File No. G2-30375
WAC Doc ID: 4303275

State of Washington
REPORT OF EXAMINATION
FOR WATER RIGHT APPLICATION

PRIORITY DATE	APPLICATION NUMBER
October 13, 2006	G2-30375

MAILING ADDRESS	SITE ADDRESS (IF DIFFERENT)
Fox Island Mutual Water Association PO Box 35 Fox Island, WA 98333	

Quantity Authorized for Withdrawal or Diversion

DIVERSION RATE	UNITS	ANNUAL QUANTITY (AF/YR)
425	gpm	342 (Partially Non-additive)

Purpose

PURPOSE	WITHDRAWAL OR DIVERSION RATE			ANNUAL QUANTITY (AF/YR)		PERIOD OF USE (mm/dd)
	ADDITIVE	NON-ADDITIVE	UNITS	ADDITIVE	NON-ADDITIVE	
Municipal Supply	205	220	gpm	217	125	Year-round as needed

Source Location

WATERBODY	TRIBUTARY TO	COUNTY	WATER RESOURCE INVENTORY AREA

SOURCE FACILITY/DEVICE	PARCEL	TWN	RNG	SEC	QQ Q	LATITUDE	LONGITUDE
Well 24/ALK 138	5875000109	21N	1E	35	SW SE	N 47 15’32”	W 122 38’30”

Datum: WGS84

Place of Use (See Map, Attachment 1)

PARCEL
N/A

LEGAL DESCRIPTION OF AUTHORIZED PLACE OF USE
The area served by the Fox Island Mutual Water Association. *The place of use of this water right is the service area described in the Water System Plan approved by the Washington State Department of Health. RCW 90.03.386 may have the effect of revising the place of use of this water right if the criteria in section RCW 90.03.386(2) are met.*

Proposed Works

Well 24 – drilled to total depth of 874 feet and completed with screen between 820 and 860 feet.

Development Schedule

BEGIN PROJECT	COMPLETE PROJECT	PUT WATER TO FULL USE
Started	In Use	January 1, 2050

Measurement of Water Use

How often must water use be measured?	Monthly
How often must water use data be reported to Ecology?	Annually (Jan 31)
What volume should be reported?	Total Annual Volume (AF/Y)
What rate should be reported?	Peak Rate of Withdrawal (cfs)

Provisions

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, 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.

Recorded water use data shall 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 to inspect at reasonable times, records of water use, wells, diversions, measuring devices and associated distribution systems for compliance with water law.

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.

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. G2-30375, 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 **Pollution Control Hearings Board** 111 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

Signed at Lacey, Washington, this _____ day of _____ 2012.

_____

Michael Gallagher, Section Manager
Water Resources Program/SWRO
Department of Ecology

BACKGROUND

On October 13, 2006, Fox Island Mutual Water Association (FIMWA) filed an application (G2-30375) for a permit to appropriate public groundwater from a well in the amount of 500 gallons per minute (gpm) for multiple domestic supply. The project site is located on the Gig Harbor Peninsula in Water Resource Inventory Area 15 – The Kitsap Peninsula.

This application has been processed under the Department of Ecology (Ecology) Cost-Reimbursement Program, under agreement between Ecology and Pacific Groundwater Group, (PGG). PGG reviewed available documents pertaining to the project's site conditions, historical water use, projected water demand, existing right-holders and seniority of pending applications potentially affected by the application.

Project Description

Table 1 Summary of Application No. G2-30375

Attributes	*Proposed*
Applicant	Fox Island Mutual Water Company (FIMWA)
Application Received	October 13, 2006
Instantaneous Quantity	500 gpm
Source	Well 24
Point of Diversion	SW ¼ SE ¼ Section 35 T. 21, R. 1 E.W.M.
Purpose of Use	Municipal Supply Purposes
Period of Use	Year-Round as Needed
Place of Use	Area served by the Fox Island Water Company

Legal Requirements for Application Processing

The following requirements must be met prior to processing a water right application:

- **Public Notice**
  Notice of the proposed appropriation was published in *The Peninsula Gateway* on May 30, 2012 and June 6, 2012 and no formal protest was received by Ecology within the thirty day comment period.

