



State of Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, Oregon 97301-1271
(503) 986-0900

Application for Limited Water Use License

A summary of review criteria and procedures that are generally applicable to these applications is available at www.wrd.state.or.us/OWRD/PUBS/forms.shtml.

License No. LL-1689

Applicant(s): Hudson Bay District Improvement Co. (HBDIC)

Contact Person: John Zerba - HBDIC (Bob Bower - WWBWC)

Mailing Address: 144 Main Str. Milton-Freewater, OR 97862

Telephone No: 541-938-6105 (Zerba) / 541-938-2176 (Bower)

I (We) make application for a Limited License to use or store the following described surface waters or groundwater-not otherwise exempt, or to use stored water of the State of Oregon for a use of a short-term or fixed duration :

1. SOURCE(S) OF WATER for the proposed use: Walla Walla River a tributary of Columbia River.

2. TOTAL AMOUNT OF WATER to be diverted: 50 cubic feet per second, or 22440 gallons per minute. If water is to be used from more than one source, give the quantity from each: 0.

3. INTENDED USE(S) OF WATER: (check all that apply)

- Road construction or maintenance;
- General construction;
- Forestland and rangeland management; or
- Other: Aquifer Recharge

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4. DESCRIPTION OF PROPOSED PROJECT: Include a description of the intended place of use as shown on the accompanying site map, the method of water diversion, the type of equipment to be used (including pump horsepower, if applicable), length and dimensions of supply ditches and pipelines:

See Attached cover letter & support materials.

5. PROJECT SCHEDULE: (List day, month, and year)
 Date water use will begin Feb. 19th 2009
 Date project will be completed Feb 18th 2014
 Date water use will be completed Feb 18th 2014

PLEASE READ CAREFULLY

NOTE: A completed water availability statement from the local watermaster, Land Use Information Form completed by the local Planning Department, fees and site map meeting the requirements of OAR 690-340-030 must accompany this request. The fee for this request is \$150 for the first point of diversion plus \$15 for each additional point of diversion. *Failure to provide any of the required information will result in return of your application.* The license, if granted, will not be issued or replaced by a new license for a period of more than five consecutive years. The license, if granted, will be subordinate to all other authorized uses that rely upon the same source, or water affected by the source, and may be revoked at any time it is determined the use causes injury to any other water right or minimum perennial streamflow.

If water source is a well, well logs or adequate information for the Department to determine aquifer, well depth, well seal and open interval, etc. are required. The licensee shall indicate the intended aquifer. If for multiple wells, each map location shall be clearly tied to a well log.

If a limited license is approved, the licensee shall give notice to the Department (Watermaster) at least 15 days in advance of using the water under the Limited License and shall maintain a record of use. The record of use shall include, but need not be limited to, an estimate of the amount of water used, the period of use and the categories of beneficial use to which the water is applied. During the period of the Limited License, the record of use shall be available for review by the Department upon request.

REMARKS: OWRO Water Master (Tony Justus) sending
his water availability report (separately) to Salem;
for this application.

SIGNATURE of Applicant: [Signature] DATE: 1-21-09
 Title: HBDC manager

Mapping Requirements (OAR 690-340-0030):

- (1) A request for a limited license shall be submitted on a form provided by the Water Resources Department, and shall be accompanied by the following:
- (c) A site map of reproducible quality, drawn to a standard, even scale of not less than 2 inches = 1 mile, showing:
 - (A) The locations of all proposed points of diversion referenced by coordinates or by bearing and distance to the nearest established or projected public land survey corner;
 - (B) The general course of the source for the proposed use, if applicable;
 - (C) Other topographical features such as roads, streams, railroads, etc., which may be helpful in locating the diversion points in the field.

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This page to be completed by the local Watermaster.

WATER AVAILABILITY STATEMENT

Name of Applicant: Hudson Bay Improvement Company Limited License
Number: LL-1189

1. To your knowledge, has the stream or basin that is the source for this application ever been regulated for prior rights?

Yes No

If yes, please explain:

The Walla Walla River is typically short of water to serve all water rights in July, August, September and October.

2. Based on your observations, would there be water available in the quantity and at the times needed to supply the use proposed by this application?

Yes No

3. Do you observe this stream system during regular fieldwork?

Yes No

If yes, what are your observations for the stream?

Typically, there can be water available November thru June. OAR Division 33 may also dictate restrictions on period of use dates.

4. If the source is a well and if WRD were to determine that there is the potential for substantial interference with nearby surface water sources, would there still be ground water and surface water available during the time requested and in the amount requested without injury to existing water rights?

