

State of Washington
**REPORT OF EXAMINATION
FOR WATER RIGHT APPLICATION**

PRIORITY DATE
12/21/2012

WATER RIGHT NUMBER
G1-28746

MAILING ADDRESS
Water District 19
PO Box T
17630 100th Avenue SW
Vashon, WA 98070

SITE ADDRESS (IF DIFFERENT)

Quantity Authorized for Withdrawal or Diversion

WITHDRAWAL OR DIVERSION RATE
20

UNITS
GPM

ANNUAL QUANTITY (AF/YR)
1.16

Purpose

| PURPOSE | WITHDRAWAL OR DIVERSION RATE | | | ANNUAL QUANTITY (AF/YR) | | PERIOD OF USE (mm/dd) |
|------------------|------------------------------|--------------|-------|-------------------------|--------------|--------------------------|
| | ADDITIVE | NON-ADDITIVE | UNITS | ADDITIVE | NON-ADDITIVE | |
| Municipal Supply | 20 | | GPM | 1.16 | | 01/01 - 12/31 |

| ADDITIVE | IRRIGATED ACRES | | PUBLIC WATER SYSTEM INFORMATION | |
|----------|-----------------|--|---------------------------------|-------------|
| | NON-ADDITIVE | | WATER SYSTEM ID | CONNECTIONS |
| NA | | | 38900R | 1,747 |

Source Location

| COUNTY | WATERBODY | TRIBUTARY TO | WATER RESOURCE INVENTORY AREA |
|--------|-------------|--------------|-------------------------------|
| King | Groundwater | NA | 15-Kitsap |

| SOURCE FACILITY/DEVICE | PARCEL | WELL TAG | TWN | RNG | SEC | QQ Q | LATITUDE | LONGITUDE |
|------------------------|-----------|----------|-----|-----|-----|------|---------------------|----------------------|
| Well | 88760TR-A | AFA518 | 23N | 03E | 31 | NESE | 47.435 ⁰ | 122.465 ⁰ |

Datum: NAD83/WGS84

Place of Use (See Attachment 1)

The service area for Water District 19 as described in the most recent Water System Plan approved by the Department of Health as shown in Attachment 1 showing the location of the authorized place of use and point of withdrawal.

Proposed Works

An existing well, 200 feet deep with a 6-inch casing and a ½ horsepower (HP) pump in the well at a depth of 67 feet, discharging water into a 1,000 gallon reservoir. A 2 HP transfer pump draws water out of the 1,000 gallon reservoir and discharges into four 86-gallon pressure tanks which distributes water to the system through a 2-inch pipeline.

Development Schedule

| BEGIN PROJECT | COMPLETE PROJECT | PUT WATER TO FULL USE |
|---------------|------------------|-----------------------|
| Started | Completed | November 30, 2014 |

Measurement of Water Use

How often must water use be measured?

Weekly

How often must water use data be reported to Ecology?

Upon Request by Ecology

What volume should be reported?

Total Annual Volume

What rate should be reported?

Annual Peak Rate of Withdrawal (gpm)

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.

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 and ensure that your water source is not impaired by future withdrawals, static water levels should be measured and recorded monthly using a consistent methodology. Static water level is defined as the water level in a well when no pumping is occurring and

the water level has fully recovered from previous pumping. Static water level data should include the following elements:

- Unique Well ID Number

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 Northwest Drinking Water Operations, 20435 72nd Avenue S, Suite 200, K17-12, Kent, WA 98032-2358, (253) 396-6750.

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 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.

Findings of Facts

Upon reviewing the investigator's report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I concur with the investigator that water is available from the source in question; that there will be no impairment of existing rights; that the purpose(s) of use are beneficial; and that there will be no detriment to the public interest.

Therefore, I ORDER approval of Application No. G1-28746, subject to existing rights and the provisions specified above.

Your Right To Appeal

You have a right to appeal this Order to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this Order. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do the following within 30 days of the date of receipt of the Order.

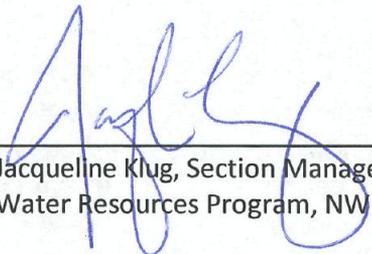
File your appeal and a copy of this Order with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.

- Serve a copy of your appeal and this Order on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

- You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

| Street Addresses | Mailing Addresses |
|--|---|
| Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503 | Department of Ecology Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608 |
| Pollution Control Hearings Board 1111 Israel RD SW Ste 301 Tumwater, WA 98501 | Pollution Control Hearings Board PO Box 40903 Olympia, WA 98504-0903 |

Signed at Bellevue, Washington, this 17 day of January, 2014.



 Jacqueline Klug, Section Manager
 Water Resources Program, NWRO

For additional information visit the Environmental Hearings Office
 Website: <http://www.eho.wa.gov>. To find laws and agency rules visit the Washington State Legislature
 Website: <http://www1.leg.wa.gov/CodeReviser>.

