>Annual Quantity</b>	30 af/yr	23.40 af/yr
<b>Purpose of Use</b>	Irrigation	Multiple/Domestic Supply
<b>Period of Use</b>	May 1 – Oct. 1	May 1 to October 1
<b>Place of Use</b>	Former Meridian Greens Golf Course	Area served by Firgrove Mutual Water District

Firgrove Well 20 is located approximately 3000 feet west of the location of the former Meridian Greens Well. Both the former Meridian Greens well and the current Firgrove Well 20 withdraw groundwater from the same aquifer.

Proposed Sources of Withdrawal or Diversion

Source Name	Parcel	Well Tag	Tw	Rng	Sec	QQ Q	Latitude	Longitude
FIRGROVE WELL 20	0419166007	ABE-834	19N	04E	16	SW NE	47.13614	-122.313902

Existing Sources of Withdrawal or Diversion

Source Name	Parcel	Well Tag	Tw	Rng	Sec	QQ Q	Latitude	Longitude
MERIDIAN GREENS WELL	0419161071	Decomm issioned	19N	04 E	16	SW NE	47.135191	-122.301178

Legal Requirements for Proposed Change

The following is a list of requirements that must be met prior to authorizing the proposed change in CG2-27079:

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## Public Notice

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Public Notice was published two times in the Puyallup Herald – a weekly news paper with a circulation of over 17,000 copies. Publication occurred twice, commencing on May 20<sup>th</sup>, 2009 and ending on May 27<sup>th</sup>, 2009.

## State Environmental Policy Act (SEPA)

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

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

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

## Water Resources Statutes and Case Law

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

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

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

- (a) The additional or replacement well taps the same body of public ground water as the original well. RCW 90.44.100(2)(a),
- (b) Where a replacement well is approved, the user must discontinue use of the original well and properly decommission the original well. RCW 90.44.100(2)(b),

- (c) Where an additional well is constructed, the user may continue to use the original well, but the combined total withdrawal from all wells shall not enlarge the right conveyed by the original permit or certificate. RCW 90.44.100(2)(c),
- (d) Other existing rights shall not be impaired. RCW 90.44.100(2) (d).

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

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

## **INVESTIGATION**

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### **History of Water Use**

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Firgrove Mutual Water Company is a public water purveyor licensed under Washington State Department of Health (DOH) water system identification number 25200M. Firgrove is organized as a nonprofit corporation registered in the State of Washington. Ownership is held jointly by each of the property owners receiving water from the company. Policy is determined by the Board of Trustees, which consists of five members who are elected by owners at an annual meeting. The Board hires a General Manager who is responsible for overseeing and directing the daily management and operation of the company. Firgrove contracts as necessary with local professionals for services including legal counsel, engineering, accounting, planning and consulting.

Firgrove was formed in 1952 to supply reliable, high quality potable, irrigation and fire protection water to its members. Membership has grown steadily since 1952 to 1980 and more rapidly thereafter. In 1977, membership included 662 members. In March 2001, membership dramatically expanded to over 5600 members. The sharp rise of members since the 1980's is due to the increased urbanized nature of the service area. Single family homes are still the dominant service, but other water system members include retail businesses, small-scale industries and multifamily dwellings.

Firgrove serves an area of approximately 6200 acres of land south of the City of Puyallup in an unincorporated area of central Pierce County. The current service area extends from 132<sup>nd</sup> Street East (northern boundary of service area) to 200<sup>th</sup> Street east (southern boundary of service area), and from 70<sup>th</sup> Avenue East (western boundary of service area) to 132<sup>nd</sup> Avenue East (eastern boundary of service area). Firgrove's service area straddles the boundary between Water Resource Inventory areas 10 (Puyallup/White) and 12 (Chambers/Clover). Both the former Meridian Greens well and Firgrove Well 20 are located in WRIA 10.