Yes No N/A

What would you recommend for conditions on a limited license that may be issued approving this application?

Allow diversion only when by-pass flows are met below Nursury Bridge Dam. Restrict with by-pass flows similar to the flows in Permit 53662. November- 64 cfs, December & January- 95 cfs, February thru May 15-132 cfs.

5. Any other recommendations you would like to make?

Subordinate to any other limited license from the same source issued prior to this one.

Signature _____ WM District #: _____ Date: _____

This page to be completed by the local Watermaster.

WATER AVAILABILITY STATEMENT

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Number: LL-1189

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If yes, please explain:

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2. Based on your observations, would there be water available in the quantity and at the times needed to supply the use proposed by this application?

Yes No

3. Do you observe this stream system during regular fieldwork?

Yes No

If yes, what are your observations for the stream?

Typically, there can be water available November thru June. OAR Division 33 may also dictate restrictions on period of use dates.

4. If the source is a well and if WRD were to determine that there is the potential for substantial interference with nearby surface water sources, would there still be ground water and surface water available during the time requested and in the amount requested without injury to existing water rights?

Yes No N/A

What would you recommend for conditions on a limited license that may be issued approving this application?

Allow diversion only when by-pass flows are met below Nursury Bridge Dam. Restrict with by-pass flows similar to the flows in Permit 53662. November- 64 cfs, December & January- 95 cfs, February thru May 15-132 cfs.

5. Any other recommendations you would like to make?

Subordinate to any other limited license from the same source issued prior to this one.

Signature Tony Justa WM District #: 5 Date: January 30, 2009

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Oregon Water Resources Department
Land Use Information Form

LL-1189

THIS FORM IS NOT REQUIRED IF: 1) water is to be diverted, conveyed, and/or used only on federal lands; or 2) the application is for a water-right transfer, allocation of conserved water, exchange, permit amendment, or ground water registration modification, and all of the following apply: a) only the place of use is proposed for change, b) there are no structural changes, c) the use of water is for irrigation, and d) the use is located in an irrigation district or exclusive farm-use zone.

Applicant Name: Hudson Bay District Improvement Company
Mailing Address: 144 Main Str.
City: Milton-Freewater State: OR Zip: 97862 Day Phone: 541-933-6105

A. Land and Location

Please include the following information for all tax lots where water will be diverted (taken from its source), conveyed (transported), or used. Applicants for municipal use, or irrigation uses within irrigation districts may substitute existing and proposed service-area boundaries for the tax-lot information requested below.

Table with columns: Township, Range, Section, 1/4, Tax Lot #, Plan Designation (e.g. Rural Residential/RR-5), Water to be: (Diverted, Conveyed, Used), Proposed Land Use.

List all counties and cities where water is proposed to be diverted, conveyed, or used. N/A

B. Description of Proposed Use

Type of application to be filed with the Water Resources Department:

- Permit to Use or Store Water, Water-Right Transfer, Exchange of Water, Allocation of Conserved Water, Limited Water Use License, Permit Amendment or Ground Water Registration Modification

Source of water: Reservoir/Pond, Ground Water, Surface Water (name) Walla Walla River

Estimated quantity of water needed: 50 cubic feet per second

Intended use of water: Irrigation, Commercial, Industrial, Domestic for household(s), Municipal, Quasi-municipal, Instream, Other Recharge

Briefly describe: HBDC Aquifer Recharge site will recharge water to shallow aquifer for community and ecological benefits.

Note to applicant: If the Land Use Information Form cannot be completed while you wait, please have a local government representative sign the receipt below and include it with the application filed with the Water Resources Department.

Receipt for Request for Land Use Information

State of Oregon Water Resources Department
725 Summer Street NE, Suite A
Salem, OR 97301-1266

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For Local Government Use Only

The following section must be completed by a planning official from each county and city listed unless the project will be located entirely within the city limits. In that case, only the city planning agency must complete this form.

This deals only with the local land-use plan. Do not include approval for activities such as building or grading permits.

Please check the appropriate box below and provide the requested information

Land uses to be served by proposed water uses (including proposed construction) are allowed outright or are not regulated by your comprehensive plan. Cite applicable ordinance section(s): 152.056

Land uses to be served by proposed water uses (including proposed construction) involve discretionary land-use approvals as listed in the table below. (Please attach documentation of applicable land-use approvals which have already been obtained. Record of Action/land-use decision and accompanying findings are sufficient.) If approvals have been obtained but all appeal periods have not ended, check "Being pursued".

