File NR G2-30575
WR Doc ID 4735440

DEPARTMENT OF
ECOLOGY
State of Washington

State of Washington
REPORT OF EXAMINATION
FOR WATER RIGHT APPLICATION

APPLICATION PRIORITY DATE	WATER RIGHT NUMBER
May 27, 2011	G2-30575

MAILING ADDRESS	SITE ADDRESS (IF DIFFERENT)
City of Gig Harbor 3510 Grandview Street Gig Harbor, Washington 98335	8700 Skansie Avenue Gig Harbor, Washington 98335

Quantity Authorized for Withdrawal or Diversion

WITHDRAWAL OR DIVERSION RATE	UNITS	ANNUAL QUANTITY (AF/YR)
1,000	GPM	1,000

Purpose

	WITHDRAWAL OR DIVERSION RATE			ANNUAL QUANTITY (AF/YR)		
PURPOSE	ADDITIVE	NON-ADDITIVE	UNITS	ADDITIVE	NON-ADDITIVE	PERIOD OF USE (mm/dd)
Municipal Supply		1,000	GPM		1,000	Year round

IRRIGATED ACRES		PUBLIC WATER SYSTEM INFORMATION	
ADDITIVE	NON-ADDITIVE	WATER SYSTEM ID	CONNECTIONS
		276009	2,692

Source Location

COUNTY	WATERBODY	TRIBUTARY TO	WATER RESOURCE INVENTORY AREA
Pierce	Deep Aquifer		15 – Kitsap

SOURCE FACILITY/DEVICE	PARCEL	WELL TAG	TWN	RNG	SEC	QQ Q	LATITUDE	LONGITUDE
Well No. 11	9902095003	-	21N	02E	6	NWSW	-	-
							Datum: NAD83/WGS84	

Place of Use

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 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

Preliminary design of Well No. 11 includes a completed depth of approximately 935 feet below ground surface (bgs) with a 10-inch diameter casing and a well screen assembly from 640 to 925 feet

bgs. Four water bearing intervals within the Deep Aquifer will be screened with 40-slot well screen for a total open interval of approximately 205 feet.

Preliminary well design is based on the geologic conditions encountered in Well No. 11T (test well), located approximately 100 feet east of the proposed well location.

Development Schedule

BEGIN PROJECT	COMPLETE PROJECT	PUT WATER TO FULL USE
Begun	June 1, 2015	June 1, 2028

Measurement of Water Use

How often must water use be measured?	Weekly
How often must water use data be reported to Ecology?	Annually (by January 31)
What volume should be reported?	Total Annual Volume & Report-Volume
What rate should be reported?	Weekly Peak Rate of Withdrawal (gpm)

Provisions

Measurements, Monitoring, Metering and Reporting
An approved measuring device shall be installed and maintained for the source identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", WAC 173-173, which 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.

Ecology is requiring the recording and reporting of meter data as described above to collect seasonal information for water resource planning and compliance.

Water use shall be recorded weekly. Recorded water use data may be submitted via the Internet. To set up an Internet reporting account, contact the Southwest Regional Office. If you do not have Internet access, you can still submit hard copies by contacting the Southwest Regional Office for forms to submit your water use data.

Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times to the project location, and will be allowed to inspect, at reasonable times, records of water use, wells, diversions, measuring devices and associated distribution systems to ensure there is compliance with the law.

Proof of Appropriation
The water right holder shall file the notice of Proof of Appropriation of water when 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.

Findings of Facts
Upon reviewing the investigator's report, I find all facts, relevant and material to the subject application, have been thoroughly investigated.

Therefore, I ORDER approval of Application No. G2-30575, subject to existing rights and the provisions specified above.

Signed at Olympia, Washington, this 15th day of May 2012.

Michael J. Gallagher

Michael J. Gallagher, Section Manager

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 **Pollution Control Hearings Board** 1111 Israel RD SW Ste 301 Tumwater, WA 98501	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608 **Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

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

BACKGROUND

On May 27, 2011, the City of Gig Harbor (City) filed an Application for a Water Right (G2-30575) with the Washington State Department of Ecology (Ecology) for a permit to appropriate public groundwater. The applicant requested authorization for a non-additive instantaneous withdrawal rate (Qi) of 1,000 gallons per minute (gpm) and a non-additive total annual withdrawal volume (Qa) of 1,000 acre-feet per year (afy) from one well.