- **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 foot 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.

INVESTIGATION

PGG reviewed the information submitted with the application and pertinent Ecology records, including relevant geologic and hydrogeologic reports. PGG evaluated the potential effects of the proposed appropriation upon existing and senior groundwater and surface water rights. A site visit was conducted by Jill Van Hulle, of Pacific Groundwater Group on August 3, 2012. The findings of this evaluation are summarized below.

Information on regional hydrogeologic data was obtained from the following resource material:

- Borden, R.K. and Troost, K.G. 2001. Late Pleistocene Stratigraphy in the South-Central Puget Lowland, Pierce County, Washington. Washington Division of Geology and Earth Resources Report of Investigations 33, Washington State Department of Natural Resources.
- Drost, B. W. 1982. Water Resources of the Gig Harbor Peninsula and Adjacent Areas, Washington, U.S. Geological Survey.
- EMCON. 1992. Gig Harbor Peninsula Ground Water Management Plan Task 5 Hydrogeologic Evaluation Report.
- Garling, M. E., Dee Molenaar, and et al. 1965. Water Resources and Geology of the Kitsap Peninsula and Certain Adjacent Islands, State of Washington, Department of Conservation, Washington Division of Water Resources.
- Golder Associates Inc. 2002. Phase II Level 1 Data Compilation and Preliminary Assessment Report. Redmond, Washington.
- Golder Associates Inc. 2003. Kitsap Watershed Planning (WRIA 15) Water Quality Technical Assessment. Redmond, Washington.
- Golder Associates Inc. 2004. Kitsap Watershed Planning (WRIA 15) Instream Flow Assessment Step C Final Report. Redmond, Washington.
- Golder Associates Inc. 2004. Hydrogeology Pertaining to Application No. G2029921. Technical Memorandum Submitted to Department of Ecology, October 6, 2004.
- Jones, M. A. 1996. Thickness of Unconsolidated Deposits in the Puget Sound Lowland, Washington and British Columbia, a Contribution of the Regional Aquifer-System Analysis Program. Tacoma, Washington: U.S. Geological Survey.
- Kahle, S. C. 1998. Hydrogeology of Naval Submarine Base Bangor and Vicinity, Kitsap County, Washington, U.S. Geological Survey.
- Laird, L.B. 2003. Report of Pumping Test Fox Island Water Association Well 23. Consultant report dated March 2003.
- Laird, L.B. 2009. Report of Pumping Test Fox Island Water Association Well 24. Consultant report dated January 2009.
- Noble, J. B. 1990. Proposed Revision of Nomenclature for the Pleistocene Stratigraphy of Coastal Pierce County, Washington, Washington Division of Geology and Earth Resources.
- Washington State Department of Ecology, 2004.Report of Examination for Groundwater Right G2-29921. Signed December 20, 2004.

Additionally the WRATS database was queried to determine existing water rights within the radius of influence of FIMWA Well 24. Well logs on file at Ecology were also examined to determine the hydrogeologic conditions in the vicinity of the water right application.

Project Description

The intent of this application is to secure additional water rights for the long-term planning needs of FIMWA. The well is referred to as Well 24 and is operated by FIMWA. The well is currently in operation and has been added as a back-up well to groundwater certificates G2-25866 and G2-27293 via the filing of a *Showing of Compliance with RCW 90.44.100*.

Site Description

The site is located on Fox Island in Pierce County west of the Gig Harbor Peninsula, in the SW ¼, SE ¼ Section 35, Township 21 North, Range 1 East (Attachment 1). Well 24 is located at 227 feet above mean sea level (msl), off of Eagle Ridge Drive in the central portion of Fox Island. The site is situated between Hale Passage, which is ½ mile to the northeast and Carr Inlet, which is ¾ mile to the southwest. Wells 17 and 19 are also located on the site.