Type of Land-Use Approval Needed (e.g. plan amendments, rezones, conditional-use permits, etc.)	Cite Most Significant, Applicable Plan Policies & Ordinance Section References	Land-Use Approval:	
		Obtained Denied	Being pursued Not being pursued
N/A	N/A	Obtained Denied	Being pursued Not being pursued
		Obtained Denied	Being pursued Not being pursued
		Obtained Denied	Being pursued Not being pursued
		Obtained Denied	Being pursued Not being pursued
		Obtained Denied	Being pursued Not being pursued

Local governments are invited to express special land-use concerns or make recommendations to the Water Resources Department regarding this proposed use of water below, or on a separate sheet.

This project previously approved by Planning,
Umatilla County Planning is supportive of
developing innovative, multi-beneficial water
storage projects we believe we can be
the "showcase" county for innovative
water management solutions.

Name: J.R. Cook Title: Asst. Planning Dir.
 Signature: [Signature] Phone: 541.278.6251 Date: 1-26-09
 Government Entity: Umatilla County

Note to local government representative: Please complete this form or sign the receipt below and return it to the applicant. If you sign the receipt, you will have 30 days from the Water Resources Department's notice date to return the completed Land Use Information Form or WRD may presume the land use associated with the proposed use of water is compatible with local comprehensive plans.

Receipt for Request for Land Use Information

Applicant name: _____
 City or County: _____ Staff contact: _____
 Signature: _____ Phone: _____ Date: _____

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To: Water Rights Section
Oregon Water Resources Department
158 12th St NE
Salem, OR 97310

From: Walla Walla Basin Watershed Council (WWBWC)/Hudson Bay District
Improvement Company (HBDIC)
810 South Main Street
Milton-Freewater, Oregon 97862

RE: **New** Limited Testing License Application for HBDIC Recharge Site (Final Order 758).

To Whom It May Concern:

This letter and attached documents are being submitted in support of our application for a new limited testing license for aquifer recharge at the HBDIC Recharge project, in Umatilla County Oregon. The actual recharge site is located in the NE 1/4, of Section 33, Township 6 North, and Range 35 East. The project has been in operation for nearly 5 years and has shown to effectively recharge water to the aquifer, help restore baseflows to downgradient streams and recharge good quality surface water in to the shallow aquifer system. Through a series of Rules Advisory Committee (RAC) meetings last spring and early summer the OWRD worked to add aquifer recharge to the basin rules¹ along with surface storage. The RAC was decided that the decision to add aquifer recharge and surface storage for the Walla Walla basin would be delayed pending the US Army Corp of Engineers (CTUIR) Feasibility study project being completed in 2010. Therefore to continue to test aquifer recharge at the HBDIC recharge site we are submitting a new limited testing license for the site (see attached).

We are also submitting the support materials (study plan, etc) from the original application titled *Hudson Bay Aquifer Recharge Project: An application for AR Testing Limited License to Oregon Water Resource Department (OWRD)* (October, 20th 2003, **Attachment A**). In this new limited testing license application we request to follow the **same** operations, monitoring and reporting plan that was outlined in this original application. ODEQ (Phil Richerson, Pendleton-ODEQ) was contacted this week regarding this new application and gave a verbal permission to submit the same water quality plan that was developed with ODEQ (2003) and submitted with our original application.

We are also requesting that the new limited license has **the same** water-use conditions of Final Order #758 including:

- Water Use time period: **November 1st through May 15th**
- Maximum Water Use Allocation of **50 cfs**.
- Seasonal Minimum Instream flow requirements** (Walla Walla River) as were determined by ODFW and CTUIR in original application which were:
 - o November 1st through November 31st = 64 cfs

¹ Mike Ladd, Tony Justus at OWRD Pendleton office can be contacted regarding this process.



- December 1st through January 31st = 95 cfs
- February 1st through May 15th = 150 cfs

Final Order #758 Final Requirements stated that *“The licensee shall meter all water use and maintain a record of use, including the total number of hours of diversion and an estimate of the total quantity diverted. During the period of the limited license, the record of use shall be available for review by the Department upon request and shall be submitted to the Watermaster upon request. Upon project completion, the license shall submit the record of use to the Water Resources Department.”*

At the time of this letter, the project was still in operations (2008-9 recharge season), but a summary for the *record of use* (as outlined above) can be found in **Attachment B**. The attachment outlines both the water use from the **Walla Walla River** (POD) to the HBDIC Recharge Project (as estimated conveyance loss of 10 cfs) and the actual water use at the HBDIC recharge site. Following the completion of final order #758, a summary of all water use 2004-2009 will be provided to the department. All water use meter records are available to OWRD staff at any time, upon request. As the HBDIC site has gone through several expansions during this 2004-2008 period, **Attachment C** outlines some additional information that will help assess the changes in water use at the site over the period of record. The HBDIC recharge project managers intend to further develop this site for recharge testing upon approval of a new limited testing license.