Meridian Greens is a former 9-hole golf course and driving range. The well that existed on the Meridian Greens property was a 400 foot deep well that provided water for irrigation of the golf course between May 1 and October 1. The well was permitted to withdraw groundwater from the Fredrickson Aquifer at a rate of 100 gallons per minute. The annual maximum withdrawal was for 30 acre-feet per year. This well was decommissioned in 2004. The former golf course and driving range have been replaced by a housing development.

The original water right at the Meridian Greens Golf Course was for irrigation use (May 1 to October 1). The water right was for 100 GPM with an annual limit of 30 acre-feet/year. This certificated water right had a priority date of March 23, 1987. According to Ecology Policy 1200 (Policy for the Evaluation of Changes to Water Rights), Ecology needs to consider any potential impairment to other water rights, any potential conflicts with existing laws and rules that would be a detriment to the public interest, and the historical use(s) of the existing water right. Ecology may change the season or period of use if the new use is does not impair existing rights and the net effect on streamflows and instream values are neutral or positive. Water right changes cannot result in enlargement of an existing water right. Additionally, Policy 1210 directs Ecology to calculate the amount of water available to add to a new purpose of use based on the annual quantity of water authorized for use under the water right, the amount of water put to beneficial use, the estimated return flow, and the annual consumptive quantity (which includes water transpired by plants at the place of use, the water that escapes from a reasonably efficient conveyance system, but does not become return flow and water that is contained within a product.

To conform with Policy 1210, Ecology uses the Washington Irrigation Guide to determine the annual consumptive quantity that is available for a water right transfer from an previous use if irrigation to a new use. Based on this application Ecology has determined the following:

**Consumptive Use Calculations**

	<b>Total Irrigation Requirement (TIR)<sup>b</sup></b> (CIR <sup>d</sup> ÷ Ea <sup>a</sup> )	<b>Consumptive Use(CU)<sup>c</sup></b> (TIR x Percent of Consumptive Use)	<b>Total Consumptive Use</b> (CU x Acres)
<b>Crop :</b> Pasture/Turf <b>System:</b> Lateral-Move Spray heads w/hose feed			
Area: 15.00 acres CIR: 1.38 ac-ft/ac Evap: 10% Ea: 75% Consumptive Use: 85%	1.38 ac-ft/ac ÷ 75% = 1.84 ac-ft/ac	1.84 × 85% = 1.56 ac-ft/ac	1.56 × 15.00 = 23.40 ac-ft
<b>Total Irrigation Requirement All Acres</b>	<b>27.60 ac-ft/year</b>	<b>Total Consumptive Use All Acres</b>	<b>23.40 ac-ft/year</b>

Notes: CIR, or Crop Irrigation Requirement, values are adopted from the Washington Irrigation Guide (WIG). WIG information on crop duties is used when the actual volume of water applied per acre is not known, or to assess whether actual use is reasonable for a given crop. Ea and Consumptive Use values are from *GUID-1210, Determining Irrigation Efficiency and Consumptive Use*.

<sup>a</sup>Application Efficiency (Ea): The ratio of the average depth of water infiltrated and stored in the root zone to the average depth of water applied, expressed as a percentage.

<sup>b</sup>Total Irrigation Requirement (TIR): Water supplied by irrigation to satisfy evapotranspiration, miscellaneous water requirements, and irrigation efficiency.

<sup>c</sup>Consumptive Use (CU): Consumptive use includes crop evapotranspiration, and water evaporated during irrigation applications (e.g. spray, canopy and wind losses).

<sup>d</sup>Crop Irrigation Requirement (CIR): Water supplied by irrigation to satisfy evapotranspiration that is not provided by water stored in the soil and precipitation.

Based on this calculation, the amount of water available for this transfer is 23.40 acre feet per year. This water is available for seasonal use only during the same timeframe as the May 1 – October 1 irrigation season as specified on the original Meridian Greens Certificate.

## Proposed Use

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### Measuring and Reporting Water Use

RCW 90.03.360 requires that the owner of any water diversion maintain substantial controlling works and a measuring device. It must be constructed and maintained to permit accurate measurement and practical regulation of the flow of water diverted. Technical requirements for the measuring and reporting of water use are described in WAC 173-173. This decision contains provisions requiring the measuring and reporting of the quantities of water withdrawn or diverted.

