STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

REPORT OF EXAMINATION
Change of: Point of Withdrawal, Place of Use, Purpose of Use
WRTS File #: CG1-20497C

PRIORITY DATE	CLAIM NO.	PERMIT NO.	CERTIFICATE NO.
January 4, 1971			G1-20497C

NAME
Cedar River Water and Sewer District

ADDRESS/STREET	CITY/STATE	ZIP CODE
P.O. Box 1040	Maple Valley, WA	98038

PUBLIC WATERS TO BE APPROPRIATED

SOURCE

Deep Well (Well 3) at Maplewood Estates

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND (cfs)	MAXIMUM GALLONS PER MINUTE (gpm)	MAXIMUM ACRE FEET PER YEAR (ac-ft/yr)
	127*	4.1*

QUANTITY, TYPE OF USE, PERIOD OF USE

Municipal supply – Continuously

*Instantaneous and annual quantities represent the amounts that may be withdrawn from the Maplewood Estates Deep Well under this water right. These quantities are a portion of the total of 453 gpm and 110.8 afy that may be withdrawn from the well under rights G1-00387C, G1-00387C@2, G1-23937C, G1-26357C, Ground Water Certificate 3908-B, and G1-20497C.

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL

1,040 feet east and 1,170 feet south from the northwest corner of Section 13, T. 22 N., R. 06 E. W.M.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP	RANGE	WRIA	COUNTY
NW1/4 NW1/4	13	22 N.	06 E. W.M.	8	King

PARCEL NUMBER	LATITUDE	LONGITUDE	DATUM

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

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]

The place of use (POU) of this water right is the service area described in the most recent Water System Plan/Small Water System Management Program approved by the Washington State Department of Health, so long as Cedar River Water and Sewer District (CRWSD) 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.

DESCRIPTION OF PROPOSED WORKS

The Maplewood Estates system, which will supply less than 5 percent of Cedar River Water and Sewer District's total supply, will serve the eastern and central portions of the service area. The system consists of a 16-inch diameter (at surface), 550-foot deep well that will supply water to some central and eastern area customers through pipes ranging in size from 2 inches to 20 inches. The pipes in the area are approximately 36 percent asbestos cement, 53 percent

ductile iron, 11 percent PVC, and less than 1 percent cast iron. The area to be served by this well contains three steel storage reservoirs. One is located on Rock Mountain (18059 E. Lake Desire Rd.) and has a capacity of 0.5 million gallons. The second is located within the central portion of the central area (20015 206th Ave. SE) and has a capacity of 2 million gallons. The third, recently completed, is a 1-million-gallon reservoir located in the eastern portion of the service area near 184th St. SE.

DEVELOPMENT SCHEDULE		
BEGIN PROJECT BY THIS DATE	COMPLETE PROJECT BY THIS DATE	WATER PUT TO FULL USE BY THIS DATE
Begun	February 28, 2014	February 28, 2019

PROVISIONS

Wells, Well logs and Well Construction Standards

1. In accordance with WAC 173-160, wells shall not be located within certain minimum distances of potential sources of contamination. These minimum distances shall comply with local health regulations, as appropriate. In general, wells shall be located at least 100 feet from sources of contamination. Wells shall not be located within 1,000 feet of the boundary of a solid waste landfill.

2. 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.

3. 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.

4. Installation and maintenance of an access port as described in WAC 173-160- 291(3) is required.

Measurements, Monitoring, Metering and Reporting

5. An approved measuring device shall be installed and maintained for each of the sources authorized by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", WAC 173-173. http://www.ecy.wa.gov/programs/wr/measuring/measuringhome.html

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

7. The following information shall be included with each submittal of water use data:
   a. owner,
   b. contact name (if different from owner),
   c. mailing address,
   d. daytime phone number,
   e. WRIA,
   f. period of use,
   g. Permit/Certificate/Claim No.,
   h. source name,
   i. annual quantity used including units,
   j. maximum rate of withdrawal including units,
   k. well tag number

   In the future, the Department of Ecology may require additional parameters to be reported or more frequent reporting. The Department of Ecology prefers web based data entry, but does accept hard copies. The Department of Ecology will provide forms and electronic data entry information. http://www.ecy.wa.gov/pubs/ecy070170.pdf

8. 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

9. In order to maintain a sustainable supply of water as required under RCW 90.44.070, pumping must be managed so that static water levels do not progressively decline from year to year. Water levels shall be measured and recorded monthly, using a consistent methodology. The length of the pumping period or recovery period prior to each measurement shall be constant, and shall be included in the record. Data shall be submitted annually, in the month of February, to Ecology. If static water levels show a declining trend, consultation with Ecology shall take place and the operator shall be prepared to minimize pumping effects by altering or ceasing withdrawal.

Municipal Supply and Public Water Systems

10. If the criteria in RCW 90.03.386(2) are not met and a Water System Plan/Small Water System Management Program was approved after September 9, 2003, the place of use of this water right reverts to the service area described in that document. If the criteria in RCW 90.03.386(2) are not met and no Water System Plan/Small

    Water System Management Program has been approved after September 9, 2003, the place of use reverts to the last place of use described by The Department of Ecology in a water right authorization.

11. 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.

Schedule and Inspections

12. 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.

13. The water right holder shall file the notice of project completion 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 superseding certificate will reflect the extent of beneficial use within the limitations of the change authorization. Elements of the project completion inspection may include, as appropriate, the source(s), system instantaneous capacity, beneficial use(s), annual quantity, place of use, and compliance with provisions.

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 change of water right as recommended will not be detrimental to existing rights.

Therefore, I ORDER approval of the recommended change in point of withdrawal, place of use, and purpose of use under Change Application No. CG1-20497C, subject to existing rights and the provisions listed above.

You have a right to appeal this ORDER. 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:		Deliver your appeal in person to:
The Pollution Control Hearings Board PO Box 40903 Olympia, WA 98504-0903	OR	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:		Deliver your appeal in person to:
The Department of Ecology Appeals Coordinator P.O. Box 47608 Olympia, WA 98504-7608	OR	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
Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008

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 .

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

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

BACKGROUND

Water System Information

Cedar River Water and Sewer District (CRWSD) is located in the southeastern portion of King County. Its service area consists of approximately 36 square miles located south and east of the City of Renton in the vicinity of the City of Seattle's Lake Youngs watershed. The District's water service area includes portions of the City of Maple Valley and unincorporated King County (Pace, 2006).

According to their 2008 Comprehensive Plan, CRWSD currently serves 9,200 ERUs (Equivalent Residential Units) through approximately 7,400 connections. CRWSD's supply water is primarily provided by Seattle Public Utilities (SPU) through two metered connections. CRWSD also maintains 4 interties with Covington Water District.

Cedar River Water and Sewer District presently holds three ground water rights that authorize withdrawal of 320 gpm and 97 afy from their Maplewood Estates Deep Well (see Table 2).

Description and Purpose of Proposed Change

Cedar River Water and Sewer District (CRWSD) recently acquired 3 separate water rights certificates (Ground Water Certificates 3908, G1-20497C, and S1-20446C) within its service area totaling 537 gallons per minute (gpm) and 311 acre-feet per year (afy). Additionally, CRWSD acquired 3 separate exempt well uses. CRWSD submitted change applications for all 6 water rights in a batch proposing to move the point of withdrawal of all of the rights to a single, deep well located approximately 2 miles north-northwest of Landsburg. See Figure 1.

The subject application proposes to change the point of withdrawal, place of use, and purpose of use for a water right originally issued to serve irrigation and domestic needs on a small farm owned by a Mr. Veenhuizen. The proposed purpose is municipal within the service area of CRWSD. The proposed point of withdrawal is the Maplewood Estates Deep Well.

Attributes of the Certificate and Proposed Change

Table 1 Summary of Proposed Changes to Water Right No. G1-20497

Attributes	*Existing*	*Proposed*
Name	Veenhuizen (now owned by Quadrant Corporation)	Cedar River Water and Sewer District
Priority Date | Date of Application for Change	March 20, 1973	April 29, 2005
Instantaneous Quantity	200.00 gpm	200.00 gpm
Annual Quantity	45.00 acre-feet per year	45.00 acre-feet per year
Source	well	Maplewood Estates Deep Well
Point of Diversion or Withdrawal	NE 1/4 SE 1/4 Township 23 North, Range 5 East, Section 22	NW 1/4 NW 1/4 Township 22 North, Range 06 East, Section 13
Purpose of Use	Group domestic, irrigation, stockwater	Municipal
Period of Use	Year-round and April 15 to October 15	Year-round
Place of Use	NE 1/4 SE 1/4 of Sec. 22, T 23 N, R 05 E, W.M. lying south of C & PS Railway right-of-way and west of a line beginning 345.6 feet west of the southeast corner of said subdivision; thence north 12° 15'00" east 1090.3 feet; LESS north 730 feet of the west 3 feet lying westerly of the above described line and LESS right-of-way.	CRWSD service area (see Page 1)