You will find the following Attachments in support of this new application:

- Attachment A-C:** Original Application Supporting document that includes:
 - Maps of site as required by OWRD application
 - ODEQ Water Quality Monitoring Plan (and supplementary changes)
- Attachment D:** Copy of Current OWRD Limited Testing License (Final Order#758)
- Attachment E:** Original Water availability report from OWRD water master (New one being sent to Salem from Pendleton Office)

Also attached you will find the application fee for \$165 dollars to cover new limited license application. As there are now two separate diversions at the recharge site, we added the additional \$15 for this application to ensure the proper fee was submitted.

Thank you for your continued support.


Robert J. Bower
Senior Hydrologist/HBDIC Project Co-manager
Walla Walla Basin Watershed Council

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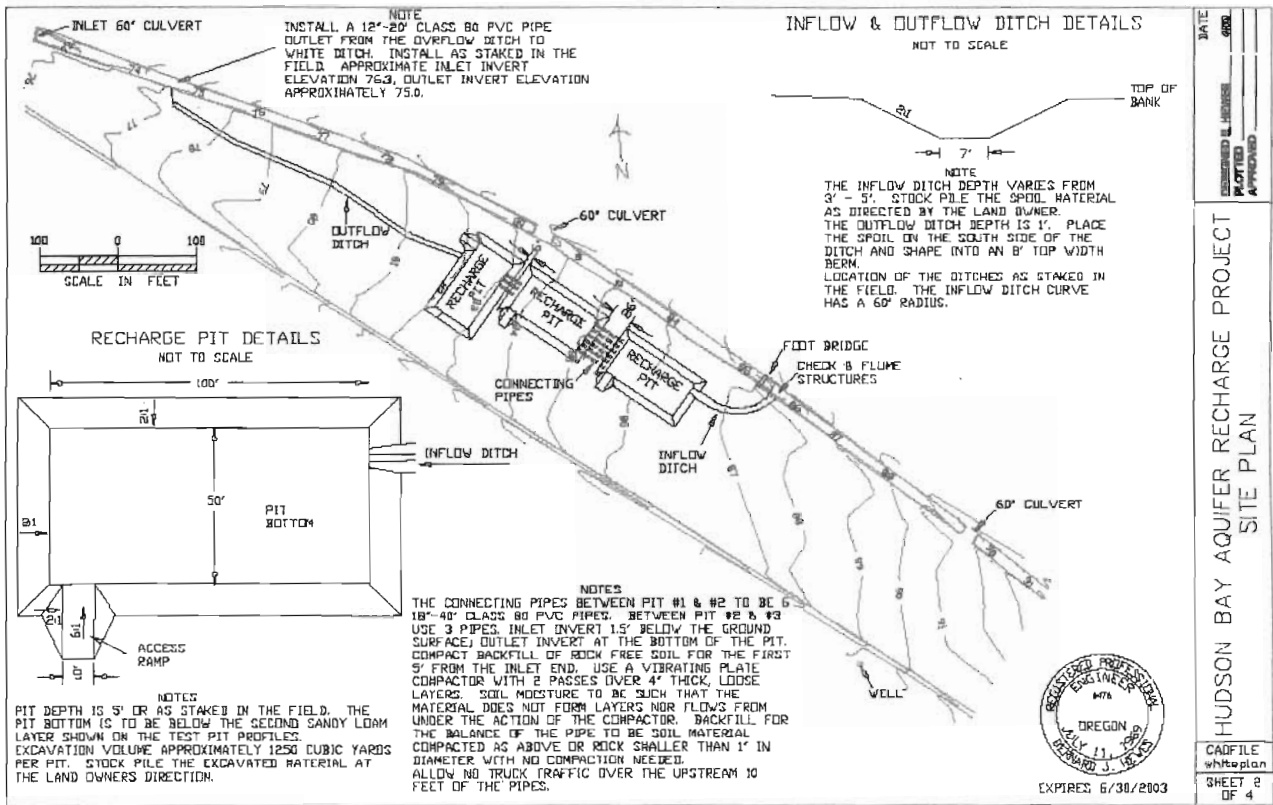
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Cc: Tony Justus, OWRD Pendleton
Rick George, CTUIR, Mission
Phil Richerson, ODEQ, Pendleton
Bill Duke, ODFW, Pendleton

