

**STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY**

**REPORT OF EXAMINATION  
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON**

- Surface Water** (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)
- Ground Water** (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

<small>PRIORITY DATE</small> February 2, 1999	<small>APPLICATION NUMBER</small> G2-29831	<small>PERMIT NUMBER</small>	<small>CERTIFICATE NUMBER</small>
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<small>NAME</small> Washington Water Service			
<small>ADDRESS (STREET)</small> 6800 Meridian Road SE	<small>(CITY)</small> Olympia	<small>(STATE)</small> Washington	<small>(ZIP CODE)</small> 98513-6302

**PUBLIC WATERS TO BE APPROPRIATED**

<small>SOURCE</small> Well 1 (AGN786) & Well 2 (AGN787)
<small>TRIBUTARY OF (IF SURFACE WATERS)</small>

<small>MAXIMUM CUBIC FEET PER SECOND</small>	<small>MAXIMUM GALLONS PER MINUTE</small> 95	<small>MAXIMUM ACRE FEET PER YEAR</small> 10
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<small>QUANTITY, TYPE OF USE, PERIOD OF USE</small> 10 Acre-feet per year	<small>Municipal supply (25 Connections)</small>	<small>Year-round, as needed</small>
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**LOCATION OF DIVERSION/WITHDRAWAL**

<small>APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL</small> Well 1: 1800 feet East and 70 feet North of the Southwest quarter corner of Section 25. Well 2: 1800 feet East and 85 feet North of the Southwest quarter corner of Section 25.
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<small>LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)</small> SE <sup>1</sup> / <sub>4</sub> SW <sup>1</sup> / <sub>4</sub>	<small>SECTION</small> 25	<small>TOWNSHIP N.</small> 19	<small>RANGE, (E. OR W.) W.M.</small> 2	<small>W.R.I.A.</small> 13	<small>COUNTY</small> Thurston
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**RECORDED PLATTED PROPERTY**

<small>LOT</small>	<small>BLOCK</small>	<small>OF (GIVE NAME OF PLAT OR ADDITION)</small>
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**LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED**

Tract A of Belwood Park as recorded in file No. 843169, Volume 17, Page 27 of Plats, Thurston County.

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DESCRIPTION OF PROPOSED WORKS

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Well 1: 7½ hp pump

Well 2: 1 hp pump

Water is pumped to one 650 gallon pressure tank then distributed. Water from Well 2 is chlorinated.

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DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	Completed	In-Use

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REPORT

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**BACKGROUND:**

On January 25, 1999, Gerald R. Petersen, in behalf of Washington Water Service, filed an application to withdraw public groundwater from two wells. The amount requested was 95 gallons per minute (gpm) and an annual quantity of 10.5 acre-feet (ac-ft) per year for community domestic supply. This proposed withdrawal is located in the Deschutes River Watershed in Water Resources Inventory Area (WRIA) 13.

Public notice was published March 5 and March 12, 1999 in the Daily Olympian. No letters of protest were received.

**Based on the provisions of Chapters 90.03 and 90.44 Revised Code of Washington (RCW), I recommend approval of this application.**

**INVESTIGATION:**

In consideration of this application, a field investigation was conducted on February 26, 2003 by Tammy Hall. Other investigations included a review of recorded water rights, registered claims, water well reports, geological information, information submitted with the application, and additional information provided by the applicant.

The project name is "Belwood Park". The subject site is located on the western portion of the Dickenson Point Peninsula near Gull Harbor, within less than one mile of Budd Inlet of Puget Sound. The Dickenson Point Peninsula forms roughly the western half of the Henderson Inlet subbasin, a portion of the Deschutes River Watershed, in WRIA 13. The western portion of the peninsula is drained primarily by several small streams that empty directly into Budd Inlet. The eastern half of the peninsula is drained primarily by Woodward Creek and several small streams that discharge to Henderson Inlet, to the east. Henderson and Budd Inlets are two of the five inlets that form the terminus of Puget Sound.

The land surface is generally flat or gently rolling and terminates in steep bluffs which form the shoreline. Elevations are only as high as 150 feet above mean sea level (msl) and the area is generally wooded. Land use surrounding the project site is primarily semi-rural. Development in the area consists of single family residences, with clusters of medium density developments, and some limited agriculture, consisting mostly of vegetable gardens and pasture for livestock. Lots range from several acres to approximately ¼ acre in size.