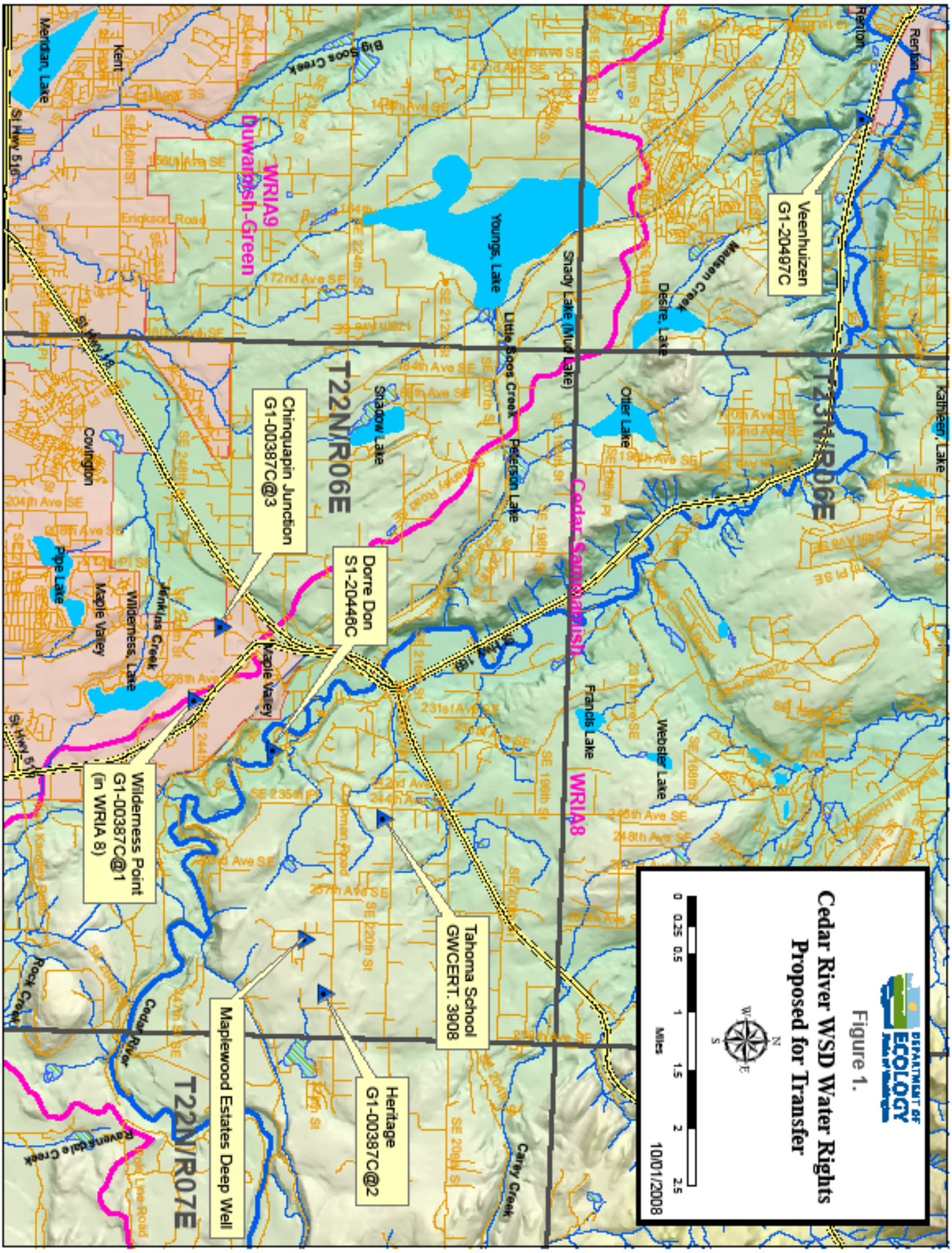
Figure 1.
Cedar River WSD Water Rights
Proposed for Transfer
DEPARTMENT OF ECOLOGY
0 0.25 0.5 1 1.5 2 2.5
Miles
10/01/2008
Veenhuizen
G1-20497C
Chinquapin Junction
G1-00387C@3
Dorre Don
S1-20446C
Wildemess Point
G1-00387C@1
(in WRIA 8)
Tahoma School
GWCERT. 3908
Heritage
G1-00387C@2
Maplewood Estates Deep Well
T23N/R06E
T22N/R06E
T22N/R07E
WRIA9
Duwamish-Green
WRIA8
Cedar-Sammamish
Renton
Kathleen, Lake
Desire, Lake
Otter Lake
Shady Lake (Mud Lake)
Youngs, Lake
Little Soos Creek
Peterson Lake
Shadow Lake
Francis Lake
Webster Lake
Big Soos Creek
Meridian, Lake
Kent
Covington
Maple Valley
Pipe Lake
Wilderness, Lake
Cedar River
Rock Creek
Ravensdale Creek
Carey Creek

Legal Requirements for Proposed Change

The following is a list of requirements that must be met prior to authorizing the proposed changes in point of withdrawal, place of use, and purpose of use.

- **Public Notice**

  The proposed changes were published in the Seattle Times on August 30 and September 6, 2007.

- **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.

- It is a surface water right application for more than 1 cubic feet 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;
- It is a groundwater right application for more than 2,250 gallons per minute;
- It is an application that, in combination with other water right applications for the same project, collectively exceed the amounts above;
- 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);
- 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.

Water Resources Statutes and Case Law

RCW 90.03.380(1) states that a water right that has been put to beneficial use may be changed. The point of diversion, place of use, and purpose of use may be changed if it would not result in harm or injury to other water rights.

Ecology cannot adjudicate a claim to a water right; only the superior courts have this authority. However, the Washington Supreme Court has held that Ecology, when processing an application for change to a water right, is required to make a tentative determination of extent and validity of the claim or right. This is necessary to establish whether the claim or right is eligible for change. *R.D. Merrill v. PCHB* and *Okanogan Wilderness League v. Town of Twisp.*

The Supreme Court has held that a prior perfected water right for a seasonal use of water may be changed to year-round use if the change is not detrimental or injurious to existing rights. *R.D. Merrill v. PCHB.*

The holder of the right may change the manner or purpose of use. The Washington State Supreme Court held in *Merrill* that a water right holder may change the season of use when related to a change in the purpose of use of a water right. A change in the purpose of use can be approved only after the water has first been applied to beneficial use.

RCW 90.44.100(1) states that a ground water permit can be amended to replace or add wells.

INVESTIGATION

Site Visits

The Maplewood Estates Deep Well site was visited on April 13, 2006. During the visit, the deep well and the nearby shallow well were observed. No distribution system appeared connected to either wellhead. A pumphouse was present on the property but was associated only with the shallow well.

The Veenhuizen Well site was visited April 13, 2006 and August 29, 2007. In 2006 the Veenhuizen Well was observed within a small “doghouse” on the property of a home within the new development. The diameter (12 inches) was noted as was the flowing artesian nature of the well. During the 2007 visit, shut-in pressure of 64 pounds per square inch was observed and a flow test was performed on the well by attaching a fire hydrant flow meter to a 3-inch orifice on the wellhead and opening the valve. The well now serves the irrigation needs of a single home within the new development, and a small diameter PVC pipe was noted leaving an outlet on the well.

Also during the visit a GPS (global positioning system) reading was taken and gave a latitude of 47.46567° north and a longitude of 122.14471° west.

History of Water Use

During the investigation two signed documents were submitted to Ecology regarding historic water use on the property. The first was signed by Ms. Ruth E. Veenhuizen, former property owner. This letter stated that for the 5 years prior to demolition of the site, water usage was for irrigation (April to October) of 2 acres planted with corn, dahlias, and pumpkins, and for 6 domestic connections including one 4-plex and 2 single-family residences. The second letter was received from Quadrant Homes, the later developer of the property, and indicated that demolition of the original structures occurred in summer 2004.

Aerial Photograph Review

The letter from Ms. Veenhuizen only covered the years 2000 to 2004 (five years prior to demolition). To determine water use prior to this time, aerial photographs of the property were reviewed. The review focused on the period from 1967 (relinquishment statute enacted) to 2000. The Veenhuizen property was found in 6 historic aerial photographs given in the table below. All aerial photographs were reviewed at Suzzallo Library Map Collection at University of Washington on April 22, 2008.

Table 2 Aerial Photograph Information

Flight	*Date Flown*	*Photo Number(s)*	*Scale*	*Procured by*	*Comments*
Mylar Enlargements 1965	July 1, 1965	K-SN-65 FL. 18-28	1 to 4,800	Pacific Aerial Surveys	8 structures, ~1/4 of property orchards, > 1/2 irrigated rows
Sea Block 2	Mar. 24, 1969	HH-7-3-24 and 25	1 to 48,000	WA Dept. of Transportation	4 structures visible, ~ 3/4 appears irrigated, entire property maintained
CR 1978	May 7, 1978	9-68	1 to 24,000	WA Dept. of Transportation	6 structures, ~1/4 irrigated rows, ~1/3 appears irrigated, entire property maintained
SP-85	June 25, 1985	21-064-102 and 103	1 to 4,800	WA Dept. of Natural Resources	6 structures, no irrigated rows visible, approx. 1/2 of property maintained, other 1/2 obviously not maintained
NW-95	May 19, 1995	9-51-46 and 47	1 to 12,000	WA Dept. of Natural Resources	6 structures, no irrigated rows visible, approx. 1/3 of property maintained, other 2/3 obviously not maintained
NW-C-01	July 9, 2001	15-51-44 and 45	1 to 12,000	WA Dept. of Natural Resources	6 structures, possible irrigation on east and west ends of property, little evidence of any other irrigation

The findings of the aerial photograph review suggest that at least a portion of the Veenhuizen property was farmed and likely irrigated each irrigation season from 1967 to about 1995. It is clear that over the period from 1967 to 2000 the farmed and likely irrigated portion of the Veenhuizen property steadily decreased in size. The 2001 photograph shows only a small area of possible irrigation. In consideration of the above, deferral will be given to

the signed statement by Ms. Veenhuizen and a determination made that 2 acres is the smallest portion of the property that has been irrigated for a period of more than 5 years since 1967.