INVESTIGATOR'S REPORT

Application for Water Right – Water District 19

Water Right Control Number G1-28746

Ria Berns, Department of Ecology Contact

BACKGROUND

Cost Reimbursement

This application is being processed under a cost reimbursement agreement between the applicant and the Department of Ecology (Ecology). This report has been prepared by HDR Engineering under a contract and Work Assignment with Ecology.

An application to appropriate public ground water was submitted to Ecology on December 21, 2012 by Water District 19 (District) of Vashon, WA, for 20 gallons per minute (gpm) and 1.16 acre-feet per year (AF/YR) for municipal supply. The application was accepted by the Ecology Northwest Regional Office and was assigned as Ground Water Application G1-28746.

HDR Engineering was selected by Ecology to perform the Phase I and II services, and the Work Assignment for this project was signed by Ecology on July 29, 2013.

Description and Purpose of Proposed Application

This application was filed by the District for an existing well which has been utilized by the Vashon Meadows Homeowners Association as an exempt well for supplying domestic water to six single family residences located approximately one half mile south of the community of Vashon. The District acquired the existing well and related water system from the Vashon Meadows Homeowners Association through an agreement signed by the Vashon Meadows Homeowners Association on December 17, 2012.

This application was filed by the District under a provision in RCW 90.44.050, which provides that a party has the option of filing an application under the ground water permitting exemption for withdrawals not exceeding 5,000 gallons per day.

The District is intending to add this well and the associated water system to its' existing municipal water system to be used as an additional source of municipal water supply for their existing service area.

Attributes of Ground Water Application G1-28746 are shown in the following tables.

Table 1. Application Summary

| Attributes | Summary |
|-------------------------------|---|
| Name | Water District 19 |
| Priority Date | December 21, 2012 |
| Instantaneous Quantity | 20 gpm |
| Annual Quantity | 1.16 AF/YR |
| Purpose of Use | Municipal supply |
| Period of Use | Year-round |
| Place of Use | Service area for Water District 19 as described in the most recent Water System Plan approved by the Department of Health |

Table 2. Proposed Source of Withdrawal

| Source Name | Parcel | Well Tag | Twn | Rng | Sec | QQ Q | Latitude | Longitude |
|--------------------|---------------|-----------------|------------|------------|------------|-------------|---------------------|----------------------|
| Well | 888760TR-A | AFA518 | 23N | 03E | 31 | NE SE | 47.435 ⁰ | 122.465 ⁰ |

Legal Requirements for Approval of Appropriation of Water

Chapters 90.03 and 90.44 RCW authorize the appropriation of public water for beneficial use and describe the process for obtaining water rights. Laws governing the water right permitting process are contained in RCW 90.03.250 through 90.03.340 and RCW 90.44.050. In accordance with RCW 90.03.290, determinations must be made on the following four criteria in order for an application for water rights to be approved:

- Water must be available
- There must be no impairment of existing rights
- The water use must be beneficial
- The water use must not be detrimental to the public interest

This report serves as the written *findings of fact* concerning all things investigated regarding Water Right Application Number G1-28746.

Public Notice

RCW 90.03.280 requires that notice of a water right application be published once a week, for two consecutive weeks, in a newspaper of general circulation in the area where the water is to be stored, diverted, and used. Notice of this application was published in the Vashon-Maury Island Beachcomber newspaper on April 24, 2013 and May 1, 2013.

State Environmental Policy Act (SEPA)

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

- (a) It is a surface water right application for more than 1 cubic feet per second (cfs), unless that project is for agricultural irrigation, in which case the threshold is increased to 50 cfs, so long as that irrigation project will not receive public subsidies;
- (b) It is a groundwater right application for more than 2,250 gpm;
- (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.

INVESTIGATION

Site Visit and Existing Related Documents

On August 20, 2013 Jerry Louthain of HDR conducted a site visit with the District's representative, General Manager, Mr. Jeffrey Lakin, who explained the details of the proposed project. Mr. Lakin provided some general background information about the application, the prior water use from this source, and what additional related information is available. The existing production well and pump house proposed for this water use, and the housing development where the water has been used were observed. The production well was the subject of a technical memorandum report which was performed by Landau Associates and is described below.

Mr. Lakin provided electronic copies of the following documents as requested during the site visit:

- Water District 19 2008 Comprehensive Water System Plan
- Water District 19 Service Area Map
- Vashon Meadows Well Technical Memorandum by Landau Associates - November 2, 2011

In addition, the following documents were reviewed:

- Vashon-Maury Island Watershed Plan- June 6, 2005

The following is a summary of the content of each of these documents:

2008 Comprehensive Water System Plan and Service Area Map

History and Service Area

The District was established by a special election in 1925, with an initial service area of approximately one square mile of land within the unincorporated Town of Vashon on Vashon Island. The original

distribution system consisted of about two miles of wrought iron pipe and a 20,000 gallon storage tank. The original source of supply was from Beall Creek located northeasterly of the community of Vashon.

In 1969, Island Mutual Water Company was annexed into the District. This annexation included the acquisition of an un-named spring source with the associated water right and a water treatment plant.