Fox Island is rural and predominately residential. Much of the Island is forested. The island is an extension of the Gig Harbor Peninsula and is located in northwestern Pierce County, near the southern end of the Puget Lowland, within WRIA 15 (Kitsap Basin). The Gig Harbor Peninsula is connected to the larger Kitsap Peninsula and is surrounded on three sides by marine embayments.

The Gig Harbor Peninsula is part of the extensive glacial drift plain comprising the Puget Lowland, which was formed by at least six glaciations that occurred in the region during the last 2 million years (Kahle, 1998). A complex sequence of unconsolidated and semi-consolidated sediments underlie the Gig Harbor Peninsula. The sediments include advance and recessional glacial deposits, and fluvial and lacustrine interglacial sediments. The total thickness of the sedimentary sequence on the Peninsula ranges between 1,200 and 2,000 feet (Jones, 1996). The sediments are underlain by Miocene volcanic and sedimentary bedrock (Garling et al., 1965).

Garling et al. (1965) describes a typical glacial sequence on the Gig Harbor Peninsula as consisting of the following units, listed from youngest (top) to oldest (bottom):

- Recessional outwash (a discontinuous mantle of sand and gravel overlying the till; often found on hilltops);
- Till (normally a gray to bluish-gray compact and unsorted mixture of cobbles and pebbles in a binder of sandy silt and clay); and
- Advance outwash (primarily consists of gravels and coarse sands capped by the overlying till).

Groundwater on the Gig Harbor Peninsula is primarily produced from three aquifers, referred to as the Vashon, Sea Level and Deep Aquifers. These aquifers are also present on Fox Island. The geologic units comprising the aquifers are outlined below after EMCON (1992) and Borden and Troost (2001):

- Vashon Aquifer: Vashon recessional outwash, till, advance outwash/glaciolacustrine silt/clay (Lawton Clay)/Olympia beds/Pre-Olympia drift. Portions of the aquifer are unconfined; however, confined conditions occur where saturation is overlain by low-permeability units (e.g. till). The water level in the advance outwash generally mimics surface topography. FIMWA Wells 14 and 17 are completed in the Vashon Aquifer system, but are used on a limited basis ;
- Sea Level Aquifer: Salmon Springs Drift/Double Bluff Drift. The Sea Level Aquifer is present throughout the Gig Harbor Peninsula. The aquifer is characterized by confined conditions and a low elevation potentiometric surface (up to 135 feet above mean sea level). FIMWA Wells 11, 22 and 20 are completed in the Sea Level Aquifer.

- Deep Aquifer: Permeable layers within the pre-Salmon Springs deposits. At least two productive, confined zones have been identified as comprising the Deep Aquifer. Borehole information for these two permeable units (Unit "E" and Unit "G") is very limited, and the lateral extent of the Deep Aquifer is not known (EMCON, 1992). Water level data for the aquifer are sparse, but several measurements indicate that the potentiometric surface is generally less than 100 feet above mean sea level. FIMWA Wells 24, 23 and 21 are completed in the deep system and have water-level elevations typically between 10 and 20 feet msl.

The Gig Harbor Peninsula is drained by multiple small streams that discharge directly to marine water; however, there are no perennial streams on Fox Island. Annual precipitation on the Gig Harbor Peninsula ranges from 40 to 52 inches/year (in/yr) (Golder 2002). Precipitation on the Peninsula infiltrates into the ground, runs off to streams, or is lost to evapotranspiration. Infiltrated water flows vertically downward to recharge the three aquifers beneath the Peninsula. It is estimated that between 13% (Drost 1982) and 18% (Golder 2004) of precipitation supplies recharge to the Sea-Level Aquifer and Deep Aquifer (after accounting for groundwater contribution to baseflow that occurs from the Vashon Aquifer). Recharge to the Deep Aquifer may also come from areas outside of the peninsula. Although groundwater flow patterns are not defined in the Deep Aquifer, Drost (1982) cites a generally downward component to groundwater flow on the Peninsula, with groundwater discharging to marine water bodies and surface drainage channels.

