STATE OF WASHINGTON
REPORT OF EXAMINATION
for Permit to Appropriate State Waters
Water Right Control Number G1-27885

PRIORITY DATE	CLAIM NO.	PERMIT NO.	CERTIFICATE NO.
February 20, 1998			

NAME
Harbor Hill Water System

ADDRESS/STREET	CITY/STATE	ZIP CODE
1787 Dusty Lane	Freeland, WA	98249

PUBLIC WATERS TO BE APPROPRIATED

SOURCE	WRIA	COUNTY
Well	6	ISLAND

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE FEET PER YEAR
	25	4.5

QUANTITY, PURPOSE OF USE, PERIOD OF USE
4.50 acre-feet, Multiple domestic, Year round as needed

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL
250 feet south and 250 feet west of north quarter corner Section 14, Township 29 N, Range 03E, W.M.

SOURCE	QTR/QTR	SECTION	TOWNSHIP	RANGE
Well	NE1/4 NW1/4	14	29N	02E

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED
[Attachment 1 shows location of the authorized place of use and point(s) of diversion or withdrawal]

Legal description is found on Attachment 2.

DESCRIPTION OF PROPOSED WORKS

Water system serves the following lots within the plat of Harbor Hill Division I: 1-3, 3-3, 4-1, 4-2, 4-3, 5-0, 5-1, 6-2, 7-1, 7-3, 8-1, 10-3, 11-2, 12-2, 16-3

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE	COMPLETE PROJECT BY THIS DATE	WATER PUT TO FULL USE BY THIS DATE
Started	Completed	January 1, 2013

PROVISIONS

STANDARD PROVISIONS

1. **Measurements, Monitoring, Metering and Reporting**
   1.1. 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.

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

   1.3. 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. Installation, operation and maintenance requirements are enclosed as a document entitled "Water Measurement Device Installation and Operation Requirements". http://www.ecy.wa.gov/programs/wr/measuring/measuringhome.html

   1.4. In order to maintain a sustainable supply of water, pumping must be managed so that static water levels do not progressively decline from year to year. Water levels shall be measured and recorded in April and September, using a consistent methodology. The length of the pumping period or recovery period prior to each measurement shall be constant, and shall be included in

the record. Data for the previous year shall be submitted by January 31 to the Department of Ecology.

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

1. Unique Well ID Number
2. Measurement date and time
3. Measurement method (air line, electric tape, pressure transducer, etc.)
4. Well status (pumping, recently pumped, etc.)
5. Water level accuracy (to nearest foot, tenth of foot, etc.)
6. Description of the measuring point (top of casing, sounding tube, etc.)
7. Measuring point elevation above or below land surface to the nearest 0.1 foot
8. Land surface elevation at the well head to the nearest foot.
9. Static water level below measuring point to the nearest 0.1 foot.

2. **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, prior to beginning (or modifying) your project.

3. **Chloride Monitoring**
In November of each year, the following information shall be submitted in writing to the Department of Ecology, Northwest Regional Office, Bellevue, Washington.

April and September measurements from the subject well(s) of:

- Chloride and conductivity (the chemical analysis shall be performed by a state-accredited laboratory)
- Depth to static water level (with pump off long enough to allow for stabilization)
- The chloride/conductivity sampling and the static water level measurement shall be conducted concurrently.

This data collection will assist the applicant and Ecology in determining if actions are necessary to prevent an increasing trend in chloride concentrations (an indicator of seawater intrusion). Preventative actions may include – reducing the instantaneous pumping rate, reducing the annual volume pumped, scheduling pumping to coincide with low tides, raising the pump intake, and/or limiting the number of service connections.

4. **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.

5. **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 FACT AND ORDER

Upon reviewing the investigator's report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I find the permit for water right as recommended will not be detrimental to existing rights or the public welfare.

Therefore, I ORDER the requested permit under Water Right Application No. G1-27885, subject to existing rights and the provisions specified above.