Three groundwater sources were developed following the development of the surface water sources, Well No. 1 in 1979, Well No. 2 in 1990, and Well No. 4 in 2005.

Through annexations and the Coordinated Water System Plan service area agreement process in the late 1980's, the District has grown to include a retail service area and corporate boundary of just over six square miles.

As of January 2007, the District served 1,421 connections, up from 1,293 as of the 2000 Water System Plan. Service is accomplished through three groundwater wells, two surface water sources, a water treatment plant, 1.725 million gallons of water storage capacity, and many miles of transmission and distribution mains ranging in size from ¾-inch to 16 inches in diameter.

As of the 2008 Water System Plan, an estimated 3,400 people lived within the water service area and approximately 1,300 people were employed within the same area. While most of the businesses and employees within the service area are served by the District, a number of residents are served by private wells within the service area. By multiplying the number of active residential accounts by the average household size, it was estimated that approximately 2,975 people of the total 3,400 residents are actually served by the District. The total population and employees within the service area was estimated to increase to approximately 3,800 and 1,480 (respectively) by the twenty-year planning horizon of 2026.

The northernmost portion of the 6.2 square mile service area is generally bounded by SW 160th Street. On the east the District is bounded by Puget Sound and on the west, the service area extends to approximately 115th Avenue SW and 103rd Avenue SW. In the southernmost portion of the District the service area extends onto Maury Island, to SW 240th Street and Dockton Road.

Existing Moratorium

The District is currently under a moratorium on establishing new connections. This is the second moratorium that the District has instituted, the first being issued in September, 1994 and was in effect until the current water treatment plant was put online a year later. Approximately 200 new connections were made during this period before the second moratorium went into effect in February, 1996 and is still in effect. The current moratorium was established because the total production of the well and surface water capacity was less than the estimated peak summertime usage.

The total authorized groundwater usage of 250 gpm from Well Nos. 1, 2, and 4 is much larger than the maximum capacity of the wellfield of 150 gpm as determined by the District in 2007. Surface water authorizations are significantly much higher than the summer-time water availability from these sources due to the low flows in these surface water sources.

Water Rights

A discussion and copies of the District's water rights is included in the Water System Plan. A more detailed discussion of the District's water rights is covered later in this report.

Vashon Meadows Well Technical Memorandum by Landau Associates Dated November 2, 2011

A copy of this memorandum is included as Attachment 2 to this report. The following is a summary of some of the content of this report.

The purpose of this report was to perform the following services for the District:

- Review existing information on the Vashon Meadows well
- Characterize hydrogeologic conditions where the well is screened
- Estimate long-term pumping rates from the aquifer where the well is screened
- Summarize methods and costs to modify the well if practical.

Details related to the content of this memorandum are included below in **Hydrogeological Setting-Vashon Meadows Well Evaluation**

Vashon-Maury Island Watershed Plan

Vashon and Maury Islands are named as two separate islands even though they are physically connected by a narrow strip of land. Vashon-Maury Island is a 37 square mile area with a population of about 10,100 with low-density residential development over most of the area, except for higher density residential areas within the small communities and along some of the shoreline. Approximately 75 percent of the water use is for municipal and domestic uses, with the majority of the other water usage being for agriculture. There is only limited commercial and industrial water use on the islands.

The Vashon-Maury Island Watershed Plan was completed June 6, 2005, as a component of the WRIA 15 watershed planning process, but was intended to be implemented as a separate and stand-alone unit. The 1990 Vashon Coordinated Water System Plan (CWSP) made recommendations for managing the groundwater supply. The Vashon-Maury Island Groundwater Management Plan was completed in 1998 after a ten-year island-based planning effort. Although this Vashon-Maury Island Watershed Plan was developed, no formal adoption of the WRIA 15 Watershed Plan occurred, since the planning group was unable to reach consensus.

The Vashon-Maury Island Ground Water Management Area was designated as a Sole Source Aquifer by the Environmental Protection Agency in June 1994, and an Island Sole Source Aquifer was designated by King County in 2005.

History of Water Use

Water has been used from this source as an exemption to the permitting requirements under RCW 90.44.050 for the Vashon Meadows six-home sub-division located just north of the well, since the development was started in the mid-1990s. Water District 19 has a signed agreement from the Vashon Meadows Homeowners Association, dated December 17, 2012, approving the transfer of ownership of this water system to Water District 19.

A totalizing meter has been installed as an element of the existing water system for this development, with production records provided from the applicant for the period from January 2008 through November 2012. From this data, the maximum water usage for a rolling 12 month period is 50,514 cubic feet during 2009, which is equivalent to 377,845 gallons, or 1.16 AF/YR.

Proposed Use and Basis of Water Demand

The documented maximum water use during a rolling 12 month period of 1.16 AF/YR, which has been an exempt water use, is the basis for this request for approval of an annual quantity of 1.16 AF/YR.

Water District 19 filed this application for the use of groundwater for municipal supply as an additional source of supply for their municipal water system.