### Well Tags

WAC 173-160 contains requirements for well drillers, system operators and/or owners to tag new and existing wells with identification tags supplied by Ecology. The well identification program creates a standard system to identify all newly constructed or existing wells, so that property owners and various agencies can readily share well data. In addition, Ecology field staff use the well tag to identify the well. Accordingly, this decision contains provisions requiring each well to be tagged with a unique identification number. Firgrove Well 20 has Well Tag Number ABE-834 assigned to it.

Other Rights Appurtenant to the Place of Use

Source Name/ Number	Permit Certificate or Claim#	Priority Date	Purpose of Use	Qi (GPM) ADD	Qa (AFY) ADD	Qa (AFY) NA
Well 1	GWC 4701A	9/12/62	Municipal	76	121.6	-
Well (7)	GWC G2-20044	3/17/72	Comm. Domestic	300	45	-
Well 4	GWC G2-20775	02/16/73	Comm. Domestic	180	144	-
Well 3	GWC G2-20776	02/16/73	Comm. Domestic	70	56	-
A Well 6	GWC G2-21086	05/23/73	Comm. Domestic	60	48	-
Wells 5 & 10	GWC G2-24021	11/28/75	Municipal	525	565.4	34.6
Well 12	GWC G2-25669	08/15/80	Comm. Domestic	250	200	-
Well 7	GWC G2-25772	12/12/80	Comm. Domestic	400	339	45
Well 13	GWC G2-26506	03/27/84	Comm. Domestic	460	380	-
Well 14	GWC G2-27256	12/24/87	Municipal	255	204	-
Well 15	GWC G2-27497	03/16/89	Comm. Domestic	265	258	-
Well 16	GWC G2-27872	09/13/90	Comm. Domestic	200	160	-
Well 17	GWC G2-27871	09/13/90	Comm. Domestic	130	100	-
Well 18	GWC G2-27935	12/04/90	Multiple Domestic	900	-	300
Well 9/20	GWP G2-28161	05/24/91	Multiple Domestic	500	56	744 <sup>1</sup>
Well 19B	GWP G2-28312	10/21/91	Multiple Domestic	160	-	54
Well 21	GWP G2-29345	01/22/96	Municipal	800	-	800 <sup>2</sup>
Well 22	GWP G2-29346	01/22/96	Municipal	500	-	500 <sup>3</sup>
	Total			<b>6,031</b>	<b>2,677.0</b>	<b>2,477.6</b>

Hydrologic/Hydrogeologic Evaluation.

***Geologic Setting***

The geology of the service area is principally glacial outwash. The topography ranges from flat to rolling. The maximum elevation in the service area is 616 feet above MSL (measured by 1929 NGVD on USGS and Pierce County maps) and the lowest elevation is 360 feet above MSL.

The geology and landscape in central Pierce County formed as a product of at least six glacial advances and retreats taking place over the past 2.5 million years. These events resulted in a complex, and generally stratified, distribution of both glacial (consisting primarily of sands, and gravels) and non-glacial

<sup>1</sup> Non-additive quantities authorized by Temporary Use Authorization, dated February 26, 2010.

<sup>2</sup> Non-additive quantities authorized by Temporary Use Authorization, dated February 26, 2010.

<sup>3</sup> Non-additive quantities authorized by Temporary Use Authorization, dated February 26, 2010.

sediments (consisting primarily of cemented impervious materials). The glacial deposits are coarser grained and permeable, serving as the area's aquifers. The non-glacial deposits are finer grained and serve as aquitards and impede groundwater flow.