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

- File your appeal with the Pollution Control Hearings Board within 30 days of the "date of receipt" of this document. Filing means actual receipt by the Board during regular office hours.
- Serve your appeal on the Department of Ecology within 30 days of the "date of receipt" of this document. Service may be accomplished by any of the procedures identified in WAC 371-08-305(10). "Date of receipt" is defined at RCW 43.21B.001(2).

Be sure to do the following:

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

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

Mail appeal to:	OR	Deliver your appeal in person to:
The Pollution Control Hearings Board PO Box 40903 Olympia WA 98504-0903		The Pollution Control Hearings Board 4224 – 6th Ave SE Rowe Six, Bldg 2 Lacey WA 98503

2. To serve your appeal on the Department of Ecology

Mail appeal to:	OR	Deliver your appeal in person to:
The Department of Ecology Appeals Coordinator P.O. Box 47608 Olympia WA 98504-7608		The Department of Ecology Appeals Coordinator 300 Desmond Dr SE Lacey WA 98503

3. And send a copy of your appeal to:

Andrew B. Dunn, LG, LHG
Section Manager
Water Resources Program -- Department of Ecology
3190 160th Avenue SE
Bellevue, WA 98008-5452

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 .

If you have any questions, please contact Noel Philip of Ecology at (425) 649-4451.

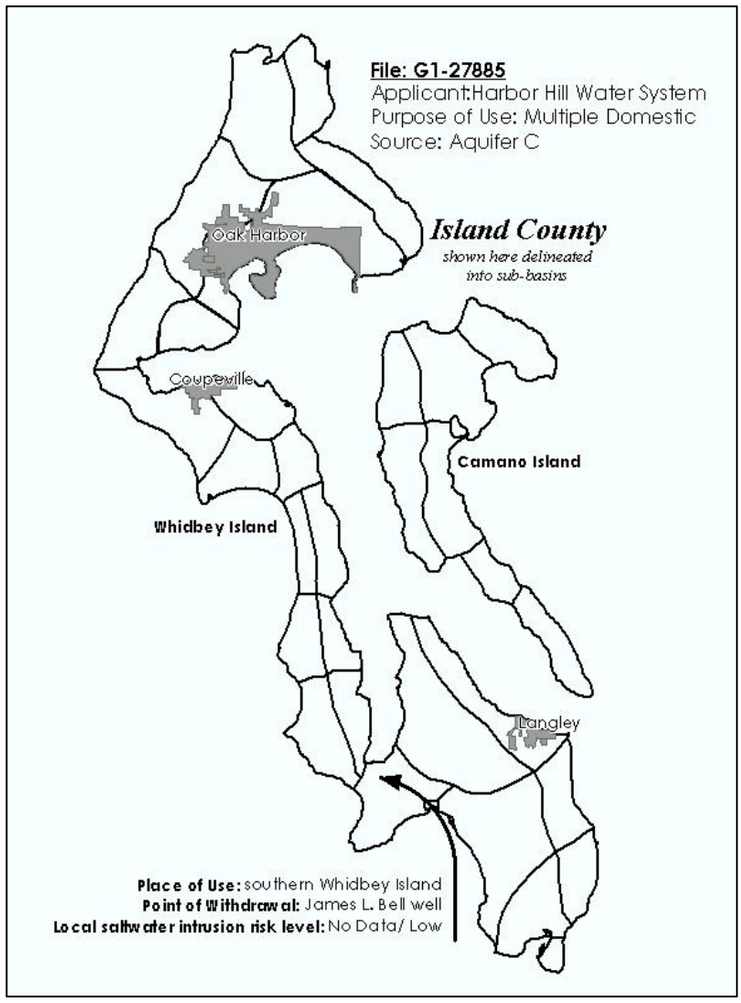
Signed at Bellevue, Washington, this _____ day of _____ 2009.