Planned use of the appropriation is for general municipal supply. The City's water system currently serves approximately 4,400 equivalent residential units (ERUs), and is forecasted to serve over 9,100 ERUs by 2028. The City's water system consists of water withdrawal, conveyance, storage, and treatment facilities. The place of use is consistent with the 2008 (updated in May 2011) City of Gig Harbor Water System Plan (Roth Hill, LLC) which is within the designated city water service area.

Table 1 – Application Summary

Attributes	Summary
Name	Well No. 11
Date	May 27, 2011
Instantaneous Quantity	1,000 gpm (non-additive)
Annual Quantity	1,000 afy (non-additive)
Purpose of Use	Municipal Supply
Period of Use	Year round, as needed
Place of Use	City of Gig Harbor approved water service area

Legal Requirements for Approval of Appropriation of Water

The following requirements must be met prior to authorizing the proposed water right:

- **Public Notice**
  Notice of the proposed appropriation was published in *The Peninsula Gateway* of Gig Harbor, Washington, on April 4 and 11, 2012. No protests were received by Ecology.

- **State Environmental Policy Act (SEPA)**
  The subject application is categorically exempt under SEPA (WAC 197-11-305 and WAC 197-11-800(4)) because the instantaneous quantity is less than the 2,250 gpm threshold.

- **Water Resources Statutes and Case Law**
  Chapters 90.03 and 90.44 RCW authorize the appropriation of public water for beneficial use and describe the process for obtaining a water right. Laws governing the water right permitting process are contained in RCW 90.03.250 through 90.03.340. Based on the provisions of RCW 43.21A.690 and RCW 90.03.265, this application has been processed by Aspect Consulting, LLC (Aspect Consulting) under Ecology Cost Reimbursement Agreement No. ASP012 (master contract No. C1000185).

- **Expedited Processing**
  This application qualifies for expedited processing under WAC 173-152-050(2)(g) whereby water right applications may be processed prior to applications submitted at an earlier date when the proposed water use, if approved, would result in no diminishment of the source. The non-additive application is water budget neutral with respect to the defined source of water.

INVESTIGATION

In consideration of this application, Aspect Consulting reviewed available documents pertaining to the application's site conditions, projected water demand, and the potential effect on existing water right holders and established minimum instream flows. This review included information submitted by the applicant, including well construction and testing reports, water system plan, and water level and water quality data, along with pertinent Ecology records, including well logs and water rights records. The review also included reports from multiple investigations characterizing the hydrogeology and water quality of the Gig Harbor peninsula.

A site visit was performed on February 14, 2012. Tyson Carlson of Aspect Consulting met with City representative Jeff Langhelm and Marco Malich to discuss the application and visit the proposed well location.

Using this information, Aspect Consulting evaluated water availability and potential effects of the proposed appropriation upon existing groundwater and surface water rights, including instream flows, and water quality. Each of the four requirements specified in RCW 90.03.290 were individually examined and findings presented below.

Project Description

The Application for a Water Right submitted by the City seeks authorization to withdraw groundwater from one well, known as Well No. 11. The application is for a non-additive authorization to the City's existing water right portfolio. The water authorized under the new permit will serve to improve reliability of the City's water system by providing a backup well should the City's largest single source (Well No. 6) be unavailable to meet peak demand.

The City's current water right portfolio includes 2,265 acre-feet (af) in primary (additive) water rights from 8 certificates. Table 2 is a summary of the City's existing water rights portfolio.

Table 2 – City of Gig Harbor's Water Right Portfolio

Source	Water Right Number	Priority Date	Qi in gpm	Qa in afy Additive	Qa in afy Non-Additive
Well No. 1	G2-01015	10/19/1948	400	238	-
Well No. 2	G2-00522	4/5/1971	330	209	-
Well No. 10				-	116
Well No. 3	G2-25078	11/15/1978	625	538	442
Well No. 4	G2-27393	8/8/1988	230	-	238
Well No. 5	G2-27794	6/21/1990	500	336	-
Well No. 6	G2-28102	3/29/1991	1,000	896	-
	G2-29896	1/14/2000		-	-
Well No. 8	GWC 6018	9/2/1965	30	48	-
Total			**3,115**	**2,265**	**796**

The place of use is consistent with the current City of Gig Harbor's Water System Plan which is the designated city water and wholesale service areas. The current water system plan was approved by the Department of Health in 2008, and last updated in May 2011 (Roth Hill, LLC).