Belwood Park Water System is a Group A water system, supplying water to 25 connections. The system was originally designed in 1971 and approved by the Department of Health to provide limited rural domestic service to the residential users in the plat of Belwood Park.

General Area Hydrogeology

*The presented geologic/ hydrogeologic information was extracted from a Department of Ecology Memorandum dated July 15, 2003 prepared by Tammy Hall, licensed hydrogeologist at Department of Ecology's Southwest Regional Office.*

The presented geologic/ hydrogeologic information was compiled from the following references:

- Drost, B.W., Turney, G.L., Dion, N.P., and Jones, M.A., 1999, *Conceptual Model and Numerical Simulation of the Ground-Water-Flow System in the Unconsolidated Sediments of Thurston County, Washington*: US Geological Survey Water Resources Investigations Report 99-4165.
- Drost, B.W., Turney, G.L., Dion, N.P., and Jones, M.A., 1998, *Hydrology and Quality of Ground Water in Northern Thurston County, Washington*: US Geological Survey Water-Resources Investigations Report 92-4109 (revised).

Repeated glacial advances and retreats formed the resulting geology of the Puget Sound area. The thickness of these unconsolidated deposits in some areas in Thurston County can exceed 2,000 feet. These unconsolidated deposits may be glacial or non-glacial in origin. The non-glacial deposits were left by streams carrying meltwater or by water that was impounded behind the masses of ice. Glacial deposits, described as tills or hardpan, were deposited directly by the glacier, itself.

Glacial aquifers may be composed predominately of sand and (or) gravel, but may also contain relatively thin and discontinuous lenses of clay and (or) silt. In addition, confining layers composed predominately of silt and (or) clay, may also contain local lenses of coarse sand or gravel. The deposits are referred to as "geohydrologic" units because they were identified using a combination of geologic (primarily grain size and sorting) and hydrologic (hydraulic conductivity and hydraulic continuity) properties.

Vashon till and possibly some older tills (Qvt) is the geohydrologic unit exposed at the land surface in the project area. The unit Qvt, considered a poor source of water, serves as a confining bed. The upper part of the unit is less compacted and can contain thin layers of relatively clean sand that will support some low producing wells. Qvt is generally between 25 and 50 feet in thickness but locally may be as thick as 150 feet.

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The Vashon advance outwash, represented as geohydrologic unit Qva. The Qva is generally between 15 and 35 feet thick, but locally may exceed 150 feet in thickness. The top of the Qva generally occurs between 50 and 200 feet above sea level.

The Kitsap Formation (Qf) underlies the Qvt in the project area. The Kitsap Formation is composed of predominately poorly permeable materials, but thin lenses of sand and gravel can yield relatively small quantities of water suitable for domestic use. It is also effective in retarding the downward percolation of groundwater into the underlying units and has the ability to act as a confining layer to those materials lying below it. Qf is generally between 15 and 75 feet thick.

Underlying the Qf are coarse-grained Salmon Springs (?) Drift, penultimate deposits, and other deposits (Qc). The Qc unit is one of the most widely used aquifers in Northern Thurston County. Groundwater in this unit generally occurs under confined conditions. Where the entire thickness of Qc has been penetrated, it is generally about 30 feet thick.

The unconsolidated and undifferentiated sediments beneath Qc are designated as geohydrologic unit TQu. These deposits are primarily thought to be older than Salmon Springs Drift but may also contain some younger materials. This unit is heterogeneous and wells utilizing water from this unit tap several different water-bearing layers that are irregularly distributed both laterally and vertically. Groundwater occurs generally under confined conditions.

Horizontal flow directions of groundwater within aquifers is generally from areas of higher head to areas of lower head, moving toward marine water bodies and surface drainage channels. Water levels in Qva are generally higher than Qc, indicating that water flows vertically downward and passes through Qf and the TQu before it discharges to marine water in the project area.

### Hydrologic Analysis

Well logs were provided by the applicant. The Department of Health has authorized withdrawals 60 and 20 gpm from Wells 1 and 2, respectively. Following is a summary of information on both wells:

	Well No. 1	Well No. 2
Date drilled:	Oct-Nov 1970	Oct 1985
Driller:	Carrs Drilling Co.	Roy McGill Drilling
Total depth:	217 feet	72 feet
Well diameter:	8 inches	8 inches
Screened interval:	197-207 feet bgs	61 to 71 feet bgs
Static water level:	150 feet bgs	39 feet bgs
Pumping water level:	168 feet bgs (at 150 gpm)	56 feet bgs (at 20 gpm)
Pump size:	7.5 h.p.	1 h.p.