Irrigation Quantity

The proposed change includes a change in purpose of use from irrigation to domestic, which is considered completely consumptive. A determination must be made of the consumptive quantity of the irrigation portion of the water right, and only that quantity is transferable to the new purpose of use.

Ms. Veenhuizen stated in her signed letter that corn, dahlias, and pumpkins were grown on two acres of the property. Little information is available regarding the water duty for dahlias and pumpkins. Internet research found that dahlias and pumpkins generally need about 1 inch of water per week. Internet research also found that corn generally requires about 1 inch of water per week. The Washington State Irrigation Guide (WIG), which is utilized to determine water duties, does not give irrigation requirements for dahlias or pumpkins, but it does give the irrigation requirement for corn (field and sweet). It also gives the irrigation requirement for cucumbers, which are in the same family (cucurbit) as pumpkins, and according to a Purdue University Horticultural Extension publication (revised April 2001) require a similar seasonal quantity of water. The water duty for cucumbers, given in Appendix A (1985) of the WIG, is smaller than the water duty for corn. No comparable crop was found for dahlias. Considering the lack of information regarding dahlias and pumpkins, both of which appear to require similar or less water than corn, and to capture the highest water use in the lowest-use 5-year period, the water duty for field corn will be used as the measure of irrigation use.

To make the water-duty calculation, a determination must be made of the amount of water (additional to rainfall) that is applied and consumptively used in growing corn. The Crop Irrigation Requirement (CIR) is the amount of water supplied by irrigation that is absorbed by plant roots. The Total Irrigation Requirement (TIR) is the amount of water that must be applied so that the roots of each plant receive the CIR and includes the water needed by the plant plus irrigation losses. TIR is derived by dividing the CIR by irrigation efficiency, which is a percentage based on irrigation method. A portion of the TIR either runs off or bypasses the root zone and returns to waters of the state. This water, known as return flow, is not considered consumptive and is not available to change purpose of use. Consumptive Use (CU) is the amount of water used by the plant plus application losses minus return flows. It is determined by multiplying the TIR by a percentage also determined by the method of irrigation. The CU is the quantity of water available for change to a different purpose of use.

The WIG offers different CIRs for different locations around the state. The station chosen in the WIG (Appendix B) as representative of the Maplewood area is Sea-Tac, which is located about 6 miles west of the Veenhuizen property. A 1992 revision of the WIG gave CIR values for corn in a new appendix, Appendix B. Appendix B gives a Crop Irrigation Requirement of 12.09 inches per irrigation season (or 1 acre-foot per acre) for field corn.

It is unknown what type of irrigation method was most recently used at the Veenhuizen Farm, but considering the irrigated area was 2 acres, a likely method is handline sprinkler. The average application efficiency of a handline sprinkler, according to Guidance 1210 (Dept. of Ecology, 2005), is 75%. Thus, the TIR is 1.33 acre-feet per acre (1 acre-foot per acre / 0.75). This quantity applied yearly to 2 acres results in a total water use of 2.66 acre-feet per year. The amount of water consumptively used (CU) with a handline sprinkler system is 85% (average) of the total water use (Dept. of Ecology, 2005) or 2.3 acre-feet per year. Therefore, 2.3 afy of irrigation water is considered tentatively valid and eligible for transfer to domestic use.

Domestic Quantity

No records are available for the residential connections that were served on the property, but the aerial photography review supports that there were multiple structures on the property. Ms. Veenhuizen's statement suggests there were 6 residential connections prior to demolition in 2004. There is no evidence to dispute the statement, thus 6 residences will be used for the water duty calculation. Due to lack of data an estimate must be made of this usage. When processing new water rights Ecology's Northwest Regional Office typically grants 0.3 afy per proposed residential connection. This is a reasonable quantity of water that would have been used from an unmetered well at each of the 6 connections served by the Veenhuizen Well. This equates to an additional 1.8 afy of water.

Total Quantities Available for Change

To determine the Qi available for change, a flow test was performed on the Veenhuizen Well during the site visit. The test found that 10 cubic feet of water flowed out of the well in 35.3 seconds, giving a Qi of 127 gpm.

The determination is that 127 gpm and 4.1 afy of water are tentatively valid and available for change.

Proposed Use

Cedar River Water and Sewer District proposes to change these quantities of water to the Maplewood Estates Deep well, which will serve a portion of CRWSD's service area.

Measuring and Reporting Water Use

RCW 90.03.360 requires that the owner of any water diversion maintain substantial controlling works and a measuring device. It must be constructed and maintained to permit accurate measurement and practical regulation of the flow of water diverted. Technical requirements for the measuring and reporting of water use are described in WAC 173-173. Measuring water at the source of a surface water diversion or ground water withdrawal before the water is put to beneficial use is essential to effectively manage water supplies. Successful water supply management requires knowing how much water is actually being used and whether there is any more water in specific areas available for new uses. Accordingly, this decision contains provisions addressing the measuring and reporting of the quantities of water withdrawn or diverted.

Other Rights Appurtenant to the Place of Use

CRWSD currently holds three water rights authorizing withdrawal of 320 gpm and 97 afy from the Maplewood Estates Deep Well. These rights were transferred to the Deep Well in a batch of changes approved in 2004.

Table 3 Summary of Existing Water Rights Held by CRWSD

Water Right Number	*Priority Date*	*Instantaneous Quantity*	*Annual Quantity*	*Source Name/Number*	*Legal Description POW*
G1-00387C	Jan. 4, 1971	100 gpm	46 afy	Maplewood Estates Deep Well	NW¼ NW¼ Section 13 T22N, R06E
G1-23937C	Sep. 4, 1981	160 gpm	34 afy	Maplewood Estates Deep Well	NW¼ NW¼ Section 13 T22N, R06E
G1-26357C	Sep. 25, 1991	60 gpm	17 afy	Maplewood Estates Deep Well	NW¼ NW¼ Section 13 T22N, R06E
Totals		320 gpm	97 afy		

Batch of Rights Proposed for Change (see Figure 1)

Table 4 Summary of Water Rights Proposed for Change

Water Right Number	*Priority Date*	*Instantaneous Quantity*	*Annual Quantity*	*Source Name/Number*	*Legal Description POW*	*Comments*
G1-00387C@1	Unknown	Unknown	Not addressed	Wilderness Point Well	N½ NW¼ Section 22, T22N, R06E	Application withdrawn as mitigation; claim filed on property
G1-00387C@2	Unknown	Unknown *0 gpm*[a]	0.9 afy *0.9 afy*[b]	Heritage Well	NW¼ NE¼ Section 13 T22N, R06E	Exempt well consolidation
G1-00387C@3	Unknown	Not addressed	Not addressed	Chinquapin Junction Well	NE¼ NW¼ Section 21 T22N, R06E	Well found to be in different WRIA, change denied
G1-05760C (Cert. 3908-A)	Oct. 17, 1961	140 gpm *6 gpm*[a]	224 afy *8.8 afy*[b]	Tahoma School District Well	NW¼ NW¼ SW ¼ Section 11 T22N, R06E	43 gpm and 11.1 afy remain at Tahoma School

G1-20497C	Mar. 20, 1973	200 gpm *127 gpm*[a]	45 afy *4.1 afy*[b]	Veenhuizen Well	NE¼ SE¼ Section 22, T23N, R05E	Original well now serving as exempt well for home
S1-20446C	Feb. 9, 1973	0.44 cfs (=197 gpm) *100 gpm*[a,c]	39.8 afy *12.8 afy*[b,c]	Dorre Don Surface Diversion	NW¼ SE¼ Section 15, T22N, R06E	
Totals ***Eligible for change***[c]		537 gpm *233 gpm*[d]	310.6 afy *26.6 afy*[d]	Maplewood Estates Deep Well	NW¼ NW¼ Section 13, T22N, R06E	

[a] Instantaneous quantity found to be tentatively valid and available for change to CRWSD
[b] Annual quantity found to be tentatively valid and available for change to CRWSD
[c] Upon review of the draft report of examination, CRWSD requested to put the CS1-20446C (Dorre Don) change on hold due to the possibility of increased Qi if investigated at a later time. See "Conclusions" section of this report.
[d] Total instantaneous and annual quantities found tentatively valid and eligible for change in the batch of changes.

Hydrogeological Assessment

The following is excerpted from the Hydrogeologic Report by Cook (2008). The report in its entirety can be found within the water right file.

General Hydrology and Physiography

Water Resources Inventory Area 8 (WRIA 8, the Cedar-Sammamish Watershed) is located primarily in King County. This 692-square mile watershed is comprised of two major subbasins (the Cedar River and the Sammamish River systems) which converge into Lake Washington. The watershed is typified by a large number of small lakes, ponds, and wetlands and receives average precipitation ranging from 38 inches per year in the lowlands to 102 inches per year in the higher elevations of the Cascade Range (Ecology, 1995).

Regional Geologic Setting

Much of the following summary is compiled from work by Liesch and others (1963), Redmond-Bear Creek Ground Water Advisory Committee (1994), Turney and others (1995), and Ecology and others (1995).