Site and New Source Description

The proposed point of withdrawal will be located approximately 100 feet west of the test well (Well No. 11T), adjacent to the City-owned maintenance facility, in the northwest quarter of the southwest quarter of Section 6 in Township 21 North, Range 2 East Willamette Meridian (WM).

Well No. 11T was completed in July 2011 to a depth of 1,010 feet below ground surface (bgs) with a 6-inch diameter casing and a well screen assembly from 644 to 924 feet bgs. Static water level is 288.5 feet bgs (approximately 16.5 feet above sea level).

Based on the testing results, preliminary design of Well No. 11 includes a completed depth of approximately 935 feet below ground surface with a 10-inch diameter casing and a well screen assembly from 640 to 925 feet bgs. Four water bearing intervals within the Deep Aquifer will be screened with 40-slot well screen for a total open interval of approximately 205 feet. The production capacity of the proposed design is in excess of 1,000 gpm (RN 2011a).

The proposed well location is on the eastern half of the Gig Harbor peninsula, approximately 1.5 miles from the shoreline of Puget Sound, within the Kitsap Water Resource Inventory Area (WRIA) 15. The well site sits near the surface divide separating North Creek (east) and Artondale Creek (west).

The local hydrogeology of the Kitsap Peninsula is defined by four major water bearing stratigraphic units: Shallow Aquifer, Sea Level Aquifer, Intermediate Aquifer, and Deep Aquifer. These units are described in the multiple reports, including Well 11 Test Well Construction and Testing Report (RN 2011a), Well 11 – Phase I Water Rights Assessment (RN 2011b), City of Gig Harbor Water System Plan (Roth Hill, LLC 2011), and in the regional studies of neighboring watersheds by the USGS (Savoca, et al. 2010; Drost, et al. 1999). Information from these documents is summarized below.

The Vashon Drift, with its characteristic large thicknesses of stratified sand and gravel, gives rise to the uppermost aquifer in the recessional outwash (Qvr) deposits. The Qvr aquifer supports numerous shallow water table lakes and wetlands, and contributes to perennial base flow to creeks and rivers. Below the Qvr, low permeable Vashon till (Qvt) often separates the upper recessional and the underlying advance outwash aquifers. The advance outwash (Qva) or Shallow Aquifer serves as a significant source of potable water for some smaller municipal and exempt water supply wells in the Gig Harbor area. The Qva is often hydraulically confined by the overlying low-permeability Qvt.

Below the Vashon Drift sequence is the clay and silts of the interglacial Olympia Beds, formally known as the Kitsap formation. This unit typically acts as a regional aquitard, 50 to 150 feet thick, separating the shallow aquifers from the more regionally extensive deeper aquifers, described below.

The Sea Level Aquifer is capable of supporting high yielding wells, including several of the City's production wells (Nos. 2 and 4). The Sea Level Aquifer consists of pre-Olympia aged glacial drift deposits consisting of saturated sand and gravels with minor lenses of silt, clay, and till.

Underlying the Sea Level Aquifer is the non-glacial Intermediate Confining Unit. Locally, the fine-grained unit is 70 to 180 feet thick, primarily composed alluvial and lacustrine sand, silt, and clay.

The Intermediate Confining Unit separates the Sea Level from the Intermediate Aquifer. The Intermediate Aquifer consists of glacial deposits, primarily silt, sand, and gravel, with discontinuous till and lacustrine deposits. Gig Harbor Well No. 6 is completed in this aquifer, with a capacity in excess of 1,000 gpm.

Limited information is available for deeper units, including the non-glacial Deep Confining Unit. However, available well logs indicate the low permeability confining unit consists primarily of silt and clay, with minor, discontinuous lenses of sand and gravel. Typical unit thickness range from 50 to 200 feet.

Below the Deep Confining Unit, the deepest known serviceable water bearing unit is the Deep Aquifer. Although highly heterogeneous, several different water bearing layers have been identified and developed as water supplies, including Well Nos. 3 and 5, and proposed Well No. 11. Few wells penetrate the entire thickness of the unconsolidated deposits, so information on thickness or extent of deeper regional water bearing zones is limited; however, regional studies – including Well No. 11T –

indicate thick (up to 200 feet) sequences of sand and gravel capable of producing quantities in excess of 1,000 gpm.