Attachment A

Hudson Bay Aquifer Recharge Project

An application for ASR Testing Limited License to
Oregon Water Resources Department (OWRD)
(OAR 690-350-0020)



Prepared for the HBDIC by:

Walla Walla Basin Watershed Council
Kennedy and Jenks Consultants, Inc.

October 20, 2003

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Introduction

The Walla Walla Basin Watershed Council (WWBWC), in cooperation with the Hudson Bay District Improvement Company (HBDIC), has proposed to test shallow aquifer recharge at a site located adjacent to the HBDIC's *White Ditch* in section 33, T6N, R35E. At the test site a series of three infiltration pits will be built. Water will be supplied to these pits via a diversion from the canal. Recharge activities are proposed during the winter and spring months, when the Walla Walla River (the source of water for the canal) is running at higher flows. The proposed shallow aquifer recharge testing would be done under an ASR Testing Limited License granted by Oregon Water Resources Department (OWRD) (OAR 690-350-0020). By recharging shallow groundwater it is hoped that a portion of the recharge water will return to restore diminished spring-creek and Walla Walla River baseflows. Testing will not include removal of stored water by pumping or other artificial means.

The Limited License Application requires several supporting documents be attached (690-350-0020 (3)(b)), including (but not limited to) those describing proposed testing, groundwater conditions (including hydrogeologic conditions and groundwater quality), and source water quality. Information not included in this assessment report, but still needed for the application, will be collected during proposed site-specific hydrogeologic characterization, monitoring, and testing process. This limited license application is to gain approval of the proposed shallow aquifer recharge testing. The complete list of Attachments as called for in include:

- Attachment 1. Project Layout and Size, 690-350-0020(3)(a)(E) and (I) and 690-350-0020(3)(b)(B)
- Attachment 2. Water Rights Statement, 690-350-0020(3)(a)(F) and (G)
- Attachment 3. Land Use Approval, 690-350-0020(3)(a)(H)
- Attachment 4. Proposed Test Program, 690-350-0020(3)(b)(A)
- Attachment 5. Proposed Monitoring Program, 690-350-0020(3)(b)(A)
- Attachment 6. Site Hydrogeology, 690-350-0020(3)(b)(C), (E), and (G)
- Attachment 7. Source Water Quality, 690-350-0020(3)(b)(D)

Overview of Watershed Conditions

The quantity, storage, timing, and availability of water are several major challenges facing watershed managers in the Walla Walla River Basin. The relationship between the Walla Walla River and its distributaries with that of the shallow alluvium aquifer has been shown to be highly interdependent (Piper, 1933, Newcomb, 1965, Barker & McNish, 1975, Bower et. al., 2001). The Walla Walla Basin Watershed Council, Walla Walla Watershed Alliance, and Hudson Bay District Improvement Company (HBDIC), working with their partners in OWRD, ODEQ and ODFW, propose to explore the utility of artificially recharging the shallow alluvial aquifer as a way to help offset the loss of natural recharge opportunities throughout the basin.

Surface water and shallow groundwater in the Walla Walla Basin (the Basin) form an interconnected system. In some areas, especially upstream areas where streams leave the mountains and highlands surrounding the Basin to flow out onto the Basin floor, streams historically probably branched out onto the Basin floor and some of the water they carried seeped into the ground, recharging the shallow groundwater system. This shallow groundwater, recharged near the edge of the Basin, formed the main source of clean, cool groundwater found further down basin where it returned to the surface via springs and base flow to the Walla Walla River. Through the years, the issuance of hundreds of surface and groundwater rights has resulted in the allocation of nearly all of the naturally available water in the basin. These allocations have pressured water resources, compelling the

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Washington State Department of Ecology to close ground waters to further appropriations due to concerns about dropping water table levels. Other indicators of overstressed water resources include: (1) dry or dropping well levels, some wells in OWRD's inventory of state-observation-wells, (2) dry or dropping flow volumes in the spring branches, and (3) loss of natural and artificial groundwater recharge opportunities through irrigation efficiency and improved surface water management.