Hydrologic Analysis

Well 24 is completed in the Deep Aquifer and was drilled to a depth of 874 feet below ground surface (bgs) in 2008 by Boart Longyear Drilling, Inc. The well is screened between 820 and 860 feet bgs (-593 to -633 feet msl) with 10 feet of 20-slot stainless steel screen overlying 30 feet of 28-slot stainless steel screen. The static water level at time of drilling (7/10/2008) was 213 ft bgs (14.8 feet above msl).

Based on the geologic description available on the well log and cross-sections created by EMCON (1992), Well 24 is removing water from a 76-foot thick water-bearing zone in Layer G of the Deep Aquifer. The well log indicates that sand and gravel was encountered between 792 and 868 feet bgs (565 to 641 feet below msl). Deep water-bearing zones that overlie the completion zone in Well 24 may be attributed to Layer E of the Deep Aquifer. FIMWA Well 23, located 1.3 miles to the southeast, encountered 82 feet of water-bearing sand and gravel from 560 to 643 feet below msl. FIMWA Well 21, located 0.8 miles to the northwest, encountered 89 feet of water-bearing materials between 413 to 502 feet below msl and did not drill any deeper. The Deep Aquifer is also encountered in wells on the Gig Harbor Peninsula and west of Tacoma in the Lakewood/Chamber's Creek vicinities. The thickness and elevation of the Deep Aquifer varies among these wells.

FIMWA Well 24 was pump tested for 24 hours at the time of construction at a rate of 425 gpm which resulted in 34 feet of drawdown. Recovery was measured for the following 24 hours with 90% recovery achieved in about 105 minutes and water levels trending towards full recovery. The time-drawdown trend did not exhibit any obvious boundary effects – suggesting either that the aquifer is extensive and well insulated from marine waters or is affected in roughly equal measure by constant-head (marine)

and no-flow (aquifer pinch-out) boundaries. Up to 2 feet of tidal response was noted in the deep wells during pre-test monitoring (Laird, 2009). Laird adjusted drawdown data from Well 24 for tidal variation and estimated a transmissivity of 43,000 gpd/ft, which is similar to the 47,000 gpd/ft value estimated from testing Well 23 (Laird, 2003). No drawdown was reported in Wells 21 and 23 (Laird, 2009); although calculations using the method of Theis (assuming no boundaries and a storativity value of 0.0001) suggest that drawdown would be on the order of 2.3 and 1.4 feet, respectively. Water-level data and tidal corrections for these two wells are not presented in the Laird (2009) report.

The observations made during the Well 24 aquifer test further illustrate that the extent and function of the Deep Aquifer are not thoroughly understood. For instance, tidal adjustments applied by Laird suggest moderate tidal influence on groundwater levels, with a tidal efficiency of 17 percent and a lag time of 75 minutes. However, the 24-hour aquifer test did not reveal an obvious hydraulic connection to marine water (e.g. constant-head boundary). While much of the seafloor surrounding Fox Island occurs at elevations above -400 feet msl, an area off the southern tip of the island shows elevations as deep as -550 feet msl. This may be sufficiently deep for a direct hydraulic connection between the Deep Aquifer and marine water; however, the above observations suggest that the aquifer may be more exhibiting tidal loading (i.e. the weight of overlying seawater) rather than a direct hydraulic connection to seawater. As discussed below, this appears to be consistent with the fact that most deep wells in the vicinity of Fox Island exhibit very low chloride concentrations. Furthermore, while the time-drawdown and recovery responses observed during testing suggest that the aquifer is extensive, the lack of observed drawdown in nearby Wells 21 and 23 suggest either the existence of unmapped boundaries or inaccurate measurements made during the aquifer test.