Groundwater Flow

In the shallow Vashon Drift aquifers (Qvr and Qva), groundwater flow directions are driven by the recharge of precipitation and generally correspond to surface topography – with groundwater divides located near ridgelines, and flow tending toward marine (Henderson Bay, Gig Harbor, and Puget Sound) and local fresh water (North or Artondale Creek) discharge points.

Groundwater flow in the Sea Level Aquifer exhibits similar flow patterns as the overlying Vashon Drift aquifers, but the effect of local surface water drainages and recharge is muted.

There are insufficient data to precisely determine groundwater flow and direction in the deeper aquifers; however, based on vertical gradient observed during testing of Well No. 11T, it is assumed that groundwater discharges via upward leakage to regional discharge features like Puget Sound (RN 2011a).

The proposed Well No. 11 will be completed in the Deep Aquifer. Testing of the Well No. 11T indicate an average aquifer transmissivity of approximately 30,000 gpd/ft (4,011 ft^2/d) with an estimated specific capacity of about 10 gpm/ft (RN 2011a).

Water Quality

Deep groundwater in the Gig Harbor area has characteristically elevated concentration of naturally occurring iron and manganese, which can exceed their respective secondary Maximum Concentration Limits (MCL) based on aesthetics. All primary MCLs are met. Reported chloride concentrations for Deep Aquifer are at regional background levels.

Water Resource Inventory Area 15

WRIA 15 includes most of the Kitsap County, as well as the Gig Harbor and Key Peninsulas, a portion of northern Mason County, and Vashon Island. The draft WRIA 15 Watershed Plan was not finalized or officially adopted by the Planning Unit. However, based on the additional data collected during the planning process, several recommendations were made regarding how to best implement the three major planning elements – Water Quantity, Water Quality, and Instream Habitat. Solutions for future water management, including way to protect water supplies, were a central theme of the planning process.

Minimum Instream Flows – WRIA 15

A state instream resources protection program with specified minimum instream flows and closures is outlined as Washington Administrative Code (WAC) Chapter 173-515. With a priority date of June 9, 1988, the program effectively limits, and in some cases prohibits, the further issuance of consumptive water rights that could affect specified instream flows in WRIA 15.

The nearest closure to the City's proposed point of withdrawal is North Creek, located approximately 3,000 feet northeast. North Creek is closed to further appropriation year round. In addition, Crescent

Creek, located about 6,000 feet to the northeast, has specified minimum instream flow for all months of the year, and is seasonally closed to further appropriation from June 1 to October 15.

APPLICATION EVALUATION

This Report of Examination (ROE) evaluates the application for the same source of water based on the conceptual model presented above. To approve the application, Ecology must issue written findings of fact and determine that each of the following four requirements of has been satisfied:

(1) Availability – water is available for appropriation;
(2) Impairment – the proposed appropriation would not impair existing water rights;
(3) Beneficial Use – the proposed appropriation would be put to a beneficial use; and
(4) Public Interest – the proposed appropriation would not be detrimental to the public interest.

Source of Water Proposed for Appropriation

The applicant seeks to withdraw water from one well located in the northwest quarter of the southwest quarter of Section 6 in Township 21 North, Range 2 East Willamette Meridian (WM). The proposed well location is approximately 100 feet of the existing test well (Well No. 11T).

Although the Deep Aquifer may not be in direct geologic contact with nearby surface water, widespread drawdown effects from pumping of the well may induce increased vertical leakage from shallower aquifers which, in turn, may reduce baseflow contribution to regulated surface water bodies. Consequently, the City of Gig Harbor's application is considered to be in hydraulic continuity and competing for water within the North Creek and Crescent Creek basins, which are limited to further appropriation under Chapters 173-515 WAC.

Water Availability and Impairment of Flows

The application requests a non-additive appropriation from the Deep Aquifer. The withdrawal of water from Well No. 11 will be in exchange for an equivalent amount of water authorized under the City's water right portfolio (see Table 2). Therefore, the application is water budget neutral with respect to the source of water defined above, and no diminishment of water will occur.

Based on Well No. 11T testing results, proposed design of Well No. 11 will be able to fully support the requested instantaneous and annual quantities.