The state of Oregon has recognized use of artificial recharge as a tool "that can be an effective and efficient method for storing water for futures uses."(OWRD, Umatilla Basin Report, 1988). Artificial recharge has been shown to work in other areas of Umatilla County such as the County Line Water Improvement District Project, in operation since 1977. An OWRD review of this project states "It has been instrumental in arresting and reversing ground water level declines in a portion of the Ordinance Critical Ground Water Area." (OWRD, 1988). The USGS also noted the need for artificial recharge in the Walla Walla valley to offset increased water demands and loss of natural and artificial recharge mechanisms: "(Irrigation efficiency measures) can diminish the infiltration to recharge the ground water," wrote Newcomb in his important 1965 report. "Consequently, any such plans for changes in river regimen could well be required to provide for compensatory recharge or to sustain counter charges for their diminution of natural recharge and storage.

This project will comprise of three major components: Construction-Operation, Monitoring-Evaluation and Outreach-Education.

Construction-Operation: After receiving the appropriate permits and/or approval from OWRD, OWDF, ODEQ, USFWS, NOAA Fisheries and the Umatilla County Planning Department, a series of three pits specifically designed for passive artificial recharge will be constructed on land provided by the Hudson District Improvement Company (HBDIC). The land is being leased from one of the district's patrons by the HBDIC and a written agreement for the lease has been secured. The pits will be constructed in such a way to maximize recharge rates while minimizing the ground water quality impacts during the winter/spring recharge period. Project features include a concrete check structure in adjacent White Ditch, a concrete flow-measuring flume, an open connection ditch, three excavated pits, pipes connecting the pits and an outflow ditch from the down stream pit. These pits are designed to handle 50 cubic feet per second (cfs) of water anticipated to be available during the winter/spring Walla Walla River runoff. The actual volume of winter-spring water delivered will depend on the above-mentioned permitting and review process and the actual field verified constraints once in operation. Operation of this structure will be based on the instructions provided by OWRD in the operation permit and agreed to by the various project partners and agencies.

Monitoring-Evaluation: Monitoring of project will be conducted at several levels including: (1) on-site subsurface hydrologic and hydrogeologic monitoring, (2) off-site subsurface hydrologic and hydrogeologic monitoring, (3) off-site surface monitoring of springs through flow and photo-point measurements, (4) on/off-site water quality monitoring of key physical and chemical properties. The results of this intensive monitoring will be evaluated to identify impacts of the proposed project on groundwater levels and flow beneath and around the site, on surface water and spring discharges down gradient of the site, and on base flow to the Walla Walla River. Monitoring will also identify potential problems associated with the project

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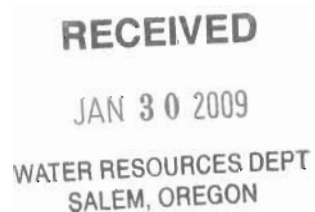
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Outreach-Education: This project will also serve as an important outreach and education tool for the general public and water users of the Walla Walla valley. Particular focus and time will be spent on utilizing the site and the results for the recharge analysis to educate people on the role that ground water plays in the rivers and streams of the Walla Walla Watershed.

This project meets all of the habitat restoration actions from the *Oregon Aquatic Habitat Restoration and Enhancement Guide* including:

1. Change the trend of aquatic habitat function from one of a diminishing ability to support salmonids and other organisms to one that supports a complex, self-sustaining system. Such systems provide high quality habitat and ecological capacity for salmonids and other species; or
2. Correct or improve conditions caused by past management and/or disturbance events; or
3. Maximize beneficial habitat in the short term where watershed degradation has been extensive and natural processes will need substantial time to restore habitat; or
4. Create beneficial habitat and restore stream function to the fullest extent possible within developed areas where no reasonable expectation of returning to natural conditions exists.

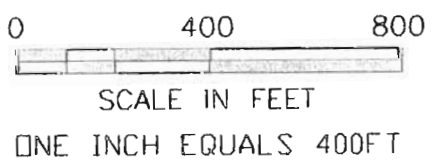


HUDSON BAY AQUIFER RECHARGE PROJECT LOCATED IN THE NE¹/₄ OF SEC33, T6 N, R35E W.M.