In addition to the well, which has a ½ horsepower (hp) pump, this existing water system includes a 10-foot by 12-foot pump house. The pump house contains a source meter, a 1,000-gallon storage tank, a booster pump, four 86-gallon pressure tanks, and a 2-inch diameter pipe connecting to the distribution system.

At the time of the site visit on August 20, 2013 the production well, and all the associated elements of this water system, were in place. The location for the existing well and the proposed place of use, shown in the most recently approved Water System Plan for Water District 19, are shown on Attachment 1.

The source of supply analysis in the 2008 Comprehensive Water System Plan showed that the District has sufficient water rights to meet the current and anticipated average daily demands of the District through the six-year and twenty-year planning periods. However, the District has difficulty in meeting the peak daily demands with their existing facilities due to the variability in supply of their existing sources.

The 2008 Water System Plan stated that, as of January 2007, the District supplied water to 1,202 single-family residential units, 20 multi-family residential units, 159 commercial, and 31 public connections, for a total of 1,412 connections. Average day demand from 2002 to 2006 and unaccounted for water amounted to 213 gpd per Equivalent Residential Unit (ERU), for a total of 1,621 ERUs or a total average annual water usage of 0.347 million gallons per day (mgd). Based on historical data, the maximum day demand is 2.88 times the average day demand, which is greater than the instantaneous total source availability for the District.

Mr. Lakin stated in a email dated October 31, 2013 that the current number of connections for the District is 1,747.

As stated above, Water District 19 is currently under a water supply moratorium since the total of their existing production capacity from their existing water rights is less than their current peak water system demands. If this request for approval of an additional 20 gpm and 1.16 AF/YR for municipal supply is approved, it will lessen the current shortfall in instantaneous source availability. However, this additional source of water would still not be enough to remove the current moratorium.

Other Water Rights Appurtenant to the Place of Use

Table 3-1 in the 2008 Water System Plan details the water rights held by the District as well as copies of some of the District's water right records. Based on this information and updated information, the following is a listing of the water rights currently held by the District, some of which were issued to other entities, which the District has now acquired.

| Record No. | Priority Date | Qi | Qa(afy) | Source |
|----------------|----------------|---------|---------|---------------------|
| Cert. No. 887 | Sept. 11, 1925 | 0.9 cfs | NA* | Beall Creek |
| Cert. No. 836 | Nov 14, 1926 | 0.5 cfs | NA* | Unnamed (Ellis Cr.) |
| Cert. No. 8145 | Apr. 14, 1960 | 0.4 cfs | NA* | Beall Creek** |
| G1-23519C*** | Nov 30, 1979 | 250 gpm | 222 | Well Nos. 1,2,3,4 |
| G1-23519P*** | Nov. 30, 1979 | 250 gpm | 78 | Well Nos. 1,2,3,4 |

* No specified annual quantity

**The District has an approved Report of Examination from Ecology to change the purpose of use, place of use, and source from surface water to ground water. A test well (Beall Well) has been drilled and completed in 2007, with a well construction and testing report by Landau Associates in 2007. The Beall Well was approved to be put into service by letter from the Department of Health dated July 28, 2011.

***Total is limited to 250 gpm and 300 AF/YR

Hydrogeologic Setting- Vashon Meadows Well Evaluation

The well site is just west of Vashon Highway SW and south of SW 184th Way (south of the community of Vashon). The ground surface elevation at the wellhead is approximately 400 feet mean sea level datum.

The well is located in an upland area near the center of the island. The surface geology in the upland area is mapped as glacial till. Based on outcrops along Judd Creek to the southwest and Ellis Creek to the east, the glacial till is underlain by advance outwash sand deposits and older pre-Fraser fine-grained deposits. This sequence of till, outwash, and older fine-grained deposits is a typical stratigraphic sequence observed on Vashon Island and other locations throughout Puget Sound. The Principal aquifer on the island is typically described as being within the advance outwash. The underlying pre-Fraser fine-grained deposits form an aquitard beneath the Principal aquifer.

The water well report (well log) for this well, known as the Vashon Meadows well shows the owner's name as Turhune Homes and indicates that the well is 200 feet deep. The well is constructed with 6-inch welded steel casing from ground surface to a depth of 190 feet, with a well screen from 190 to 200 feet. The well log also indicates the presence of 83 feet of till underlain by what is probably 117 feet of advance outwash gravel and sand. The sand portion from 143 feet to 200 feet is described as medium sand. The aquitard was not encountered in the boring. The static water level on the well log is shown as 145 feet.

An approximate estimate of specific capacity of the well was calculated from the bailer test recorded on the well log. After installation, the well was bailed at 7.5 gpm with 12 feet of drawdown in the well, which equals a specific capacity (Q/s) of 0.6 gpm/ft.

Water Availability

For water to be available for appropriation, it must be both physically and legally available.

Physical Availability

The amount of water requested to be approved under this application has been used from this source for over 10 years without any reduction in the amount of water being available, such that the requested amount of water has proven over the years to be physically available.

Legal Availability

The amount of water requested under this application is legally available as an exempt groundwater use under RCW 90.44.050.