The United States Geological Survey report by Jones, et al., - Water-Resources Investigations Report 99-4013 (USGS-1999) defined the areas subsurface in terms of hydrogeologic units. This report describes the ground water hydrology of the Tacoma and Puyallup area. A hydrogeologic unit is a group of sediments deposited at about the same time and under similar geologic conditions. Hydrogeologic units have the same physical and hydrologic conditions. USGS (1999) identified ten hydrogeologic units in the Tacoma-Puyallup study area with the uppermost five hydrogeologic units consisting of three aquifers and two semi confining units.

The surface layer, often classified as "recessional glacial outwash deposits" (Qvr [Quaternary Vashon Recessional]), is the unit exposed on the ground surface. This unit consists mostly of Vashon recessional sands and gravels but also includes more recent surficial deposits and alluvium. In most places where this unit is saturated, it is the water table aquifer. The thickness of this unit ranges from a thin veneer to 100 feet (USGS 1999). In the general Firgrove area, the Qvr Unit is typically 25-50 feet thick. Shallow wells in the area tap water bearing zones within the Qvr Unit. These shallow wells are usually exempt wells that withdraw water for primarily domestic supply.

The second unit is classified as till or hardpan (Qvt [Quaternary Vashon Till]), and is the principal regional aquitard, separating the upper aquifers in the Qvr Unit from the aquifers below. The Qvt Unit consists of mostly clay, silt, and fine sand. The thickness of the Qvt Unit in the Firgrove service area ranges from 150 to 200 feet.

The third unit, referred to as Qc1 [Quaternary Confining Aquifer #1] in the USGS study, is often classified as "advance outwash deposits". This unit is generally a confined aquifer in the area that supports many of the area's deeper wells. Deposits within the Qc1 Unit are mostly stratified sand and gravel with thin, discontinuous layers of silt and clay. Lenses of till are scattered throughout the sequence. The Qc1 Unit is typically 25 to 125 feet thick in the Firgrove area and is often referred to as the Fredrickson Aquifer.

Below the Fredrickson Aquifer is the Qf1 [Quaternary Confining Layer #1] Unit. This unit consists mostly of clay, but can also contain alluvial and mudflow deposits. It can also contain lenses of sand and gravel (USGS 1999). In the Firgrove service area, this unit ranges in thickness from 50 to 150 feet. In other locations, this Unit is often referred to as the Kitsap Formation.

Beneath the Qf1 Unit is the Qc2 [Quaternary Confining Aquifer #2] Unit. This Unit is a confined aquifer and it consists largely of gravel and sand deposits, but can contain thin beds of silt and clay. In other locations, this Unit is often referred to as the Salmon Springs Drift Formation.

Recharge to all aquifers is by precipitation and vertical leakage. Because vertical groundwater flow is generally downward, all aquifers are hydraulically connected and can be considered the same source of public groundwater.

No significant natural barriers exist in the service area due to its location on a plateau and the absence of significant rivers and canyons. The general area is poorly to moderately drained with localized depressions fed by shallow perched groundwater with limited surface outlets. There are no significant streams or surface water bodies in the Firgrove service area.

Immediately beyond the Firgrove service area, major geographic landforms include the Puyallup River Valley to the east and north, the Kirby glacial meltwater channel to the south and the Clover glacial meltwater channel to the west. Both the Meridian Greens Well and the Firgrove Well 20 are located in WRIA 12 – the Chambers/Clover Basin, although regional groundwater also flows north and east towards WRIA 10 – the Puyallup /White Basin.

**Table 1. Firgrove Well 9 and Meridian Greens well construction details**

	Firgrove Well 20	Meridian Green s Well
Date Drilled	October 23, 1968	July 1, 1987 (decommissioned 2004)
Well head elevation (ft above mean sea level, msl)	455	460
Well diameter (inches, in)	12"	8"
Completed depth (ft below ground surface, bgs)	450'	400'
Perforations or screens (ft bgs)	Screen (8") 398' – 450' bgs	Perforations 375'-380' and 390' – 400'
Static water level (ft bgs)	286'	260'
Date measured	May 10, 1995	July 1, 1987
Pumping capacity (gpm)	550	200

## Impairment Considerations

### Impairment of Minimum Instream Flow Water Rights

The term "instream flow" is used to identify a specific stream flow (typically measured in cubic feet per second, or 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.