Figure 1 Scaled Map of Project and Surrounding Area



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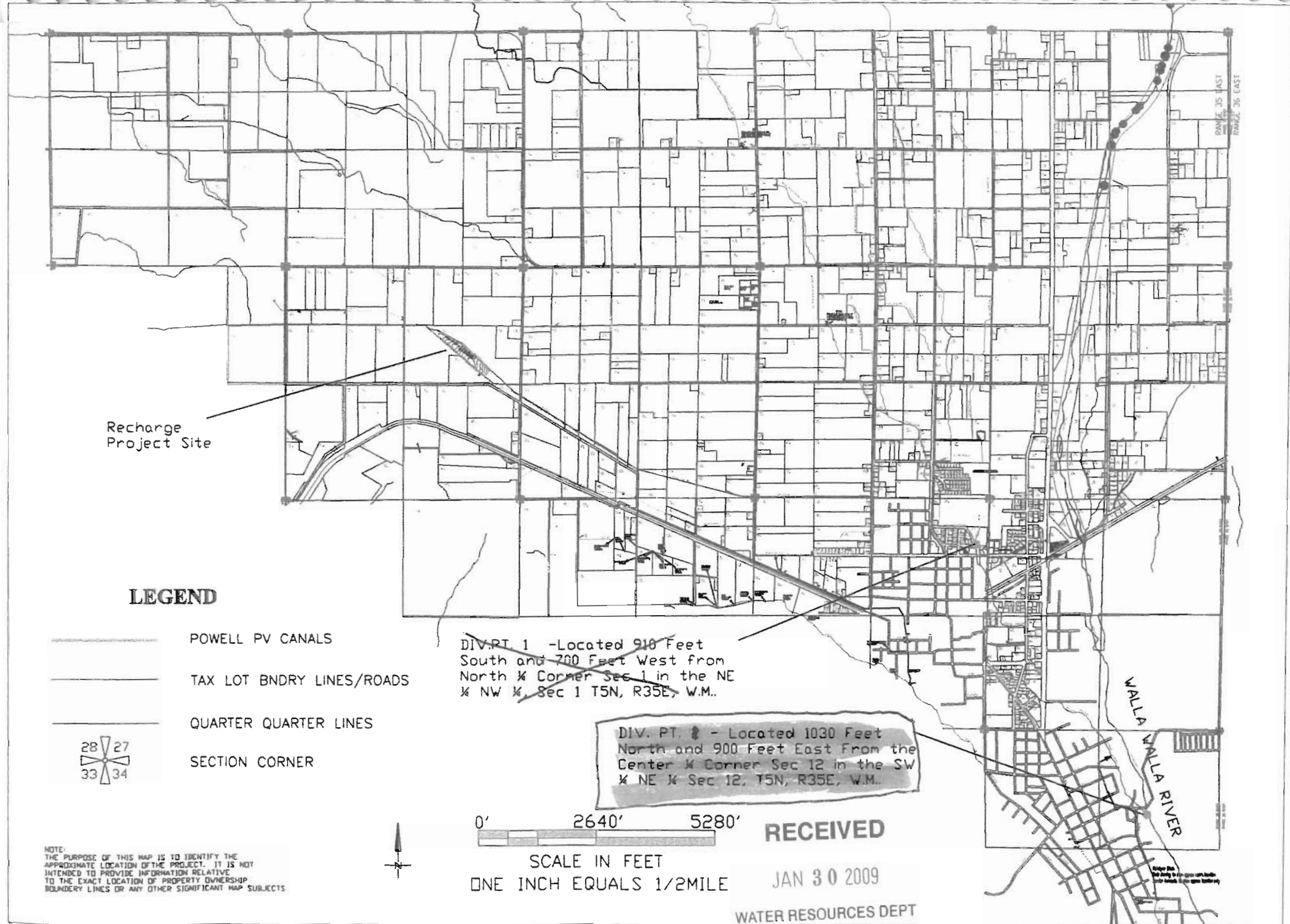


LEGEND

- POWELL PV CANAL
- TAX LOT BOUNDARY LINES
- QUARTER QUARTER LINES
- SECTION CORNER

NOTE:
THE PURPOSE OF THIS MAP IS TO IDENTIFY THE APPROXIMATE LOCATION OF THE PROJECT. IT IS NOT INTENDED TO PROVIDE INFORMATION RELATIVE TO THE EXACT LOCATION OF PROPERTY OWNERSHIP BOUNDARY LINES, OR ANY OTHER SIGNIFICANT MAP SUBJECTS