The system was designed to serve connections utilizing a single well, but due to high levels of manganese and iron, Well No. 2 was drilled. Although both wells are in service today, the applicant is presently making modifications to Well No. 1 to incorporate a treatment system to address the high iron and manganese levels, after which Well No. 2 will be used on a standby basis. Once the treatment system is fully operational, Well No. 1 will be re-equipped with two pumps of lesser capacity for reliability purposes. Presently, the water system has no storage capacity requirements. Currently water pumped from Well No. 2 is being chlorinated.

According to information provided in Drost (1998), Well No. 1 is likely drawing water from the TQu hydrologic unit. Well No. 2 is likely drawing water from the Qva. Both Belwood Park wells intercept water that ultimately discharges to marine water.

In general, chloride concentrations in Thurston County are relatively low, although small pockets of seawater intrusion occurs in localized areas. Information in Drost (1998) gives chloride concentrations for wells in the area, within a short distance of marine water. All reported chloride concentrations are less than 2.4 milligrams per liter (mg/l), well below concentrations that indicate seawater intrusion (SWI). Due to the distance of these wells from marine water (more than ½ mile) and the elevation of the water table with relation to the distance from marine water, neither well appears to be a high risk area for SWI.

### Effect on Existing Water Rights

The nearest groundwater certificate, located less than ½ mile west of the Belwood Park wells, was issued to Charles and Elaine Merrilees on August 5, 1988 and authorizes withdrawal of 25 gpm and for 4 ac-ft per year for group domestic supply for 6 connections. The well was drilled in 1981 and has a completed depth of 74 feet bgs. The well is screened from 69 to 74 feet bgs and has a static water level of 40 feet bgs (measured July 1981). Based on information in Drost (1989), this well is likely drawing water from the same geohydrologic unit as the Belwood Park Well No. 2.

The following additional water rights, claims, and well reports are on file with Ecology and may be within a one-mile radius from the Belwood Park Well Nos. 1 and 2.

- Eleven ground water right certificates have been issued for group domestic supply, single domestic supply, irrigation, and stock watering. The combined withdrawal rate is 748 gpm and 176.9 ac-ft of water per year.
- Six surface water rights have been issued authorizing a combined instantaneous diversion of 0.385 cubic feet per second (cfs). Water is used mostly for single domestic use and irrigation.
- Two hundred and two ground water claims and surface water claims are registered that may be located within the one mile radius.
- Ecology's well log data listed approximately 157 wells within a mile of the Belwood Park wells. Most of these wells appear to be single domestic and range in depth from 39 feet bgs to 360 feet bgs. The majority of these wells appear to be utilizing water from less than 150 feet bgs.

It is not anticipated that withdrawals from the Belwood Park wells will impact nearby water users. The Belwood Park water system has been operating since the early 1970's without any negative affects to neighboring water users.

## Report Continued

### Effects to Surface Water

The Belwood Park wells intercept water that would otherwise discharge Puget Sound. As such, withdrawals from this well are not expected to affect surface waters in the WRIA.

### WATER DEMAND:

The water demand for 25 single family residences should not exceed 10 ac-ft per year, or approximately 0.4 ac-ft per year per residence. The lots in Belwood Park are smaller than average, only about ¼ acre in size. Because of the small lot size, water use for irrigation of individual lots is minimal. This system is approved for 26 connections based on system capacity; however, the system currently serves 25 connections. Washington Water Services intends on purchasing the last undeveloped lot to site their water treatment system and does not intend to add a 26<sup>th</sup> connection. Both wells and each of the 25 connections are metered for water usage.

The applicant requested an instantaneous amount of 95 gpm. Although, the Washington Department of Health Division of Drinking Water currently allows withdrawal rates of 60 and 20 gpm from Wells 1 and 2, respectively, based on the information provided by the applicant, it appears that these wells can easily produce the requested 95 gpm. However, the pumping rate from both wells will need to be managed so that the combined withdrawal rate from both wells does not exceed 95 gpm.