Minimum instream flows were established in 1988 through WAC 173-512-040, the Instream Resources Protection Program for the Chambers-Clover Creek Basin Water Resource Inventory Area (WRIA) 12. This WAC closes consumptive appropriations for several streams and lakes in the Basin. For groundwater withdrawals, the natural interrelationship of surface and groundwaters shall be fully considered in water allocation decisions to assure compliance with the intent of this chapter.

The nearest surface water body to Firgrove Well 20 is Clover Creek. Clover Creek originates at a spring located near the eastern boundary of Section 30, approximately 12,000 feet (2.25 miles) southwest of the Firgrove Well 20 location. According to WAC 173-512, Clover Creek, and all of its tributaries are closed to further consumptive appropriation. The Meridian Greens water right (March 23, 1987) (Certificate # G2-27079) predates the establishment of WAC 173-512.

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).

This water right change application will not impair any instream flows levels that are set in WAC 173-512 or WAC 173-510.

#### Impairment, Qualifying Ground Water Withdrawal Facilities, and Well Interference

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

Impairment is an adverse impact on the physical availability of water for a beneficial use that is entitled to protection i.e. water rights that are both senior and junior in priority to the right the applicant seeks to change.

Qualifying ground water withdrawal facilities are defined as those wells which in the opinion of the Department are adequately constructed. An adequately constructed well is one that (a) is constructed in compliance with well construction requirements; (b) fully penetrates the saturated thickness of an aquifer or withdraws water from a reasonable and feasible pumping lift (WAC 173-150); (c) the withdrawal facilities must be able to accommodate a reasonable variation in seasonal pumping water levels; and (d) the withdrawal facilities including pumping facilities must be properly sized to the ability of the aquifer to produce water.

Well interference may occur when several wells penetrate and withdraw ground water from the same aquifer. Each pumping well creates a drawdown cone. When several wells pump from the same aquifer, well density, aquifer characteristics, and pumping demand may result in individual drawdown cones that intersect and form a composite drawdown cone. At any point in an aquifer, the composite drawdown caused by pumping wells will be greatly influenced by the transmissivity (T) of the aquifer. In aquifers with high Ts, composite drawdown will generally be much less than in aquifers with similar

properties but with low Ts. Transmissivity is related to hydraulic conductivity (K) and the saturated thickness (b) of an aquifer by the relationship  $T=Kb$

An aquifer's hydraulic conductivity (K) is derived from the physical properties of both the fluid and geologic materials that form an aquifer. Once formed, an aquifer's saturated thickness (b) becomes important in evaluating its transmissivity. For regions of similar K in an aquifer, a large saturated thickness will result in a much higher T than a small saturated thickness. As a result, regions of similar K in an aquifer with a large saturated thickness will experience less composite drawdown or well interference than with a small saturated thickness.

Some conditions, however, will increase or steepen composite drawdown in an aquifer. For instance, where characteristics (such as very fine, clay-rich, or poorly sorted sediments) of an unconfined aquifer cause significant drawdown relative to the saturated thickness, the composite drawdown will increase as saturated thickness is reduced and T becomes smaller. Additionally, in regions where negative or no-flow boundaries occur, such as near the edges of a valley fill aquifer where it is bounded by bedrock, composite drawdown will be steeper than in the central part (generally the greatest thickness region) of the aquifer. Consequently, it is commonly understood that the greatest composite drawdown or well interference is more likely to occur in regions of low transmissivities, thin saturated thicknesses and near negative or no-flow boundaries than in regions of high transmissivities, large saturated thicknesses, and away from negative or no-flow boundaries.

Ecology's Water Rights Tracking System (WRTS) database was queried to determine the number of water right certificates, permits, claims, and water wells within a 5000 foot radius of Firgrove Well 20. The search identified eight groundwater certificates, permits and claims. Details of these certificates are summarized in the Table below. All wells appear to be drawing water from the Fredrickson Aquifer. It is not known if any wells fully penetrate the aquifer's thickness. Of the four claims within 5000 feet, three do not have an associated well log on file with Ecology. The fourth claim had its well decommissioned in 2000.