In addition, due to the increased completion depth, pumping impacts in the Deep Aquifer will likely have less effect on surface water than pumping from shallower (Intermediate or Sea Level) aquifers. Therefore, based on the collective information summarized above, we conclude that the quantity of water requested for use in this application is available for appropriation, and no impairment of instream flow will occur.

Saltwater Intrusion

A common concern across the Kitsap Peninsula is intrusion of saltwater induced by pumping of nearshore wells. Saltwater intrusion occurs when head near the submarine outcropping of an aquifer is sufficiently reduced so that it can no longer counter the opposing head of denser saline water; thus, allowing saline water to laterally migrate into the aquifer. Saltwater may also intrude into the aquifer vertically, as leakage from shallow saline water bodies.

Although the likelihood of saltwater intrusion is low, the well is considered a risk due to the depth, and relative proximity to the shoreline. It is recommended that the City routinely monitor for chlorides.

Impairment Considerations

Using the reported aquifer parameters for Well No. 11T (RN 2011a), including an assumed storage coefficient of $1x10^{-4}$, the governing Theis equation (Theis 1935) was used to estimate the interference drawdown from pumping the proposed point of withdrawal on the closest water supply well completed in the Deep Aquifer – City of Gig Harbor's Well No. 5, located approximately 3,900 feet south. Based on this analysis, the interference drawdown from continuously pumping Well No. 11 at the requested annual rate (1,000 afy) is estimated to be less than 20 feet; a small percentage of the estimated 450+ feet of available drawdown.

In addition to the City-owned well described above, the Ecology database was queried for additional well logs within a 1.0-mile radius of the subject application for water supply wells completed in the Deep Aquifer. Results of the search indicated there were no wells completed to a depth greater than 500 feet below ground surface (inferred Deep Aquifer contact elevation). We therefore conclude that although pumping interference effects are likely, no impairment of existing rights in the Deep Aquifer is anticipated with full use of the requested quantity.

Wells completed in the Deep Aquifer are separated from the Intermediate Aquifer by a thick (50 to 200 feet) low permeability aquitard. This unit greatly limits the hydraulic connection between aquifers. Therefore, impairment of wells completed in shallower aquifers is also not expected to occur.

Beneficial Use

In accordance with RCW 90.54.020(1), the proposed appropriation for municipal use represents a beneficial use of water.

The proposed point of withdrawal will improve reliability of the City's existing water system and be supported by the necessary infrastructure to deliver water to customers in the water and wholesale service areas. The water will be used at rates consistent with established municipal demand in Western Washington, including all standards required in the Department of Health's Water Use Efficiency Program.

Public Interest Considerations

No detriment to the public welfare was identified.

RECOMMENDATIONS

Based on the above investigation, 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:

1,000 gpm
1,000 acre-feet per year
Municipal Supply

Point of Withdrawal
NW¼, SW¼, Section 6, Township 21 North, Range 2 East WM

Place of Use
As described on Page 1 of this Report of Examination.

Report by Tyson D. Carlson, LHG, Aspect Consulting, LLC *Date*

Phil Crane 5/15/2012

Reviewed by Philip Crane, Water Resources, SWRO *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

Drost, B.W., Turney, G.L., Dion, N.P., and Jones, M.A., Conceptual Model and Numerical Simulation of the Ground-Water Flow System in the Unconsolidated Sediments of Thurston County, Washington. U.S. Geological Survey Water Resources Investigation Report 99-4165, 1999.

Robinson & Noble 2011a. City of Gig Harbor, Well 11 Test Well, Construction and Testing Report. September 2011.

Robinson & Noble 2011b. City of Gig Harbor, Well 11 – Phase 1 Water Rights Assessment. September 2011

Roth Hill, LLC 2011. City of Gig Harbor, Water System Plan, 2008. Updated May 2011.

Savoca, M.E., Welch, W.B., Johnson, K.H., Lane, J.R.C., Clothier, B.G. and Fasser, E.T. 2010. Hydrogeologic Framework, Groundwater Movement, and Water Budget in the Chambers-Clover Creek Watershed and Vicinity, Pierce County, Washington. U.S. Geological Survey Scientific Investigation Report 2010-5055.

Theis, C.V. 1935. The relation between the lowering of piezometric surface and the rate and duration of discharge of a well using groundwater storage. Trans. Amer. Geophys. Union, 2, pp. 519-524.