This application was filed to have beneficial use established under the RCW 90.44.050 exemption certificated per RCW 90.44.050.

The requested annual quantity of 1.16 AF/YR has been documented as an exempt usage of groundwater

The location of the point of withdrawal is within Water Resource Inventory Area 15, which is subject to Chapter 173-515 WAC Instream Resources Protection Program-Kitsap Water Resource Inventory Area (WRIA) 15. WAC 173-515-050 Groundwater states the following. "Future groundwater withdrawals will not be affected by this chapter unless it is determined that such withdrawal would clearly have an adverse impact upon the surface water system contrary to the intent and objectives of this chapter."

Based on the location of this existing point of withdrawal on Vashon Island in that it is situated on a high divide, with no surface water sources in the immediate vicinity, continuing to withdraw water from this source in an amount that is exempt from the permit process, it can not be determined that this withdrawal would have an adverse impact on the surface water system. Therefore it is considered that water is legally available from this source.

Impairment Considerations

Impairment is an adverse impact on the physical availability of water for a beneficial use that is entitled to protection. A water right application may not be approved if it would:

- Interrupt or interfere with the availability of water to an adequately constructed groundwater withdrawal facility of an existing right. An adequately constructed groundwater withdrawal facility is one that (a) is constructed in compliance with well construction requirements and (b) fully penetrates the saturated zone of an aquifer or withdraws water from a reasonable and feasible pumping lift.
- Interrupt or interfere with the availability of water at the authorized point of diversion of a surface water right. A surface water right conditioned with instream flows may be impaired if a proposed use or change would cause the flow of the stream to fall to or below the instream flow more frequently or for a longer duration than was previously the case.
- Interrupt or interfere with the flow of water allocated by rule, water rights, or court decree to instream flows. Degrade the water quality of the source to the point that the water is unsuitable for beneficial use by existing users (e.g., via sea water intrusion).

There is no documentation of any existing impairment, or any reason to believe there would be any future impairment of any other water uses, as a result of the usage of this amount of water from this source.

Beneficial Use

The use of water for municipal supply purposes is defined in statute as a beneficial use of water (RCW 90.54.020(1)).

Public Interest Considerations

There were no protests filed or objections made to the approval of this application and approval of this application for municipal supply is not considered to be detrimental to the public interest.

Consideration of Protests and Comments

No protests were filed against this application.

Conclusions

In conclusion, approval of this application for the recommended quantities meets the following four criteria that must be met for a water right to be approved:

- Water must be available
- There must be no impairment of existing rights
- The water use must be beneficial
- The water use must not be detrimental to the public interest

RECOMMENDATIONS

Based on the above investigation and conclusions, I recommend that this request for a water right be approved in the amounts and within the limitations listed below and subject to the provisions listed above.

Purpose of Use and Authorized Quantities

The amount of water recommended is a maximum limit and the water user may only use that amount of water within the specified limit that is reasonable and beneficial:

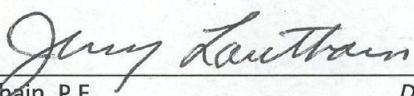
20 gpm

1.16 AF/YR for municipal supply

Point of Withdrawal: NE $\frac{1}{4}$ SE $\frac{1}{4}$ Section 31, Township 23 North, Range 3E.W.M as shown in Attachment 1.

Place of Use: Service area for Water District 19 as described in the most recent Water System Plan approved by the Department of Health and shown in Attachment 1.

Report by:


Jerry Louthain, P.E.
HDR Engineering Inc.

Date:

1/13/14

Licensed Engineer 11771

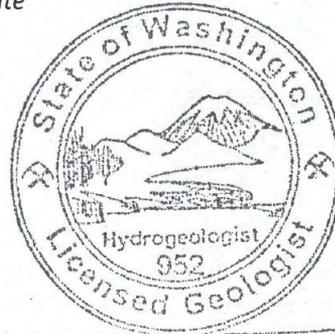
Reviewed by:

Douglas H. Wood
Doug Wood, LG, LHG
Ecology Water Resources Program

Date

Jan 16, 2014

Licensed Geologist/Hydrogeologist



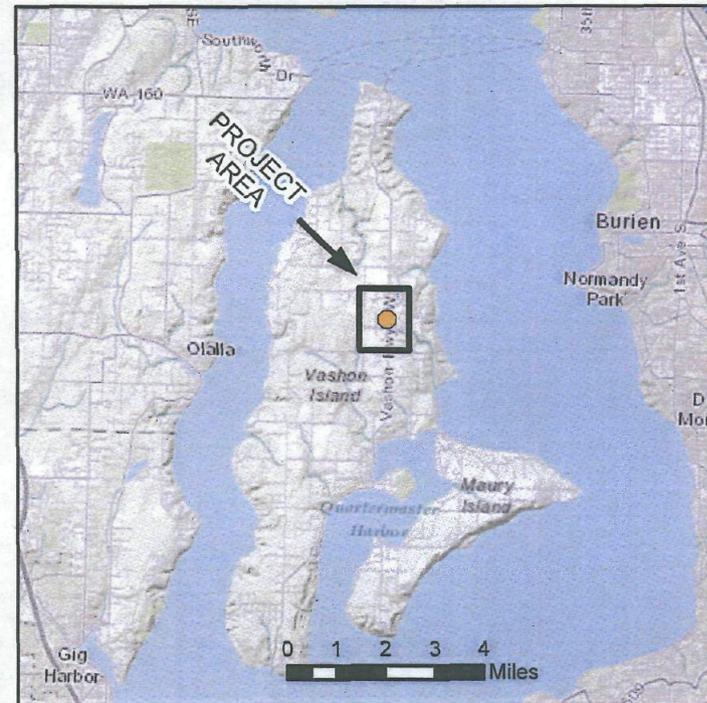
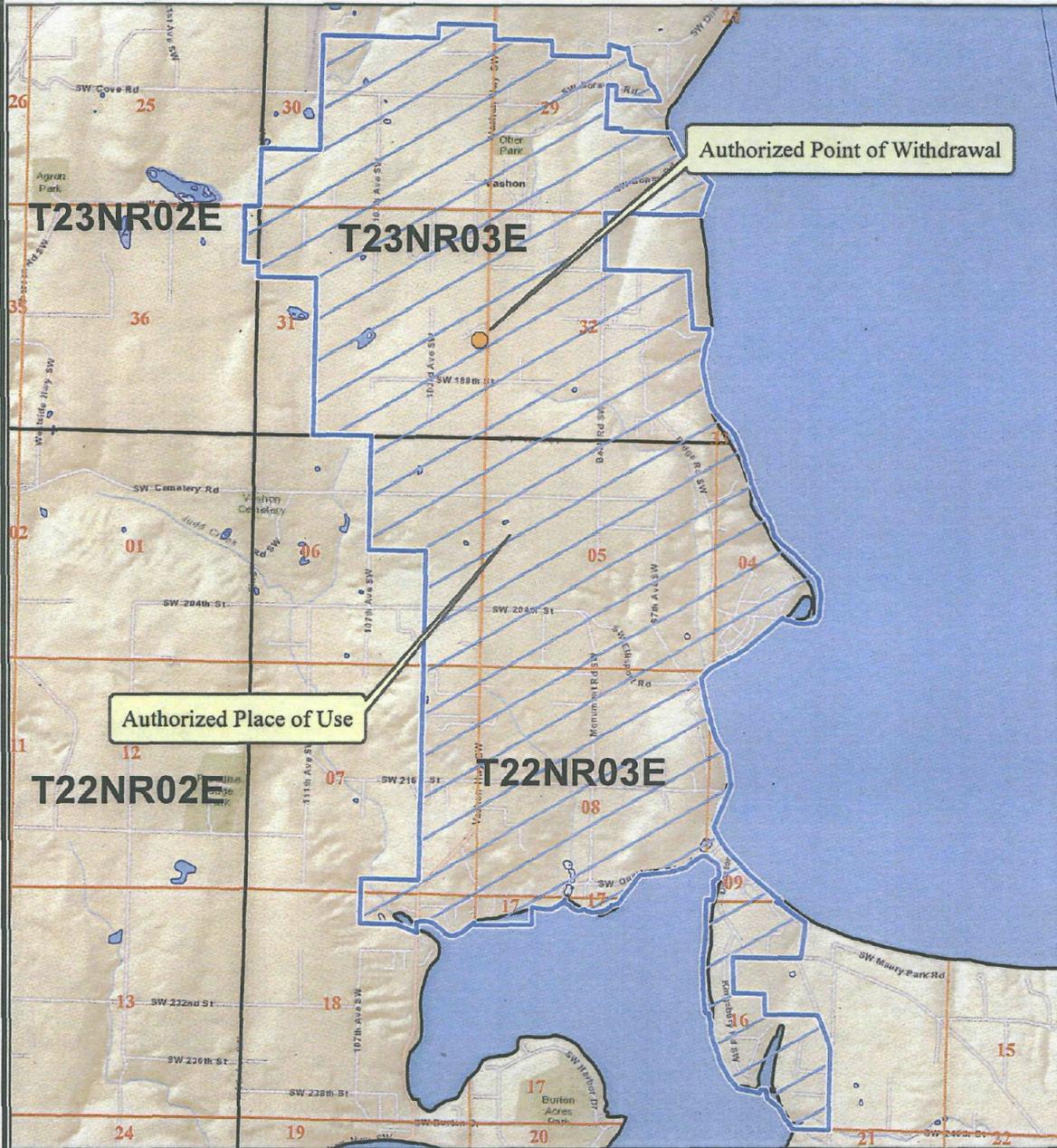
DOUGLAS H. WOOD

LIST OF ATTACHMENTS

- Attachment 1 – Point of Withdrawal and Place of Use
- Attachment 2 – Landau Associates November 2, 2011 Memorandum

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.

Water District 19
 Water Right G1-28746
 Section 31 T23N R03E W.M.
 WRIA15 - King County



Legend

-  Authorized Place of Use
-  Authorized Point of Diversion
-  Water Body
-  Townships
-  Parcels
-  Sections



Map Date: 11/25/2013



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.'