_____
Andrew B. Dunn, LG, LHG
Section Manager
Water Resources Program
Northwest Region Office

INVESTIGATOR'S REPORT
Noel S. Philip, LG, Department of Ecology
Water Right Control Number G1-27885

Background

Groundwater App. No.G1-27885
Applicant Name: Harbor Hill Water System
Priority Date: February 20, 1998
Source: Aquifer C, well
Purpose of Use: Multiple Domestic
Period of Use: Year-round continuous
Notice of Publication:Whidbey News Times, March 31 and April, 7, 2007
Protests: None received during 30-day protest period
SEPA Compliance:Exempt



Harbor Hill submitted Groundwater Application G1-27885 to the Department of Ecology to appropriate state waters February 20, 1998. The well is located in NE ¼ , NW ¼ of Section 14, Township 29N, Range 2E, Island County (Attachment 1). The place of use is shared with service from the Sunnyview Farms Water System. The undeveloped area in the place of use is to be served by the Sunnyview Farms system.

Whidbey Island Hydrogeology

As noted by Easterbrook (1968), Whidbey Island is generally composed of unconsolidated Pleistocene glacial and interglacial deposits overlying Tertiary and older bedrock. The Island County Groundwater Management Plan, Part A, Technical Memorandum, (GWMP) describes the groundwater flow system on Whidbey Island as a series of discontinuous water-bearing zones (sand and gravel aquifers) surrounded by zones of lower-permeable glacial sediments (silt, clay and till aquitards). All recharge to the system originates as rain falling on the surface of the island. Groundwater generally flows downward in the inland portions of the island then outward through the aquifers toward the coast and offshore. In these discharge areas, groundwater generally flows from deeper to shallower aquifer zones and then discharges to the sea where the aquifers intersect a cliff, beach face or ocean bottom.

The series of aquifers on Whidbey Island is complex, resulting from the deposition and erosion patterns created by at least three glaciation and three inter-glaciation periods. Although the USGS has designated five aquifer zones, termed A (oldest) through E (youngest), these zones are laterally discontinuous, vary in depth and thickness, and may be interconnected at various locations. The degree of connection with marine waters is also likely variable. As a result, the effect of withdrawing groundwater from any particular depth and location could have widely variable impacts on nearby wells and on the potential for seawater intrusion.

INVESTIGATION

Hydrogeology Near G1-27885

The Harbor Hill well is approximately 3,675 feet southeast of Holmes Harbor, Puget Sound, on southern Whidbey Island (Attachment 1). James L. Bell Water Well Drillling constructed the well (Figure 1), extending into the Whidbey Formation. Easterbrook describes the Whidbey Formation as glacial deposits consisting of horizontally and cross-bedded layers of sand, silt, and clay with two distinct organic (peat) layers. The well likely penetrates Aquifer C, the hydrogeologic unit commonly appearing near sea-level on Whidbey Island. The entire unit is described as a zone containing many small, separate aquifers; not one laterally continuous water-bearing zone. The well log shows the driller's interpretation of materials as they were brought to the surface.

The screened interval spans a zone of water-bearing sand and gravel. The static water level measured in 2008 is present approximately -1 feet MSL (Table 1), is above the screened layer but below the "Brown clay and sand," (a likely

Table 1. Well construction details.	Well #1
Date completed	10/13/1967
Casing diameter (inches)	6
Static Water Level (TOC)[1]	178[1]
Wellhead elevation (MSL)	177
Static Water Level elevation (MSL)	-1
Screened Interval (MSL)	-23 to -12
Height of water column above screen	11
Volume of static water column above pump intake	16 gallons

Note (1): TOC = top of well casing: Ecology measurement 07/23/08; MSL = feet relative to sea level; Units are feet unless otherwise noted.