Puget Sound basin has been in existence since Tertiary times (about 66 to 2.2 million years before present) when sedimentary and volcanic basement rocks were folded downward between the Olympic and Cascade ranges. The resulting basin provided an avenue for several episodes of piedmont or ice sheet-type glacial flow from southwestern Canada, with concurrent sedimentary deposition during the Pleistocene (2 million to 10,000 years before present). Recent post-glacial topographic modifications by erosion and deposition have been minor, occurring primarily along river floodplains.

The Cedar-Sammamish Watershed is comprised of two major physiographic areas. The eastern half of the watershed lies in the Cascade Range while the western half occupies the Puget Sound Lowland. The Cascade Range is composed of sedimentary and volcanic Tertiary rocks rising more than 5,000 feet above the glacial drift plain. The Tertiary bedrock, which underlies the Cedar-Sammamish Watershed, is comprised primarily of sandstone, siltstone, and volcanic deposits typically of great thickness (thousands of feet). The mantle of debris overlying the bedrock units in the Puget Sound Lowland and reaching thicknesses in excess of 1,000 feet typically is composed of Pleistocene-aged, glacially derived sediments. These sediments were deposited during four (possibly 5) periods of glaciation during which the Puget Lowland was overridden by continental glaciers advancing from the north. The most recent glacial event and the primary source of the glacial sediments in the area was the Vashon Stade of the Fraser Glaciation, which receded from the area approximately 13,000 years ago.

Vashon-aged glacial sediments found within the Puget Sound Lowland consist of: advance outwash (Qva) – typically compact and composed primarily of gravels with discontinuous sand lenses and local lenses of silt and clay all deposited by meltwater streams; glacial till (Qvt) – very compact, also known as hardpan, composed of clay, silt, and gravel deposited at the base of the advancing glacier; and recessional outwash (Qvr) – not compact, deposits composed primarily of well-sorted gravels, sand, silt and clay deposited by meltwater streams as the glacier retreated.

Subsequent to the deposition of the glacial sediments, alluvial sediments of the Holocene age (10,000 years ago to the present) were deposited. These are predominantly fluvial deposits of sand and gravel in stream and river valleys. Concurrently, still-water bog and marsh deposits were formed in low-lying areas.

Local Geology

During this investigation, driller's logs from the subject wells and wells in their vicinity were examined along with publications of geologic research performed in the area.

The Maplewood Estates Deep Well (proposed point of withdrawal) is situated in the western foothills of the Cascade Range in the southeastern portion of the Puget Sound Lowland where mountain foothills and glacial drift plain merge. Although located near the Cascades and exposed bedrock, the well was drilled to a depth of 685 feet before encountering bedrock and continued to a total depth of 700 feet. Originally this well was planned to be a test well for gathering information prior to installation of a deep production well. A test well report was completed by GeoEngineers in February 1995 and submitted to Ecology. The GeoEngineers (1995) report notes that shallow aquifers (less than 80 feet depth) in the vicinity are either post-glacial fluvial deposits or Vashon recessional outwash and that the intermediate aquifers (between 100 and 300 feet depth) are Vashon advance outwash. No detailed geologic information was found for the deep aquifer at the Maplewood location during this investigation. Based on general geologic knowledge of the area, the well, which is screened between 530 and 550 feet, likely taps the Pre-Vashon lower coarse grained unit, Q(B)c, as defined by Woodward et al (1995).

The Veenhuizen Well (the original point of withdrawal) is about 8 miles west of the Maplewood Deep Well. It is situated well within the Puget Lowland on floodplain deposits of the Cedar River. No well log exists for the Veenhuizen Well. Ecology's original report of examination suggested the well was or would be about 700 feet in depth, which compares well with other known wells in the area, notably the Kolscey Well that was located a few hundred feet to the east. The Kolscey Well was the subject of a water rights investigation for CRWSD in 2004. The Kolscey Well log is incomplete, giving no lithologic descriptions, but it does note the depth of the well at 665 feet (-545 feet MSL), the location of the perforations from 655 feet to 665 feet (-535 to -545 feet MSL), and that the well is flowing artesian. The Veenhuizen Well also is flowing artesian. Considering their depths, it appears both the Kolscey Well and the Veenhuizen Well penetrate the post-glacial fluvial deposits and Vashon-aged glacial sediments and are completed within Pre-Vashon unconsolidated and undifferentiated deposits as defined by Woodward et al (1995). The aquifer tapped by the Veenhuizen Well is thought to be limited in extent and occurring within a deep, narrow subsurface bedrock trough lying northwestward from Lake Youngs and trending toward Maplewood (Liszak, 1992 in Liszak, 1996).

Local Hydrogeology

Proposed Point of Withdrawal

Much of the following information regarding the Maplewood Estates Deep Well was taken from the GeoEngineers (1995) report. The Maplewood Estates Test Well (now the proposed production well) was originally drilled in May and June 1994 with diameters of 16 inches (0 to 22 feet), 10 inches (22 to 410 feet), and 8 inches (410 feet to total depth) to a total depth of 700 feet. The wellhead elevation is 715 feet above MSL. Bedrock was encountered at 685 feet (about 30 feet MSL). Of note is that the test well encountered a confining layer of silt and silty clay from 370 feet to 455 feet in depth (about 345 feet to 260 feet MSL) and encountered a sand and gravel aquifer unit from 455 feet to 660 feet (260 feet to 55 MSL). Two zones within this sand and gravel unit were selected for installation of well screen and performing pumping tests, they were: the lower zone between about 615 feet and 660 feet depth, which is composed of sand and gravel with silt and clay lenses, and the upper zone between about 455 feet and 600 feet, which is composed of relatively clean fine to coarse gravel with some sand and minor silt.

Static water levels of 146 feet depth (565 feet MSL) were measured in both zones, indicating they are hydraulically connected. Two pumping tests were performed within the lower zone and three pumping tests were performed in the upper zone. The tests ranged in duration from 4 to 72 hours.

Pumping tests showed the lower zone was not as productive as desired. Twenty feet of screen was placed in the boring between 632 and 652 feet. Due to difficulties with pulling the casing back, only 14 feet of screen was exposed for the pumping test. A 4-hour step test and a 6-hour constant rate pumping test were performed. The July 11, 1994 step test ranged from 88 gpm at its onset to 130 gpm for the last step with a maximum drawdown of 243 feet. The 6-hour constant-rate test was performed on July 12, 1994 at a rate of 100 gpm. After about 1 hour of pumping, the water level stabilized at a depth of 331 feet giving a maximum drawdown of about 185 feet. GeoEngineer's analysis of the data indicates the lower zone has a transmissivity of approximately 34 feet squared per day (254 gallons per day per foot).

The pumping test in the upper aquifer zone proved more successful. Again, twenty feet of screen was installed, this time from 530 to 550 feet. The casing was successfully pulled back the full twenty feet. A 5-

hour constant-rate pumping test was performed at a rate of 225 gpm on August 18, 1994. Water level stabilized after about 1 hour of pumping with a maximum drawdown of 27.6 feet. A 32.5-hour pumping test was then performed at a rate of 350 gpm. The pumping test stalled twice early in the test due to generator malfunctions. Total drawdown from beginning to end of the 32.5-hour test was 33 feet, however, the water level recovered about 55 feet during the second generator malfunction, significantly reducing the overall drawdown. Analysis of the data indicated a transmissivity of about 975 ft^2/day (7,300 gpd/ft). Also observed during the test was a decrease in drawdown and a corresponding increase in specific capacity, indicating an increase in well efficiency (GeoEngineers, 1995). A possible barrier boundary was observed, so a 72-hour test was recommended. The 72-hour pumping test was performed between September 20 and 23, 1994 at a constant rate of 405 gpm. Drawdown was fairly constant during the test, but during the entire 72 hour test there were no indications of water-level stabilization, defined by Ecology as a drop in water level of less than or equal to 0.1 foot drawdown per hour during pumping. Moreover, the drawdown versus time graph showing the pumping test data shows that drawdown increased near the end of the test. The lack of stabilization and increased drawdown could be the result of constraints due to well construction, boundary conditions, or aquifer properties. Total drawdown at the end of the test was 37.1 feet. Analysis by GeoEngineers (1995) indicates a transmissivity in the upper zone of 3,630 ft^2/day (27,152 gpd/ft).

Conclusions regarding the test well and the upper aquifer zone were presented in the GeoEngineers (1995) report. They state that the pumping test data indicate that two barrier boundaries were encountered during the 72-hour test that would account for about 7 feet of drawdown. The report goes on to state that evaluation

of the pumping test data indicates that a "production well completed between 500 and 600 feet could produce between 900 gpm and 1,500 gpm at a pumping water level between 250 and 350 feet below ground surface." They also recommend that, "a 48-hour to 72-hour constant rate pumping test be conducted in the production well."

Cedar River Water and Sewer District has chosen not to construct a production well. Instead they have chosen to use the existing test well as the production well to receive the water rights from the proposed changes. The test well is smaller in diameter than recommended and will not produce water at the rates that GeoEngineers (1995) suggested.

The capability of the Maplewood Estates Deep Well and the aquifer it taps were mentioned as a concern to CRWSD early in discussions preceding this investigation. The proposed application could fail the water availability and public interest tests if the proposed well and/or aquifer were incapable of long-term production at the proposed quantities. In response, CRWSD had their consultant, Robinson and Noble, Inc., submit a formal, hydrogeologist-stamped letter discussing the well and the hydrogeology. The letter was received on November 27, 2006.