MEMORANDUM

TO: Jeff Lakin, King County Water District 19

FROM: Eric Weber, L.Hg.

DATE: November 2, 2011

RE: **VASHON MEADOWS WELL**

INTRODUCTION

Landau Associates is providing services to King County Water District 19 (KCWD19) to evaluate the Vashon Meadows well. The scope of our services includes:

- Review existing information on the Vashon Meadows well
- Characterize hydrogeologic conditions where the well is screened
- Estimate long-term pumping rates from the aquifer where the well is screened
- Summarize methods and costs to modify the well if practical.

The Vashon Meadows well is located on Vashon Island, King County in the NE quarter of the SE quarter of Section 31 in Township 23 North, Range 3 East. The water well report (log) for this well was supplied by KCWD19. The log is labeled as "Turhune Homes" and indicates that the well is 200 feet (ft) deep. The well is constructed with 6-inch welded steel casing from ground surface to 190 ft depth. A nominal 6-inch diameter 0.012-inch (012) slot stainless steel screen is installed from 190 ft to 200 ft depth. The log is included as Attachment A. The approximate well location is shown on Figure 1.

The well is located in an upland area near the center of the island. The surface geology in the upland area is mapped as glacial till. Based on outcrops along Judd Creek to the southwest and Ellis Creek to the east, the glacial till is underlain by advance outwash sand deposits and older pre-Fraser fine-grained deposits. This sequence of till, outwash, and older fine-grained deposits is a typical stratigraphic sequence observed on Vashon Island and other locations throughout Puget Sound. The Principal aquifer on the island is typically described as being within the advance outwash. The underlying pre-Fraser fine-grained deposits form an aquitard beneath the Principal aquifer. Surface geology in the vicinity of the well is presented on Figure 1.

The Vashon Meadows well log indicates the presence of 83 ft of till underlain by what is probably 117 ft of advance outwash gravel and sand. The sand portion from 143 ft to 200 ft is described as medium sand. However, since advance outwash deposits typically get finer with depth (i.e., fining downward sequence), it is likely that the upper portion of this sequence is coarse or medium sand while the lower portion, where the well is screened, is a fine or fine to medium sand. The aquitard was not

encountered in the boring, but in our opinion, it is probably present within 10 ft or so of the bottom (i.e., between 200 ft and 210 ft depth). The location of the aquitard is estimated based on nearby well logs¹. A conceptual diagram of site geology constructed from existing well logs in the vicinity of the Vashon Meadows well is shown on Figure 2.

The water level at the Vashon Meadows well was measured by KCWD19 staff at 154 ft depth. Based on this static level, the aquifer saturated thickness is probably about 50 ft. Landau Associates surveyed 31 Principal aquifer wells in the vicinity of the Vashon Meadows well². The average estimated saturated thickness of the Principal aquifer in these surveyed wells was 40 ft.

An approximate estimate of specific capacity of the well can be calculated from the bailer test recorded on the well log. After installation, the well was bailed at 7.5 gpm with 12 ft of drawdown in the well. This equals a specific capacity (Q/s) of 0.68 gpm/ft. The average specific capacity of the 31 surveyed Principal aquifer wells was appreciably higher at 1.97 gpm/ft. In our opinion, the specific capacity is low in this well for the soil texture described in the log and for advance outwash in general. A potential cause of low specific capacity is poor well development. Redeveloping this well has a reasonable likelihood of increasing the specific capacity.

The well screen size is 012 slot. This is a typical slot size used in other Principal aquifer wells throughout the survey area, however all of these wells appear to be residential or Group B and probably were not necessarily designed to maximize well yield. Even so, a 012 slot is a typical size for fine to medium sand. For example, the Beall well was screened in a fine to medium sand and the well was designed to have both a 010 and a 012 well screen slot size based on gradation analysis. While it is difficult to estimate screen slot size without detailed, high quality well logs or gradation analysis, it is likely that a 012 slot size is appropriate for this well. This slot size is unlikely to affect specific capacity within the range of likely pumping rates for this well (i.e., less than 35 gpm)³.

The screen length is 10 ft. An optimal screen length for this well is probably 15 ft, especially since the soil texture probably coarsens upward in the soil column. A 15 ft well screen would increase specific capacity and likely increase overall yield of the well. Increasing screen length would require pulling the existing screen, drilling out the well, and driving the existing casing down at least 10 ft and setting a new screen. The surface seal would also probably have to be repaired. The cost would be approximately \$5,000 to \$8,000, depending on the drilling contractor used. The primary risk is breaking the welds on the existing casing when the casing is driven back down during drilling. The Vashon

¹ The Douglas well (located in the NE ¼ of the SE ¼ of Section 31) located about a quarter mile north of the Vashon Meadows well encountered a clay aquitard at 195 ft depth. The nearby deep KCWD19 wells located at the well field/water tank site encountered a clay aquitard at 176 ft depth.

² The survey consisted of all wells between 100 and 200 ft deep in Sections 5 and 6 (T22N, R3E) and Sections 31 and 32 (T23N, R3E).