Table 2.

**Summary of certificates, claims and permits from within a 5000 foot radius of Firgrove Well 20.**

<i>WRC #</i>	<i>Name</i>	<i>Priority date</i>	<i>Purpose of use</i>	<i>gpm</i>	<i>ac-ft/yr</i>	<i>Distance from Firgrove Well 9 (ft)</i>	<i>Well depth (ft)</i>	<i>Water bearing unit</i>
G2-29217	Fruitland Mutual	4/21/95	Multiple Domestic	200	200	5000	498	Layer A
G2-026036CL	Simms, Kent	Claim 3/8/73	Domestic Supply			3000	?	Layer A
G2-038862CL	Ockfen, A.L.	Claim 9/10/73	Domestic Supply			1000	?	Layer A
G2-29346-P (well 22)	Firgrove Mutual	1/22/96	Municipal-Additive	500	500 (Supp.)	4500	350	Layer A Layer C
G2-061025CL	Hurst, C.	Claim 2/11/74	Domestic, Stock			3000	?	Layer A
G2-27497CWRIS (Well 15)	Firgrove Mutual	3/16/89	Multiple Domestic	265	258	2250	374	
G2-27872-C (Well 16)	Firgrove Mutual	9/13/90	Multiple Domestic	200	160	5000	261	

**Public Interest Considerations**

Firgrove Well 20 is operated by the Firgrove Mutual Water District, a water purveyor subject to metering and reporting, and to water use and efficiency requirements. The change will not cause new impacts to surface water or groundwater. Approval of this change is not detrimental to the public interest and is consistent with WAC 173-512 and RCW 90.54.

The Firgrove Mutual Water District is a designated water purveyor for this area. Firgrove Mutual's Water System Plan dated 2002 was approved by the Department of Health and addresses future service to customers in their service area. An updated water system plan is expected later in 2010.

**RECOMMENDATIONS**

**Consideration of Protests and Comments**

The Department of Ecology did not receive any protests or comments in response to the public notice that appeared in the *Puyallup Herald*.

## **CONCLUSIONS**

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Approving this change application is not detrimental to the public interest and is consistent with WAC 173-510 and WAC 173-512 and RCW's 90.03, 90.44 and 90.54. I find that:

- Groundwater is available from the source in question.
- Multiple domestic supply is a beneficial use of water.
- The proposed change of the point of diversion will not impair existing rights.
- The proposed change will not be detrimental to the public welfare.
- Firgrove Well 20 is completed in the same aquifer as the former-Meridian-Greens well.
- The change of the original Meridian Greens groundwater point of withdrawal to the Firgrove Well 20 groundwater point of withdrawal will not enlarge the underlying water right.

## **RECOMMENDATIONS**

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Based on the above investigation and conclusions, I recommend that the request for change to CG2-27079 be approved in the amounts and limits listed below, subject to the provisions beginning on Page 2, et seq.

### Purpose of Use and Authorized Quantities

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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:

100 gpm  
23.40 acre-feet per year  
Multiple domestic supply

### Point of Withdrawal

SW¼, NW¼, Section 16, Township 19 North, Range 4 E W.M. – from the Fredrickson Aquifer.

### Place of Use

As described on Page 1 of this Report of Examination.

*Michael J. Gallagher*  
Michael J. Gallagher/LHG #1209

*6/8/10*

Report Writer

Date

*If you need this publication in an alternate format, please call Water Resources Program at (360) 407-6600. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.*

**References**

USGS, 1999, Ground-Water Hydrology of the Tacoma-Puyallup Area, Pierce County, Washington, Water-Resources Investigations Report 99-4013.

Firgrove Mutual Water Company, December 2002, Water System Plan.

Department of Ecology Water Resources File # CG2-27079 – Firgrove Mutual Water