Robinson and Noble reviewed the data from the original pumping tests performed in 1994 by GeoEngineers and noted that the well has a specific capacity of 11 gpm/foot of drawdown, and with corrections for partial penetration of the aquifer, they found a transmissivity of the aquifer to be greater than 45,000 gpd/foot. They note that at a rate of 720 gpm, which is the total Qi recognized in the letter, the well should experience about 65 feet of drawdown after 72 hours of pumping and 127 feet of drawdown after 100 days of pumping at that rate. Total available drawdown in the well is greater than 300 feet.

The well itself, due to the fact that it was constructed as a test well, has a small diameter which could restrict productivity. Robinson and Noble address this in their letter by suggesting that a high-rpm pump could be placed in the 8-inch diameter well to produce 720 gpm. The letter also noted that 720 gpm slightly exceeds the recommended production capacity of the screen, but that the Qi should still be achievable. Robinson and Noble add that an additional well could be drilled on site to achieve the full Qi.

The assertions and calculations put forth by Robinson and Noble in the 2006 letter appear reasonable and have been accepted for this investigation.

Original Point of Withdrawal

Not much geologic or hydrogeologic information is available for the Veenhuizen Well. The report of examination for the original water right suggested that the well would be drilled to 700 feet. During a site visit on August 29, 2007, the well was observed to be flowing artesian with approximately 64 pounds per square inch shut-in pressure, equaling approximately 148 feet of head above the ground surface (Cedar River floodplain). This corresponds well with the now-decommissioned Kolscey Well located a few hundred feet away. The well log submitted to Ecology for the Kolscey Well shows the depth of the drilled well to be 665 feet and that the well at completion had an artesian pressure of 60 pounds per square inch. Subsequent logs for the Kolscey Well submitted to Ecology in July 1993 and December 1994 show artesian

flow at 12.4 gpm and shut-in pressure of about 63 pounds per square inch with the SWL at about 146 feet above the top of casing.

Potential Impacts at New Point of Withdrawal

The Maplewood Estates Shallow Well is present at the Maplewood site and is located approximately 100 feet from the Maplewood Estates Deep Well. The well is 80 feet deep and is completed in a shallower, likely confined aquifer that is separated from the deep aquifer by a silt/clay aquitard. It was monitored during the pumping tests and showed no response to pumping.

The quantities found to be tentatively valid in the batch of proposed changes total 233 gpm[1] and 26.6 afy[1]. Prior water right changes authorized 320 gpm and 97 afy to be withdrawn from the Maplewood Estates Deep Well. Thus, totals of 553 gpm[1] and 123.6 afy[1] are proposed to be withdrawn from the well. Using the transmissivity of 45,000 gpd presented by Robinson and Noble along with a storativity of 0.0001 estimated within the GeoEngineers (1995) report, a spreadsheet calculation was performed using the Theis and Cooper-Jacob methods to determine the drawdown at distance within the deep aquifer due to pumping the proposed well. A pumping rate of 550 gpm drawn continuously for 50 days (approximate period Qa would last if Qi pumped continuously) was used to make the calculation. The calculation found that at the end of this period, drawdown of less than 10 feet would be expected at a distance of ½-mile[1]. Considering that this estimate is inherently high (assumes no leakage through adjacent aquitards, assumes CRWSD would entirely use the Qa in less than two months), and considering the tapped aquifer has available drawdown greater than300 feet, it is very unlikely any well greater than ½-mile from the Maplewood Estates Deep Well will be impaired by the proposed total withdrawal.

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[1]Note that CRWSD has chosen to put the Dorre Don change application on hold. See "Conclusions" section of this report. This application being removed from the batch of changes will result in totals of 133 gpm and 13.8 afy being changed to the Maplewood Estates Deep Well, giving a grand total of 453 gpm and 110.8 afy authorized at the well and a smaller drawdown at ½-mile.

The static water level (SWL) within the Maplewood Estates Deep Well, at an elevation of 569 feet MSL, is about 120 feet higher than the Cedar River at its nearest point. The few well logs in the immediate vicinity offer little information, but considering topography, general knowledge of the area, and hydrogeologic principles, the ground-water gradient within the deep aquifer is likely to the south and west toward the Cedar River Valley. The Maplewood Estates Deep Well is approximately 4,500 feet from the Cedar River at its closest point. Water flowing through the well's source aquifer eventually discharges downstream into the Cedar River, via its alluvial aquifer, or into tributaries of the Cedar.

Impairment Considerations

Impairment of Minimum Instream Flow Water Rights

The term "instream flow" is used to identify a specific stream flow (typically measured in cubic feet per second, or cfs) at a specific location for a defined time, and typically following seasonal variations. Instream flows are usually defined as the stream flows needed to protect and preserve instream resources and values, such as fish, wildlife and recreation. Instream flows are most often described and established in a formal legal document, typically an adopted state rule.

Once established, a minimum flow constitutes an appropriation with a priority date as of the effective date of the rule establishing the minimum flow (RCW 90.03.345). Thus, a minimum flow set by rule is an existing right which may not be impaired (RCW 90.03.345; RCW 90.44.030). The Cedar River, about 1 mile from the proposed well, has instream flows measured at a compliance point (USGS Gage 12119000) located in Renton, WA.

To evaluate potential impairment to the Cedar River Instream Flow, a determination must be made of the new versus the original impact and whether the change will reduce flows as measured at the Renton compliance point, assuming the transferable quantity has been/will be withdrawn from each. Both points of withdrawal, existing and proposed, are well upstream of the Renton gage and withdrawal from either will have the same impact at the gage.

This application is one of four applications that have been investigated concurrently and are being approved for change[2]. All water rights in this batch have been intercepting surface and ground water that is destined for the Cedar River and all are located upstream of the gauging station in Renton. The withdrawal from the proposed Maplewood Estates Deep Well should have no greater effect at the Renton gage than the original points of withdrawal/diversion and will not impair Cedar River instream flows.

Impairment, Qualifying Ground Water Withdrawal Facilities, and Well Interference

There are three concepts that are important when considering whether a withdrawal of water from a well would impair another existing water right. The concepts are defined as follows:

Impairment is an adverse impact on the physical availability of water for a beneficial use that is entitled to protection i.e. water rights that are both senior and junior in priority to the right the applicant seeks to change.

Qualifying ground water withdrawal facilities are defined as those wells which in the opinion of the Department are adequately constructed. An adequately constructed well is one that (a) is constructed in compliance with well construction requirements; (b) fully penetrates the saturated thickness of an aquifer or withdraws water from a reasonable and feasible pumping lift (WAC 173-150); (c) the withdrawal facilities must be able to accommodate a reasonable variation in seasonal pumping water levels; and (d) the withdrawal facilities including pumping facilities must be properly sized to the ability of the aquifer to produce water.

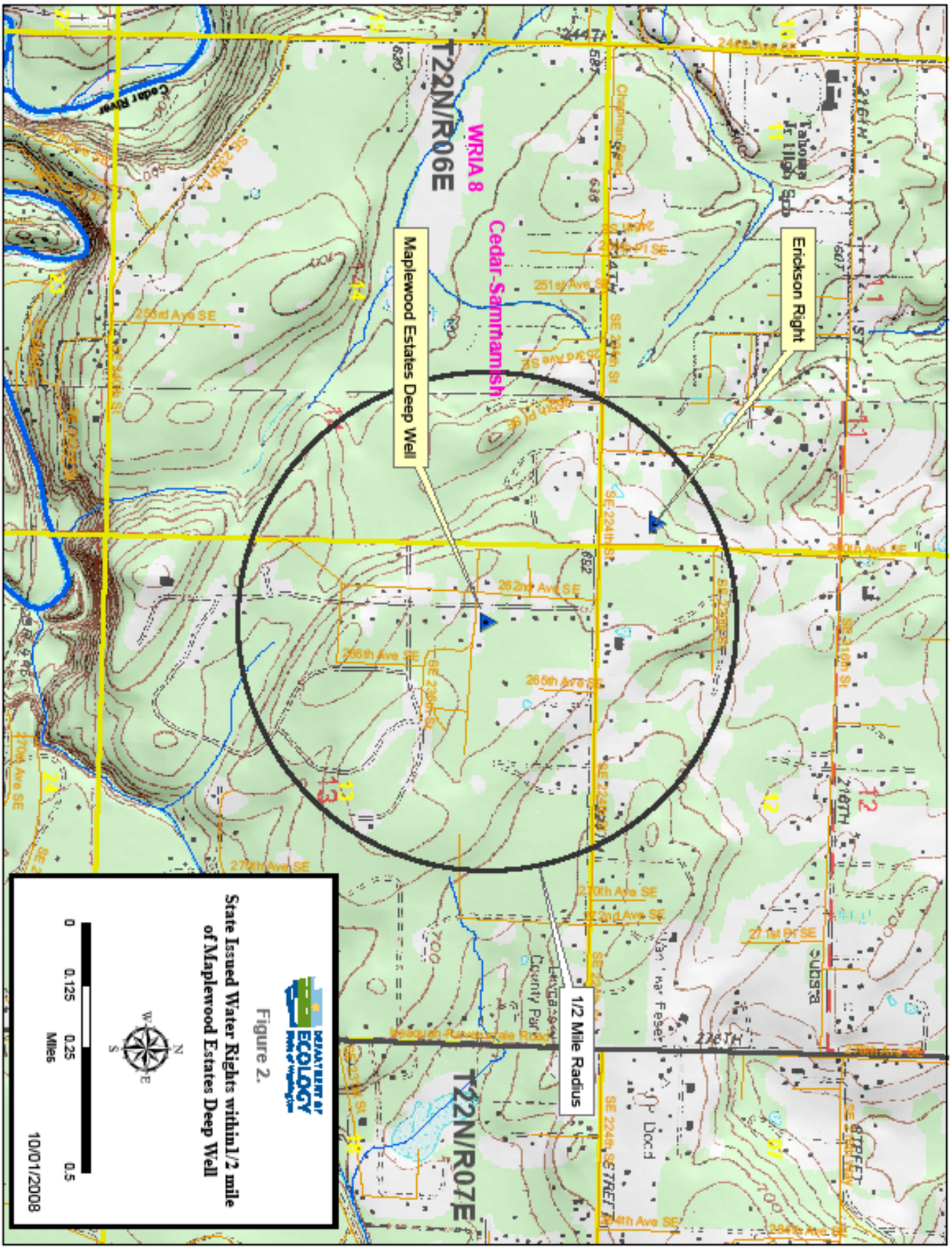
Well interference may occur when wells penetrate and withdraw ground water from the same aquifer. Each pumping well creates a drawdown cone that may interfere with another well.