Fox Island Mutual Water Rights:

Fox Island is characterized as rural residential. Future land use is not expected to change significantly from current conditions. Currently nearly the entire island is zoned Rural-10, which generally allows 1 dwelling unit per ten acres, however changes to the County zoning code have made the creation of accessory dwelling units (mother-in-law homes) easier to develop which is expected to increase the total number of water users on the system.

FIMWA's service area covers approximately 3,000 acres and consists of all of Fox Island, except for the southern portion of the island, which is served by Peninsula Light Co. Water Division.

FIMWA currently supplies the system from a total of 10 active groundwater wells with a combined capacity of 1,715 gpm. Table 2 lists the water rights associated with the system, and Table 3 lists the rates that the active wells are generally operated at.

Table 2 – Water Rights for Fox Island Water System – Including Recommendation for Well 24

WR.#	Well #	GPM	Additive (AF)	Non-additive (AF)
5670-A	**1 & 5**	100	22.4	-
6998-A	2 & 10	66	100	-
G2-01057	4, 13 & 15	100	107	-
G2-25024	16	70	51	-
G2-25866	11,**14**,16,17 and **24**[1]	260	218.6	33
G2-27086	18	40	-	32
G2-27293	19 and **24**[2]	80	47	17
G2-28411	**20**	250	-	200
G2-28773	**21**	250	14	90
G2-29295	**22**	150		120
G2-29921	**23**	400		322
G2-30375	***24***	***425***	***217***	***125***
Total		**1,766**	**777**	

The wells typically operate below peak capacity due to system conditions and to ensure that water right instantaneous withdrawal limits are not exceeded. The system also includes wells that have been disconnected from the system, but are still available for emergency use. FIMWA's water rights are issued such that the more recently issued water rights allow the Association to fully exercise their water right portfolio from newer sources. Well 24 was drilled to replace Wells 17 and 19 and was approved by WDOH as a source of supply in 2010.

[1] Well 24 Added as a POW via a Showing of Compliance replaces Well 17
[2] Well 24 Added as a POW via a Showing of Compliance replaces Well 19

Table 3 –Production for FIMWA Wells

Active Well Sources	
Well Name	**General Operating Rate (gpm)**
14	54
21	250
24	400
11	56
22	150
15	82
23	400
1	57
5	56
20	210
Totals	**1,715**

The water system currently includes six active reservoirs, with a total active storage capacity of 651,400 gallons.

Demand Forecasting

Based on the forecasted population trend, the number of service connections is projected to increase from the 1,257 supplied in 2010 to 1,961 in 2050. FIMWA uses an Average Daily Demand factor of 354 gallons per day per ERU, which reflects an ongoing conservation program. Based on that demand the predicted annual volume of groundwater required in the year 2050 will be 777 acre-feet. Currently, FIMWA has water rights for 560 acre-feet.

The State Department of Ecology has issued groundwater rights to FIMWA for a peak withdrawal of 1,766 gpm and a maximum annual quantity of 560 acre-feet. Accordingly, we recommend the issuance an additional 217 acre-feet per year to meet future need. Well 24 can be operated at a peak rate of 425 gpm, but will generally be operated at a rate of 400 gpm. Based on a 12 hour average production day FIMWA will produce 342 acre-feet per year from this source. These quantities will be authorized with 217 acre-feet as a primary allocation and the balance of 125 acre-feet as a non-additive allocation. Currently the operation of Well 24 is authorized by G2-25866 and G2-27293. Those two certificates authorized a combined withdrawal of 340 gpm, of which 220 gpm can be produced by wells authorized

by the certificates other than Well 24, accordingly a portion of the Qi amounting to 220 gpm should be considered non-additive and 205 gpm is additive.