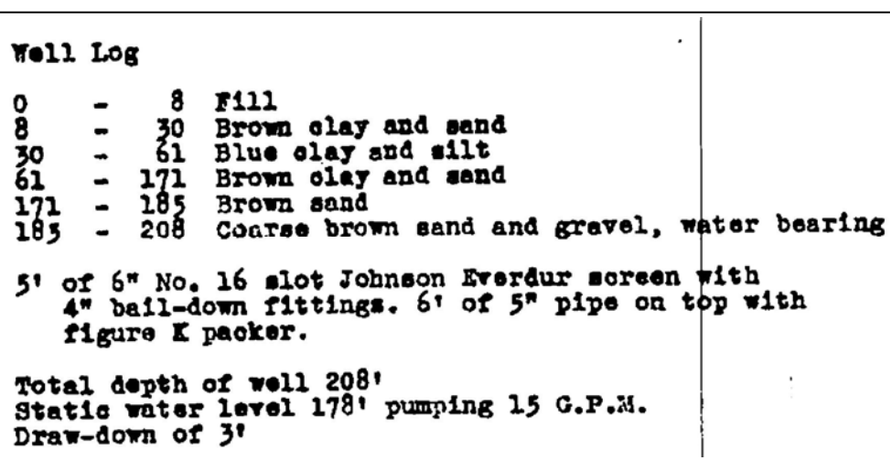
confining unit), extending from 61-171 feet below ground surface. This static measurement is consistent with measurements recorded at the time of well completion in 1967. The water level is below a confining layer in the hydrogeologic unit, thus the aquifer likely acts as an unconfined, or water table, aquifer at this point of withdrawal.

Water Availability, Pump Test Data (Dillenberger, 1998)

The well sustained a withdrawal rate of 25 gpm during the pump test. Recovery occurred within a reasonable amount of time. Water levels in the pumped well declined approximately 2.07 feet, and reached this level (i.e. stabilized) in 60 minutes. Near-full recovery occurred after 30 minutes to pre-pumping conditions. The summary of pump test data is provided in Table 2, below:

Table 2. Pump test data.	
Date	02/18/1998
Rate (gpm)	25
Duration (hours)	22
Static Water Level (TOC)	177.18
Pumping Water Level	179.25
Drawdown	2.07
Stabilization Time	60 minutes
Available Head During Pumping	9 feet
Recovery Level (TOC)	177.20
Recovery Time	30 min

The pump test and recovery data show water was available in 1998 for multiple domestic use. Ecology staff measured the distance 179.06 to pumping water level July 23, 2008. A subsequent reading within ten minutes of pump shutdown showed 177.93 feet to water in the well. These two values show the stability of this well in its production at the current


Well Log

0 - 8 Fill
8 - 30 Brown clay and sand
30 - 61 Blue clay and silt
61 - 171 Brown clay and sand
171 - 185 Brown sand
185 - 208 Coarse brown sand and gravel, water bearing

5' of 6" No. 16 slot Johnson Everdur screen with 4" bail-down fittings. 6' of 5" pipe on top with figure K packer.

Total depth of well 208'
Static water level 178' pumping 15 G.P.M.
Draw-down of 3'

Figure 1. Well log of Harbor Hill well. The lithology encountered by the driller shows similarity between stratigraphy and depths when compared with other wells in the area. Modified from Ecology well log database.

pumping rate. The water level had not fully recovered since pumping ceased, but the depth to water is comparable to the static measurement of the pump test ten years earlier. Regular monitoring of static water levels shall be necessary to promote awareness of water levels and availability, and prevent groundwater mining.

The annual water requirement for the Harbor Hill multiple domestic use is estimated, taking the number of anticipated connections and multiplying by estimations of water use per connection. Residential water use is based on historical and current water use data from similar water systems on Whidbey Island. Presently, these data indicate that average water use per connection is approximately one-third (0.3) acre-foot per year. At this rate, the annual water quantity required by the applicant to serve 15 residential connections is 4.5 acre-feet per year.

The Harbor Hill system is a fully built, completed project that has water system management that keeps records of their use. The permit should issue with a development schedule necessary to accommodate the collection of records needed for proof of appropriation.