There are 160 water rights (not including CRWSD) in the four sections nearest the Maplewood Estates Deep Well (sections 11, 12, 13, and 14). Of these, 145 are claims and 15 are permits and certificates.

Of the 145 claims, it is known that 127 are ground water withdrawals and the remaining 18 are surface diversions. Validity of claims in King County can only be evaluated in an adjudication by King County Superior Court.

Of the 15 permitted/certificated water rights in this four-section area, 13 are for ground water withdrawals and 2 authorize surface water diversions. One of the permits or certificates is within ½-mile of the proposed deep well. It was issued to R. L. Erickson for 20 gpm and 11.5 afy for single domestic supply and irrigation purposes. The Erickson Well is located approximately 1,500 feet north-northwest of the Maplewood Estates Deep Well and is 40 feet in depth. See map following page.

[2] Four changes were approved in draft Reports of Examination. Upon review of the drafts, CRWSD requested that one change proposal, the Dorre Don application, be put on hold. See “Conclusions” section of this report.


Erickson Right
Maplewood Estates Deep Well
1/2 Mile Radius
WRIA 8
Cedar-Sammamish
T22N/R06E
T22N/R07E
Figure 2.
State Issued Water Rights within 1/2 mile of Maplewood Estates Deep Well
0 0.125 0.25 0.5
Miles
10/01/2008

Research indicates 42 wells within ½-mile of the Maplewood Estates Deep Well (not including the Maplewood Shallow Well). Most (34) of these wells do not have a corresponding water right. It is likely that these wells are exempt from the permitting process pursuant to RCW 90.44.050 and are authorized to each withdraw a maximum of 5,000 gallons of ground water per day. The remaining 8 wells are associated with ground water claims. All 42 wells are shallower than 300 feet deep.

Considering the lack of interference drawdown in the shallow aquifer during pumping of the Maplewood Estates Deep Well as evidenced by no drawdown measured in the Maplewood Shallow Well, and considering that all nearby wells appear to tap the shallower aquifer, it is unlikely that any wells will be impaired by the total withdrawal of 553 gpm[3] and 123.6[3] afy from the Maplewood Estates Deep Well.

Public Interest Considerations

Effects on Fisheries Resources

The alteration of flows may have impacts on aquatic resources through changes in habitat. Direct effects include changes to water depth, velocity and the wetted perimeter, which affect the suitability and availability of habitat. Preferences for hydraulic conditions vary depending on fish species and life stage. Indirect effects on aquatic habitat result from the response of sediment processes and riparian vegetation to flow alterations. These include changes in channel features such as sinuosity, sediment movement, channel movement, gravel bars, and beaches. Because of flow changes, there also may be changes to riparian vegetation which, in turn, may affect the aquatic environment.

Several tributary streams are located in the vicinity of the Maplewood Estates Deep Well. The natural extension of the Walsh Lake Diversion Ditch is located between the well and the Cedar River, and there are two mapped wetlands, one approximately 4,000 feet east and one approximately 2,500 feet west of the well. Considering the depth of the well and the assumed ground water gradient toward the Cedar River, there should be no adverse impacts to streams or wetlands near the proposed well. See Figure 3.

There is some public interest concern with moving the point of withdrawal under one change in this batch – G1-20497C (Veenhuizen Well) – upstream approximately 8 miles in the Cedar River basin. While the transfer will not impair instream flows as measured at the Renton gage, within this 8-mile stretch is a segment of the Cedar considered impaired under water quality standards (2004 303(d) list). Taken alone, the change from the deep Veenhuizen Well to the Maplewood Estates Deep Well could slightly reduce flows in the Cedar River for the stretch and could negatively impact water quality by increasing concentrations of fecal coliform and increasing temperature.

Three of the changes being recommended for approval – CG1-*05760C (Cert. 3908-A), CS1-20446C, and CG1-00387C@2 – all propose moves from shallow (less than 140 feet deep) wells or surface water to the Maplewood Estates Deep Well. To evaluate potential impacts on the Cedar River system, a 1996 publication by the United States Geological Survey was reviewed. The publication, *Numerical Model Analysis of the Effects of Ground-Water Withdrawals On Discharge to Streams and Springs in Small Basins Typical of the Puget Sound Lowland, Washington*, suggests that adjusting the depth of withdrawal within a river system alters effects on different reaches within the system. The report shows, through numerical modeling of a hypothetical Puget Sound river basin, that while virtually all water pumped is removed from the river system, generally shallow withdrawals have a greater, more immediate impact on nearby streams and deepening a well spreads the effects over a larger area. The model also shows that moving withdrawals deeper, especially below aquitards, reduces impacts in upper-basin springs and streams by shifting the impacts to lower-basin springs and streams.

One series of model simulations showed the impacts on upper and lower springs and streams as the depth of the modeled withdrawal was increased. The impacts on stream and river segments were given as a percentage of the water pumped. Two model runs are reasonably analogous to CRWSD's proposal. One simulates a pumping well located 6,000 feet from a stream segment and withdrawing water at a rate of 300 gpm from the shallowest confined aquifer at a depth of about 60 feet (similar to pre-change points of withdrawal). The other model run uses the same parameters but the well is pumping from the next aquifer down at a depth of about 140 feet, below an interglacial aquitard. Results of the modeling suggest that when pumping from the shallowest confined aquifer, approximately 76% of the stream impact is in the upper basin. Moving the withdrawal to the next aquifer down, the model shows a reduction in impact to upper-basin streams with the modeled impact falling to 65% of the water pumped. Thus, a transfer of shallow pumping to a deeper confined aquifer will result in more water flowing in upper tributaries and main stem with a greater portion of the impact shifted downstream.

This analogy is not perfect, and the model was not constructed for detailed hydrogeologic analysis, but the similarities are sufficient that it can reasonably be used to reach some general conclusions for the proposed changes. In the USGS report, the lower-basin streams and springs are at least 7 to 8 miles downstream of the pumping well. The impaired reach of the Cedar is about 6 miles downstream from the Maplewood Estates Deep Well. It appears that a significant portion of the reduced upstream impact in the model is the result of the source aquifer being in direct continuity with a stream or the mainstem river (or their alluvial aquifers) in downstream locations. As pumping moves deeper, the source aquifer physically intersects the surface system at a lower elevation (i.e. farther downstream). The aquifer tapped by the Maplewood Estates Deep Well is situated between 260 feet and 50 ft MSL. The Cedar River is at an elevation of 260 feet about 2 miles upstream of the impaired reach and the river reaches 50 ft MSL well downstream of the impaired reach, suggesting a significant portion of the impact from pumping the Maplewood Estates Deep Well will be at or near the impaired reach.

[3]Cedar River Water and Sewer District has requested the Dorre Don change application be put on hold considering the possibility that the instantaneous quantity found tentatively valid and eligible for change may be increased if processed at a later time. See "Conclusions" section of this report. Without the Dorre Don change, total quantities of 453 gpm and 110.8 afy should also not impair nearby wells.