### FINDINGS AND CONCLUSIONS:

- Based on the hydrogeology of the area and the proximity of the well to Puget Sound, these wells draw water from aquifers which ultimately discharge to marine water. As such, this withdrawal will not impair surface water flows in the Deschutes River Watershed.
- The water will be put to beneficial use in accordance with Chapter 90.54.020(1) RCW.
- The issuance of this water right will not be detrimental or impair any senior water right holders. This water system has been operating since 1971 without any detrimental effects.

### RECOMMENDATIONS:

Based on the provisions of Chapters 90.03 RCW and 90.44 RCW, I find that water is available for appropriation from the source in question and that the appropriation would not impair existing rights. I recommend the issuance of a water right permit in the amount of 95 gpm and 10 ac-ft per year for municipal supply for 25 connections. Multiple domestic supply has been defined as municipal supply under SB 1338. The time of use is year-round as needed.

### PROVISIONS:

"The pumping rate from both wells will need to be managed so that the combined withdrawal rate from both wells does not exceed 95 gpm."

The water appropriated under this application will be used for public water supply. The State Board of Health rules require public water supply owners to obtain written approval from the Office of Water Supply, Department of Health, 1112 SE Quince Street, PO Box 47890, Olympia, Washington 98504-7890, prior to any new construction or alterations of a public water supply system.

The applicant is advised that the quantity of water allocated by this permit may be reduced at the time of final certification to reflect system capacity and actual usage.

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", Chapter 173-173 WAC.

Water use data shall be recorded monthly. The maximum rate of diversion/withdrawal and the annual total volume shall be submitted to Ecology by January 31st of each calendar year.

The following information shall be included with each submittal of water use data: owner, contact name if different, mailing address, daytime phone number, WRIA, Permit/Certificate/Claim No., source name, annual quantity used including units, maximum rate of diversion including units, monthly meter readings including units, peak monthly flow including units, Department of Health WFI water system number and source number(s), purpose of use, well tag number and period of use. 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".

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:

1. Unique Well ID Number
2. Measurement date and time
3. Measurement method (air line, electric tape, pressure transducer, etc.)

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4. Well status (pumping, recently pumped, etc.)
5. Water level accuracy (to nearest foot, tenth of foot, etc.)
6. Description of the measuring point (top of casing, sounding tube, etc.)
7. Measuring point elevation above or below land surface to the nearest 0.1 foot
8. Land surface elevation at the well head to the nearest foot.
9. Static water level below measuring point to the nearest 0.1 foot.

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.

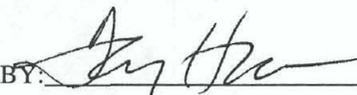
Installation and maintenance of an access port as described in Chapter 173-160 is required. An air line and gauge may be installed in addition to the access port.

The subject wells have been tagged with unique well identification numbers. These unique well numbers shall remain attached to the wells, please reference this number when submitting data.

The Water Resources Act of 1971, Chapter 90.54 RCW specifies certain criteria regarding utilization and management of the waters of the State in the best public interest. Favorable consideration of this application has been based on sufficient waters available, at least during portions of the year. However, it is pointed out to the applicant that this use of water may be subject to regulation at certain times, based on the necessity to maintain water quantities sufficient for preservation of the natural environment.

Issuance of this water right is subject to the implementation of the minimum requirements established in the Conservation Planning Requirements, Guideline and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, July 1994, and as revised.

Under RCW 90.03.005 and 90.54.020(6), conservation and improved water use efficiency must be emphasized in the management of the State's water resources, and must be considered as a potential new source of water. Accordingly, as part of the terms of this water right, the applicant shall prepare and implement a water conservation plan approved by Department of Health. The standards for such a plan may be obtained from either the Department of Health or the Department of Ecology.

REPORTED BY:  Date: August 15, 2003

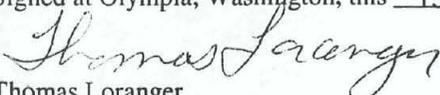
The statutory permit fee for this application is \$10.00.

FINDINGS OF FACT AND DECISION

Upon reviewing the above report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I find water is available for appropriation and the appropriation as recommended is a beneficial use and will not be detrimental to existing rights or the public welfare.

Therefore, I ORDER a permit be issued under Ground Water Application Number G2-29831, subject to existing rights and indicated provisions, to allow appropriation of public ground water for the amount and uses specified in the foregoing report.

Signed at Olympia, Washington, this 15th day of August, 2003.

  
Thomas Loranger  
Water Resources Supervisor  
Southwest Regional Office