Potential for Seawater Intrusion

The greatest threat to groundwater in Island County is seawater intrusion. The potential for seawater intrusion relates to the elevation of the groundwater (or potentiometric surface) relative to sea level. Aquifers having little or no groundwater head above sea level are susceptible to intrusion. Other factors such as recharge rate, pumping rate, aquifer transmissivity, hydraulic gradient, seasonal variation, and the geometry of the aquifer can influence the distribution and magnitude of seawater intrusion resulting from any particular withdrawal. Increasing concentrations of chloride in groundwater can be an indication of seawater intrusion. Unaffected groundwater in Island County generally contains a chloride concentration between 10-20 mg/L. Concentrations of 100 mg/L or greater provide evidence of seawater intrusion unless other sources of chloride are present such as naturally occurring hard groundwater.

The Island County Health Department (Kelly, 2005) classifies the area of withdrawal low risk (or no data), for seawater intrusion. However, the classification matrix for individual well sites shows the low groundwater level elevation (-1 MSL) is cause for greater scrutiny than wells with water levels above 8.4 MSL. While the subject wells themselves show no signs of seawater intrusion and water level stability based use over the last 23 years, long term pumping (decades more) may promote the advancement of the saltwater-freshwater interface throughout the lifetime of the permit, to say nothing of water use in perpetuity. Such an event could impair the use of wells completed in the same aquifer between the Maple Hill well and both coasts. Impairment is discussed in the next section.

Water quality data from samples taken throughout the test from both wells show little variation over 24 hours of pumping. The most recent data from samples collected in 2005 show similar chemistry levels: 17 mg/L chlorides and 330 mhos conductivity, and 150 mg/L hardness. Ecology obtained these values from the Washington State Department of Health SENTRY online water system database. Records submitted by Maple Hill from 2007 show similar values for chemical components (Cl-: 16 mg/L, Cond.: 380, CaCO3: 180), further showing stable conditions. Regular, diligent monitoring and reporting is necessary to describe current conditions and help citizens and administrators prevent degradation of the aquifer.

Impairment to Existing Water Rights and Exempt Wells

Groundwater wells at greatest risk of potential impairment are those completed in the same aquifer zone, located in close proximity, and hydrogeologically down-gradient from the subject well. As water in the aquifer travels toward wells located down-gradient, the subject well may capture this water and impair the production of down-gradient wells. Also, surface water diversions located within a close proximity of the subject well may be impacted by the groundwater withdrawal, depending upon hydraulic continuity between the aquifer and surface water body. An arbitrarily, yet conservatively chosen area of one-half mile (1/2-mile) is used to define “close proximity.” This value is justified experimentally based on current and historical pump test data showing negligible drawdown, and therefore unlikely impairment to wells or surface water diversions, induced by groundwater withdrawal at distances of 1000 feet in most cases. Furthermore, it is widely understood the aquifer systems in Island County are not laterally continuous, suggesting physical barriers exist in addition to limiting hydraulic conditions.

The Department of Ecology Water Rights Application Tracking System (WRATS) and Well Log databases and the Island County Hydrogeology database (March 2003) show the existence of four water right certificates, three permits, and 18 water right claims within a 1/2-mile radius of the Harbor Hill Well. At least seven of the 27 production wells of record within one half mile are likely tied to these water rights, and some are likely exempt from the application process. Still others may be sources for existing water right certificates or claims under a different name.

A water right claim is a statement describing the beneficial use of water occurring prior to the adoption of the water right codes and is not authorized by a state-issued permit or certificate. It is unknown whether the nearby claims are valid, not valid, or once valid and now relinquished back to the state. The Department of Ecology cannot verify the validity of these claims, as water right claims can only be confirmed in an adjudication by a Washington State Superior Court. Exempt withdrawal of public groundwater is defined in RCW 90.44.050.

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 their allocations. Therefore, due to this and the low pumping rate, impairment to any senior water rights due to pumping of the Harbor Hill wells is unlikely.