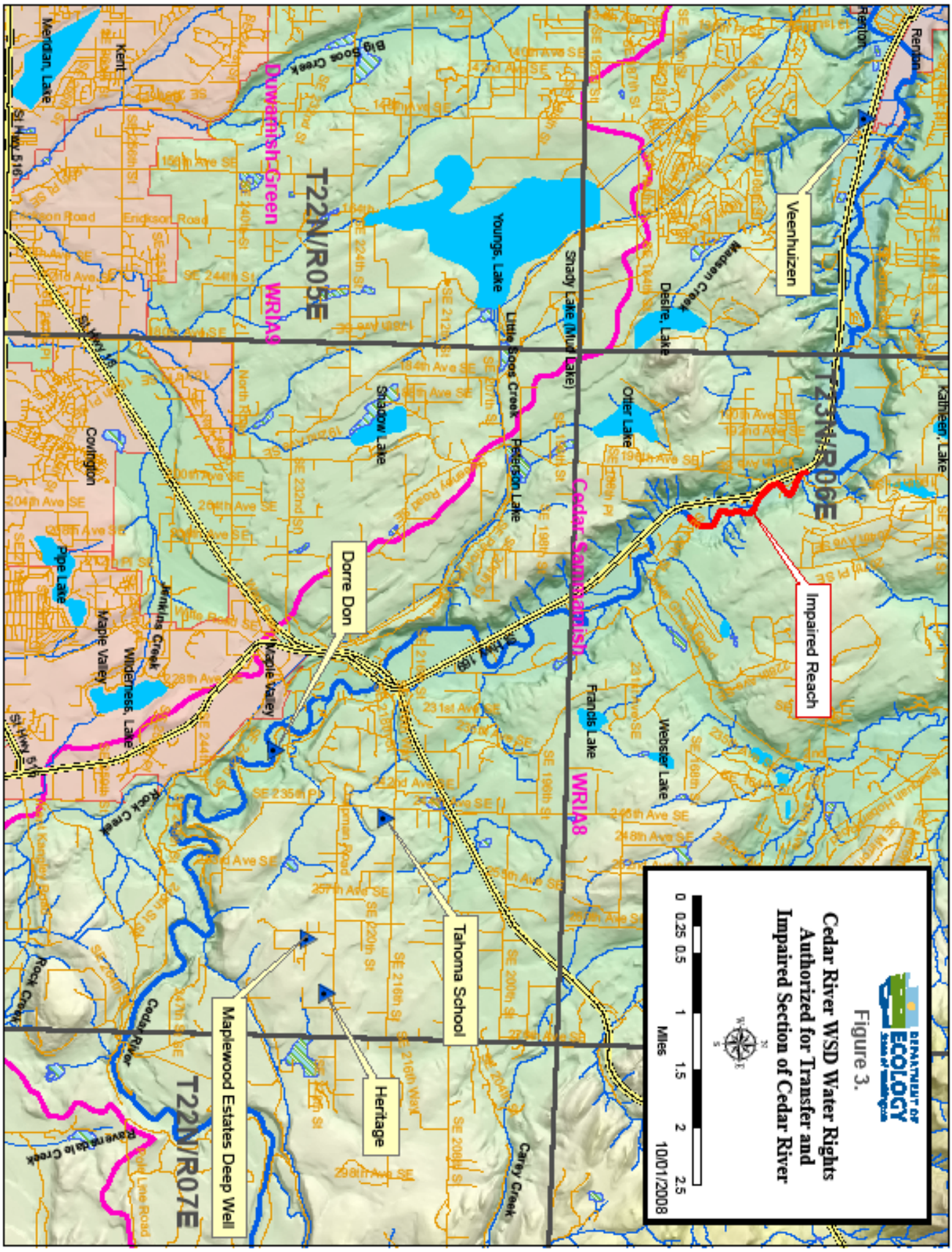


Figure 3.
Cedar River WSD Water Rights
Authorized for Transfer and
Impaired Section of Cedar River
0 0.25 0.5 1 1.5 2 2.5
Miles
10/01/2008
Impaired Reach
Veenhuizen
Dorre Don
Tahoma School
Heritage
Maplewood Estates Deep Well
T23N/R06E
T22N/R05E
T22N/R07E
Cedar-Sammamish WRIA8
Duwamish-Green WRIA9
Renton
Kent
Covington
Maple Valley
Cedar River
Shady Lake (Mud Lake)
Young, Lake
Desire, Lake
Otter Lake
Shadow Lake
Peterson Lake
Francis Lake
Webster Lake
Kathleen, Lake
Meridan, Lake
Pipe Lake
Wilderness, Lake
Big Soos Creek
Little Soos Creek
Madsen Creek
Jenkins Creek
Rock Creek
Ravensdale Creek
Carey Creek

Assuming the lower-basin impacts on the Cedar River will be felt at (slightly upstream, within, and downstream of) the impaired reach of the river, percentages presented in the USGS (1996) report can be used for a comparison between impacts on the Cedar River at the impaired reach due to withdrawal/diversion at the original points versus impacts at the new point of withdrawal.

Table 4 shows that the impact at the impaired reach likely will be reduced with the proposed batch of changes. The Veenhuizen withdrawal being moved upstream of the impaired reach should be completely offset by the deepened withdrawal of the other rights. It should also be noted that the depth of withdrawal for the Maplewood Estates Deep Well is over 300 feet deeper with at least one thicker aquitard than the aquifer modeled and used as comparable, suggesting the benefit to the upper Cedar River may be greater than estimated. As seen in the table, CRWSD has voluntarily offered to relinquish the Wilderness Point exempt right (CG1-00387C@1) to additionally offset potential impacts to the Cedar.

Table 4 Withdrawals/Diversions and Estimated Impacts on Cedar River at Impaired Reach

Original Point of Witdrawal/Diversion Name	*Annual Quantity Found Tentatively Valid and Available for Change (afy)*	*Impact Felt Above Impaired Reach Due to Original Withdrawal/Diversion Based on 76% Upper-Basin Impact (afy)*	*Impact Felt at Impaired Reach Due to Proposed Withdrawal Based on 65% Upper-Basin Impact (afy)*
Veenhuizen (downstream of impaired reach)	4.1	0	2.7
Tahoma School District	8.8	6.7	5.7
Dorre Don (surface diversion)	12.8	12.8 (surface diversion = no reduction)	8.3
Heritage (exempt well)	0.9	0.7	0.6
Wilderness Point (exempt well)	0.9	0.7	-- (voluntarily relinquished)
Total	27.5	20.9	17.3

An investigation was performed to determine the validity of the Wilderness Point exempt right. CRWSD submitted two well-decommissioning logs for a property that has now been subdivided and developed. During the 2006 site visit, Kirk Hunkeler with CRWSD explained that the property had previously been used commercially by Malone's Landscaping. A review of Washington Department of Natural Resources historical parcel data obtained through King County's online parcel viewer shows that in 2004 the parcel in question was owned by the Malone family and was sold to Baja Properties. An internet search showed that Malone's Landscaping is a current business, though obviously no longer at the Wilderness Point location. Based on this information, it appears that an exempt water right was being utilized on the property within the past 5 years and is available for consolidation.

Baja Properties signed a contract with CRWSD that no new exempt wells would ever be constructed on the property. Thus, relinquishment of the right by CRWSD will remove a shallow exempt withdrawal from the Cedar River system above the impaired reach.

Taken as a package, the batch of proposed water right changes being authorized should benefit a significant section of the Cedar River and have minimal, if any, greater impact at the impaired reach. Thus, the proposed changes are in the public interest[4].

[4]Cedar River Water and Sewer District has requested that the Dorre Don change application be put on hold pending the Supreme Court decision in the Municipal Water Law case (*Lummi Nation, et al. v. State of Washington).* Delaying this change decision will not alter the outcome of the Public Interest test discussed above. Until the Supreme Court decision is rendered and a final Report of Examination issued, CRWSD will not be authorized to pump Dorre Don water from the Deep Well, thus all water formerly diverted at Dorre Don will remain in and benefit the Cedar River. After the Supreme Court decision, the transfer of the quantities found tentatively valid will be considered as part of this batch.

Water Availability at the New Point of Withdrawal

Water Availability and Change Applications

When there is a request to move the point of withdrawal for an existing water right, the proposed point of withdrawal must be capable of physically producing the quantities authorized. This availability test is different than that of the physical and legal availability test conducted for a new water right application.

Pumping test information supplied by the applicant's consultant indicates that water in adequate quantities is available from the Maplewood Estates Deep Well. However, the pumping test performed at 405 gpm indicated likely barrier boundaries and did not show a stabilization of the pumping water level over the entire 72-hour test. Total drawdown during the test was relatively small at 37 feet with over 300 feet of drawdown available, and recovery after cessation of pumping appears rapid. The combined total quantities that will be authorized to be taken from the Maplewood Estates Deep Well in this batch of changes are 233 gpm[1] and 26.6 afy[1]. These quantities added to the quantities already authorized from the well, 320 gpm and 97 afy, give a total of 553 gpm[1] and 123.6 afy[1]. At these rates the well can operate about 14% of the time to fully use its annual quantity. It is most likely the well will be used to supply homes in an as-needed fashion throughout the year. Although this is significantly less stress on the aquifer than continuous pumping, the well could, at times, be operated nearly continuously, especially during summer months. This, along with the lack of stabilization during the pumping test, raises concerns of long-term impacts and possible mining of the aquifer.

The letter submitted by Mr. Mike Krautkramer of Robinson and Noble (November, 2006) suggests the aquifer is unquestionably able to sustain the proposed quantities. I agree with Mr. Krautkramer that another pumping test is unnecessary, considering the first test lasted 72 hours and pumping tests in confined aquifers typically last only 24 hours. Until the aquifer is stressed regularly, the potential long-term impacts from pumping will not be evident. Therefore, this report of examination and superseding documents will be provisioned to require close monitoring of static and pumping water levels in the well and reporting of the data to Ecology on a yearly basis. If, based on these data, it is determined that water levels have shown a general declining trend or if intense summer pumping causes mining of the aquifer, Ecology will require a reduction in instantaneous withdrawal or alteration of the pumping scheme to mitigate the decline.

Same Source of Water

The prior appropriation or "first in time first in right" doctrine for managing water rights has meaning only within a specific *water source*. For surface water rights, the state has historically defined the source as the stream or lake from which water is diverted. This can include one or more streams or other water bodies managed together. For groundwater, the source has been historically defined as the aquifer or aquifer system from which groundwater is withdrawn.