Potential for Impairment

Water rights and well logs for wells completed in the Deep Aquifer were examined in order to determine if pumping FIMWA Well 24 would impair other water right holders. Within a mile of Well 24, the only wells and water rights associated with the Deep Aquifer are FIMWA Wells 21 and 23. FIMWA will operate all three wells in combination so as to maximize production.

Given the confined nature of the Deep Aquifer, pumping drawdowns can spread over relatively large distances. PGG is aware of 7 Deep-Aquifer wells or wellfields located within 6 miles of FIMWA Well 24. These points of withdrawal occur on the Gig Harbor Peninsula (Horsehead Bay, Point Fosdick, Gig Harbor) and the mainland east of Tacoma (Lakewood, near Chambers Bay). Although existing information are insufficient to characterize the full geographic extent of the Deep Aquifer, all of these wells are completed at significant depth (predominantly between 350 and 900 feet below msl). Assuming that the Deep Aquifer extends to all of these wells and applying a Theis drawdown analysis (transmissivity of 43,000 gpd/ft, storativity of 0.0001, pumping rate of 324 af/yr, pumping duration of 1 year) predicts that interference drawdown in these wells will range from about 2.6 to 3.5 feet. Given the depth of the well completions and expected static water-level elevations, available drawdown in these wells will not be significantly reduced by these predicted drawdowns.

PGG evaluated the occurrence of shallower wells and associated water rights within close proximity to Well 24. Ecology records indicate the following:

- Two water rights (for 3 wells) are located within ¾ to 1 mile of Well 24;
- Approximately 37 claims have been filed for groundwater and surface water use within ¾ mile of Well 24. Water used is from wells, and a few isolated springs for domestic, stockwater, and irrigation. Four groundwater claims have been filed by FIMWA.
- Twenty-one well reports were on file on Ecology's data base within ¾ mile of Well 24. These wells range in depth from 18 to 318 feet bgs.

Wells and water rights associated with the shallower (Vashon and Sea Level) aquifers are not expected to be affected by Well 24 withdrawals due to the significant thickness of low permeability confining units above the Deep Aquifer. The well log for Well 24 indicates the presence of clay and silt,or clayey/ silty sand or gravels, between 252 to 306 feet bgs, 320 to 356 feet bgs, 465 to 540 feet bgs, 668 to 732 feet bgs and 760 to 792 feet bgs. The well log for Well 23 indicates the presence of silty sand and clay between 366 and 517 feet bgs and fine sand, silt and clay between 517 and 791 feet bgs. These low permeability materials above the Deep Aquifer limit hydraulic communication with the shallower aquifers. Theis calculations similar to above suggest about 5 feet of drawdown within the Deep Aquifer at a distance of ¾ mile. These intervening aquitards would limit drawdown in overlying aquifers to a fraction of the drawdown estimated for the Deep Aquifer. Therefore, pumping of Well 24 is unlikely to impair properly constructed wells in overlying aquifers.

Effects to Surface Water

Minimum instream flows were established in 1981 through Chapter 173-515-040 WAC, the Instream Resources Protection Program for the Kitsap Water Resource Inventory Area (WRIA) 15. Any groundwater withdrawals with priority dates later than the closure dates stated in the WAC must not impair instream flows.

There are no perennial streams indicated on Fox Island on the USGS 7.5-minute topographic map. Even over a wider geographic area, as noted above, impacts to the Vashon Aquifer from pumping the Deep Aquifer are expected to be minimal. Impacts to surficial streams are expected to be similarly insignificant.