Public Interest Considerations

Factors considered in determining whether this use of water is in the public interest include but were not limited to: consideration given to exempt wells; existing water right certificates, applications, and claims; potential impacts to the aquifer subject to withdrawal as it pertains to drawdown and water quality (i.e. sea-water intrusion); beneficial use of water as a resource defined in this report. No detriment to the public interest could be identified during the investigation of the subject application. Available data show existing wells in the area are not expected to be impaired by the anticipated operation of the subject well.

Consideration of Protests and Comments

No protests were filed against this application.

CONCLUSIONS

The Harbor Hill Water System is fully built-out, and needs only a few years to perfect their water use. Currently the system is in negotiations with Freeland Water District, a municipality, regarding annexation. At the time the permit holder pursues their proof of appropriation, examination should be made to determine the status of that activity and provide guidance for both parties to navigate Ecology water right regulations.

RECOMMENDATIONS

Based on the above investigation and conclusions, I recommend that the request for permit be approved in the amounts and within the limitations listed below and subject to the provisions beginning on Page 2, et seq.

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:

- 25 gpm
- 4.5 acre-feet per year
- Multiple domestic

Point of Withdrawal

NE¼, NW¼, Section 14, Township 29 North, Range 02E.W.M.

Place of Use

As described on Page 1 of this Report of Examination.

References

Dillenberger, Doug, Northwest Hydrogeo Consultants. 22 Hour Pumping Test on Existing Well, Conducted at the Harbor Hill Community, Freeland, Washington. March 19, 1998.

Easterbrook, Don J., Henry W. Anderson, and A.S. Van Denburgh. Pleistocene Stratigraphy of Island County (Part I), Ground-Water Resources of Island County (Part II). United States Geological Survey, Water Resources Division, 1968.

Economic and Engineering Services. Island County Groundwater Management Plan Part A Technical Memorandum. Olympia: Economic and Engineering Services, Inc., 1989.

Economic and Engineering Services. Island County Coordinated Water System Plan Regional Supplement. Olympia: Economic and Engineering Services, Inc. in association with Hart-Crowser & Associates, 1990.

Kelly, Doug. Island County Water Resources Management Plan: Saltwater Intrusion Topic Paper. Coupeville: Island County Department of Health, Environmental Health Division, 2005.

National Resource Conservation Service. Washington Irrigation Guide. United States Department of Agriculture, National Resource Conservation Service, 2007. Available for download as of May 22, 2008 at: http://www.wa.nrcs.usda.gov/technical/ENG/irrigation_guide/index.html.

Sapik, C.B., et al. Ground-Water Resources and Simulation of Flow in Aquifers Containing Freshwater and Sea Water, Island County, Washington. Tacoma: United States Geological Survey, Water Resources Investigations Report, 1988.

Report by: _____

_____

Noel S. Philip, LG Date
Water Resources Program

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.