All the subject water withdrawals/diversions authorized for change within this batch of applications are within the Cedar River basin and beneficially use water that would eventually discharge into the Cedar River. In consideration of this, the subject wells and diversion are within the same source of water.

Consideration of Protests and Comments

No protests or letters of concern were received during this investigation.

CONCLUSIONS

CRWSD originally submitted a batch of 6 water right change applications for concurrent processing. One of those change applications, the Chinquapin Junction exempt well consolidation, is being denied due to the original and proposed wells being in different Water Resource Inventory Areas. A second exempt well consolidation proposal was voluntarily withdrawn as mitigation for potential impacts to an impaired reach of the Cedar River. The remaining 4 applications, as a package, satisfy the considerations listed above. The changes will not impair other water rights or be detrimental to the public interest.

After review of the four draft Reports of Examination and consideration of the King County Superior Court decision in the Municipal Water Law Case (*Lummi Nation, et al. v. State of Washington)*, Cedar River Water and Sewer District requested to have the Dorre Don change application (CS1-20446C) put on hold until the Supreme Court decision is rendered in the appeal. CRWSD has chosen to do so with the belief that the King County Superior Court ruling may be overturned by the Washington Supreme Court, returning the Dorre Don water right to municipal status and exempting the water right from relinquishment. If not subject to relinquishment, the instantaneous quantity of the right could be found to be 197 gpm, which is 97 gpm more than was found tentatively valid in the draft Report of Examination. The possible change in status of the water right will not affect the annual

quantity found to be valid and eligible for change. An unaltered version of the Dorre Don draft Report of Examination is available upon request.

A new tentative determination of extent and validity will be performed for the Dorre Don certificate soon after the Supreme Court ruling. If the Superior Court ruling is upheld, the instantaneous quantity found tentatively valid and eligible for change will likely remain 100 gpm. If the Superior Court ruling is overturned, it is possible the instantaneous quantity will increase. The quantities found tentatively valid and eligible for change will, at the time of consideration, be evaluated as part of this batch and part of new totals proposed to be withdrawn from the Maplewood Estates Deep Well.

Until the Dorre Don surface water right is changed, the totals to be withdrawn from the Maplewood Estates Deep Well are 453 gpm and 110.8 afy. If the Superior Court decision in the Municipal Water Law case is upheld by the Supreme Court (Municipal Water Law found unconstitutional), then the total quantities authorized from the Maplewood Estates Deep Well will likely be 553 gpm and 123.6 afy. If the Superior Court decision is overturned, the instantaneous quantity could be increased to 650 gpm.

RECOMMENDATIONS

Based on the above investigation and conclusions, I recommend that the request for change to G1-20497C 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:

- 127 gpm
- 4.1 acre-feet per year
- municipal

Point of [Diversion Withdrawal]

NW¼, NW¼, Section 13, Township 22 North, Range 06 East, W.M.

Place of Use

As described on Page 1 of this Report of Examination.

Report by: _____ _____

Jay Cook Date

Water Resources Program

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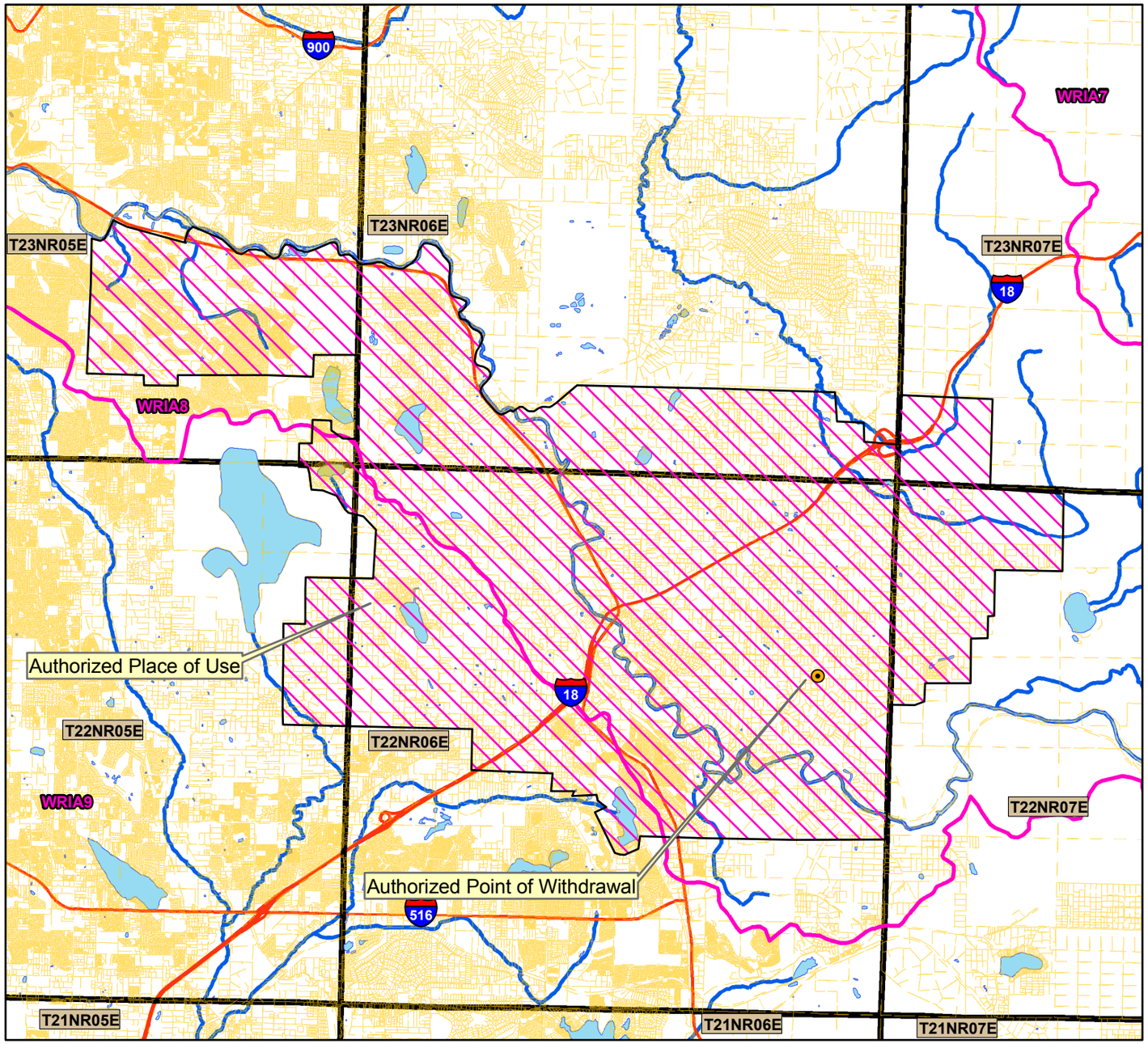
Cedar River Water & Sewer District
Water Right Number CG1-20497C
WRIA 8 & 9 - King County

DEPARTMENT OF ECOLOGY
State of Washington



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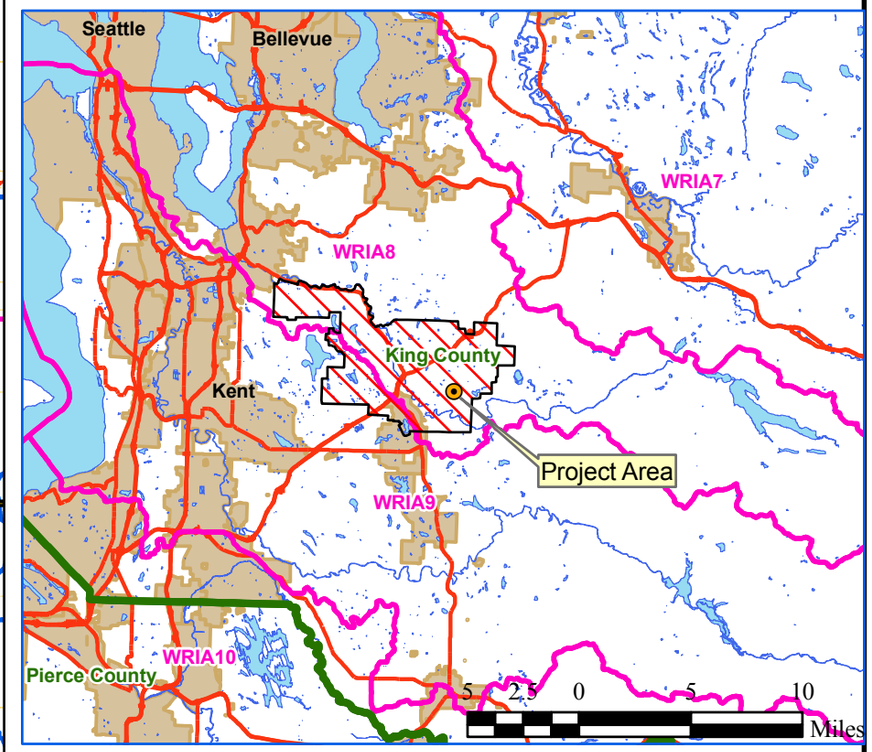

Legend

- County
- WRIA
- cities
- Highways
- Local Roads
- Townships
- 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