³ Based on an open area of 35 in²/ft for 012 wire wound slot screen.

Meadows well was drilled in 1999. The welds lose strength over time. Many drillers would not work on a well this old if they did not install it, in part due to uncertainty associated with the quality of the original welds. An estimate of the cost to drill a new well is approximately \$12,000 to \$15,000 and would eliminate the risk of working on an old well.

SUMMARY

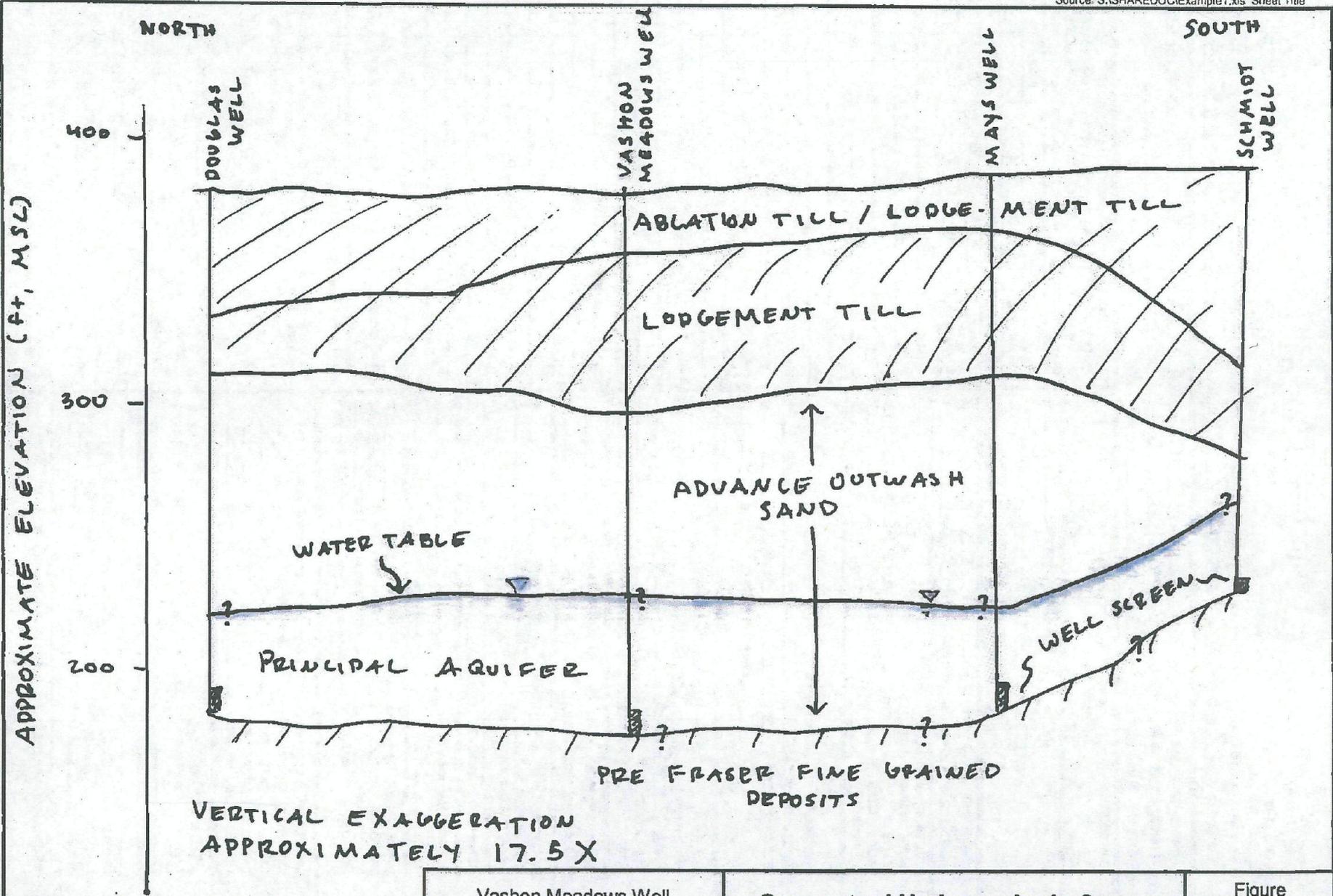
The Vashon Meadows well has a low specific capacity. We would recommend redeveloping the well, which should increase the specific capacity somewhat. For estimating a long term pumping rate, we have assumed that a specific capacity of 1 gpm/ft could be realized for this well. Assuming an available head of about 30 ft and accounting for well losses, we would estimate a long term pumping rate from this well between 15 and 20 gpm.

If you have any questions regarding this memorandum, please contact us.

EFW/jrc

ATTACHMENTS

- Figure 1: Geology and Well Location
- Figure 2: Conceptual Hydrogeologic Cross Section
- Attachment A: Vashon Meadows well log



Vashon Meadows Well
King County Water District 19
Vashon, Washington

Conceptual Hydrogeologic Cross
Section

Figure
2