Seawater Intrusion

Given the coastal nature of the Gig Harbor Peninsula, seawater intrusion is always a potential concern, not just for FIMWA Well 24, but for other wells completed in the Sea Level and Deep Aquifers. Given minimal drawdown expected in the Sea Level Aquifer, PGG evaluated the potential for seawater intrusion in the Deep Aquifer. As noted above, PGG is aware of 7 points of withdrawal from the Deep Aquifer within 6 miles of Well 24. All but one of these has no reported occurrence of elevated chlorides. Where reported values exist, concentrations of less than 5 mg/l chloride are noted (e.g. Gig Harbor Wells and FIMWA wells 23 and 24). It is interesting to note that the static elevation in Well 24 (15 feet above msl) suggests that the saltwater interface would occur within the completion interval of the well (approximately 600 feet below msl); however, chloride concentrations are very low even during pumping. This observation along with the lack of elevated chloride in most other coastal Deep Aquifer wells and the lack of a constant-head boundary observed in the Well 24 aquifer test data all suggest that the Deep Aquifer may have limited direct hydraulic exposure to marine waters in the Fox Island vicinity.

The Moorelands Corporation has two deep wells in the Horsehead Bay vicinity, completed at elevations of almost 600 feet below msl and located 2.6 miles northwest of Well 24. Their wells have exhibited slightly elevated chlorides from the time of development, with a slight increase from between 50 and 65 mg/l in the 1990's to between 65 and 75 mg/L post-2000. Review of their well logs suggests the possibility of enhanced hydraulic connection between the Deep Aquifer and the Sea Level Aquifer in this location where the Sea Level Aquifer is known to exhibit elevated chlorides. The driller's log for one of Moorelands' deep wells shows only about 70 feet of clay/silt occurrence between the two aquifers, whereas the other log shows as much as 180 feet. Limited isolation between aquifers in this area could explain the locally higher chloride concentrations in the Deep Aquifer.

Beneficial Use

Municipal water supply is considered a beneficial use of water. FIMWA is a qualifying municipal water supply provider, operating in accordance with a Department of Health approved water system plan.

Availability

Water is physically available for appropriation. This well has been in use for this purpose since 2009 and has provided a consistent source of water to the applicant. Testing has indicated that the well can be reliably operated at rate of 400 to 425 gallons per minute.

Potential for Impairment

Other Groundwater Users

Groundwater wells at greatest risk of potential impairment are those which are completed in the same aquifer zone as the subject well, located in close proximity to the subject well. An evaluation of relatively shallow wells within a one mile radius of the production well and deeper wells within an approximate 6 miles radius indicates that projected drawdown to other groundwater users is not significant enough to impair its operation.

Washington water law does not consider drawdown to be an impairment of existing water rights, unless the affected wells fully penetrate the aquifer and can no longer produce adequate water to meet the demands for which they were intended. The aquifer shows adequate capability to produce water in the amount requested without impairment to neighboring wells.

Surface Water Bodies

There are no perennial streams located on Fox Island. Even over a wider geographic area, impacts to the Vashon Aquifer from pumping the Deep Aquifer are expected to be minimal. Impacts to surficial streams are expected to be similarly insignificant.

Public Interest

RCW 90.03.290 requires that a proposed appropriation not be detrimental to the public interest.

The 1971 Water Resources Act provides the most comprehensive list of legislative policies that guide the consideration of public interest in the allocation of water. These policies generally require a balancing of the state's natural resources and values with the state's economic well-being. Specifically, the policies require allocation of water in a manner that preserves instream resources, protects the quality of the water, provides adequate and safe supplies of water to serve public need, and makes water available to support the economic well-being of the state and its citizens.

Public water supply is considered a beneficial use in accordance with RCW 90.54.020.

CONCLUSIONS

The conclusions based on the above investigation are as follow:

1. The proposed appropriation for municipal supply is a beneficial use of water;

2. The 425 gpm and 342 acre-feet per year – *217 acre-feet primary and 125 acre-feet is non-additive*, is available for appropriation;
3. The new appropriation will not impair senior water rights; and
4. The new appropriation will not be detrimental to the public interest.

RECOMMENDATION

Based on the information presented above, the author recommends that the request to appropriate 425 gpm, be approved in the amounts described, limited, and provisioned on page 1 through 3 of this report.

Report by: _____

Jill Van Hulle Date

Reviewed by: _____

Phil Crane, Water Resources Program 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.