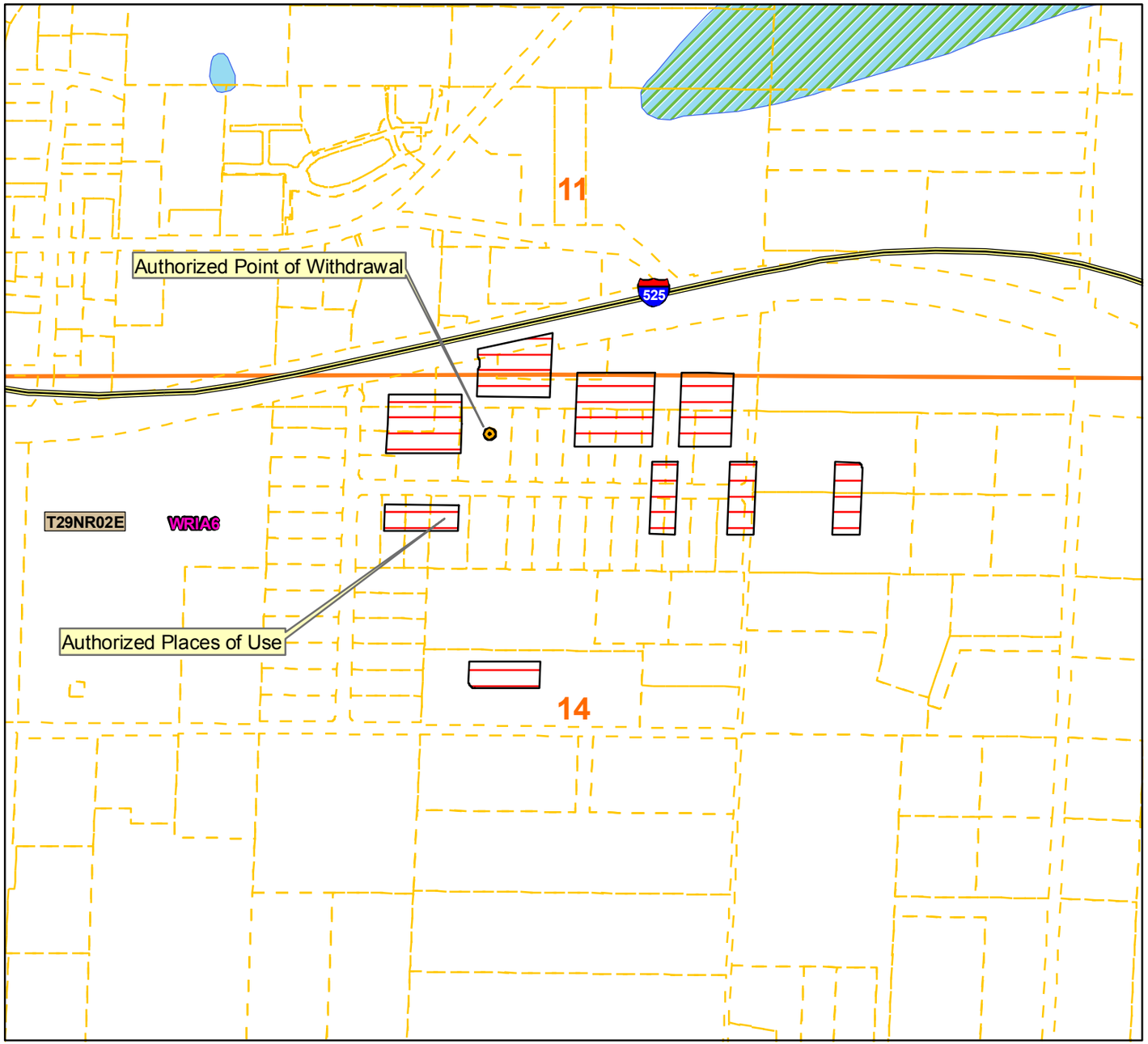
DESCRIPTION

THE PLAT OF HARBOR HILL, DIVISION NO. ONE, EMBRACES THE FOLLOWING DESCRIBED TRACT OF LAND IN SECTIONS 11 AND 14, TOWNSHIP 29 NORTH, RANGE 2 EAST OF THE WILLAMETTE MERIDIAN, INCLUDING LOTS 7, 8, 9, 10 AND A PORTION OF LOT 18, SUNNY VIEW FARMS, AS PER PLAT RECORDED IN VOLUME 2 OF PLATS, PAGE 41:

BEGINNING AT THE NORTHWEST CORNER OF SAID LOT 9, THENCE SOUTH 89° 52' 23" EAST 1319.04 FEET TO THE NORTHEAST CORNER OF THE NORTHWEST QUARTER OF THE NORTHEAST QUARTER OF SAID SECTION 14; THENCE SOUTH 2° 00' 51" WEST 662.99 FEET ALONG THE EAST LINE OF SAID NORTHWEST QUARTER OF THE NORTHEAST QUARTER; THENCE NORTH 89° 54' 48" WEST 1318.16 FEET TO THE SOUTHWEST CORNER OF SAID LOT 10; THENCE SOUTH 1° 56' 07" WEST 663.89 FEET TO THE SOUTHEAST CORNER OF THE NORTHEAST QUARTER OF THE NORTHWEST QUARTER OF SAID SECTION 14; THENCE SOUTH 89° 47' 02" WEST 661.44 FEET ALONG THE SOUTH LINE OF SAID NORTHEAST QUARTER OF THE NORTHWEST QUARTER; THENCE NORTH 1° 49' 45" EAST 1325.60 FEET TO THE NORTHWEST CORNER OF SAID LOT 7; THENCE NORTH 1° 54' 40" EAST 18.51 FEET ALONG THE WEST LINE OF THE SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SAID SECTION 11 TO THE SOUTH LINE OF STATE HIGHWAY 525; THENCE NORTH 77° 30' 27" EAST 685.06 FEET ALONG SAID SOUTH LINE TO THE EAST LINE OF SAID SOUTHEAST QUARTER OF THE SOUTHEAST QUARTER OF THE SOUTHWEST QUARTER OF SECTION 11; THENCE SOUTH 1° 56' 53" WEST 162.18 FEET TO THE POINT OF BEGINNING.

Harbor Hill Water System
Water Right Number G1-27885
Sec.14 T 29N R 02E W.M.
WRIA 6 - Island County

DEPARTMENT OF ECOLOGY
State of Washington



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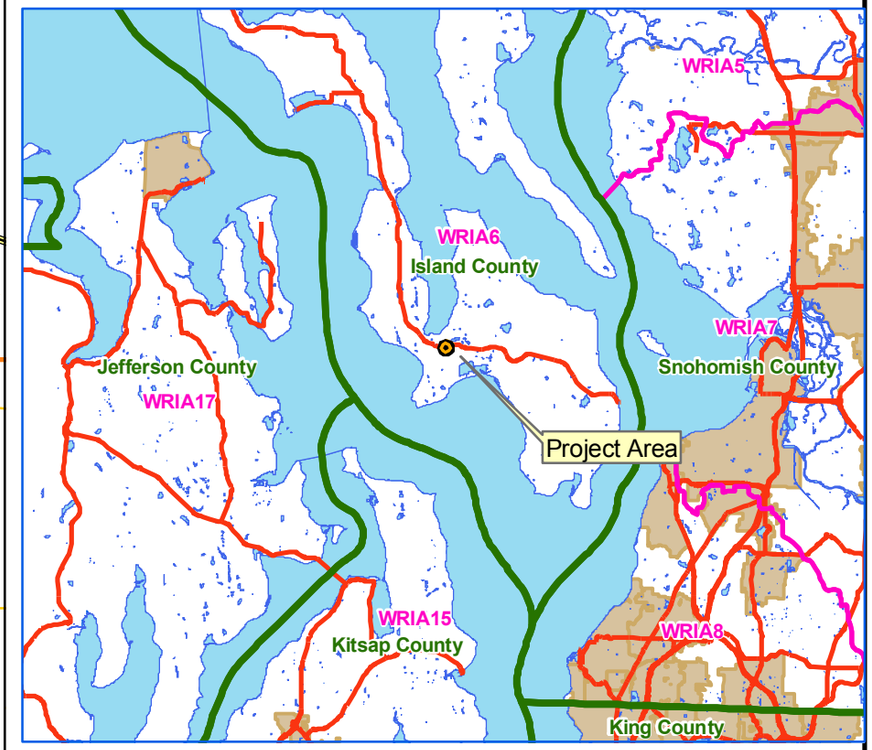

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Legend

- County
- WRIA
- Highways
- Townships
- cities
- Sections
- Authorized Point of Withdrawal
- Authorized Place of Use

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.'

Attachment 1