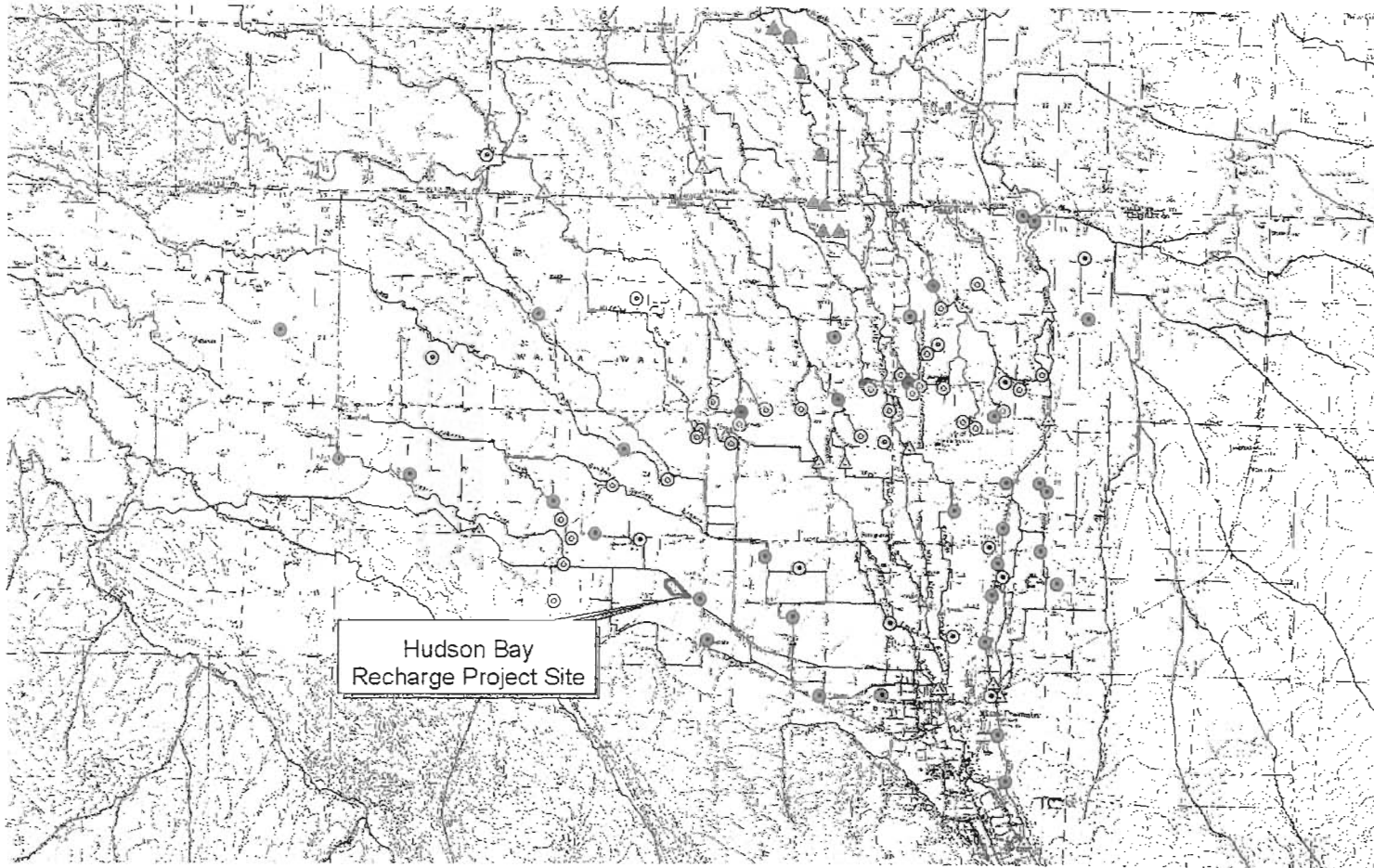
HUDSON BAY AQUIFER RECHARGE PROJECT
 LOCATED IN THE NE 1/4 OF SEC 33, T6 N, R35E W.M.
 FIGURE 1A



NOTE:
 THE PURPOSE OF THIS MAP IS TO IDENTIFY THE APPROXIMATE LOCATION OF THE PROJECT. IT IS NOT INTENDED TO PROVIDE INFORMATION RELATIVE TO THE EXACT LOCATION OF PROPERTY OWNERSHIP BOUNDARY LINES OR ANY OTHER SIGNIFICANT MAP SUBJECTS

Figure 2 WWBW Monitoring and Recharge Site Map

**FIGURE 2. WWBWC Monitoring Network
and Hudson Bay Recharge Project 2003**



Hudson Bay
Recharge Project Site

2 0 2 4 Miles

- Hudson Bay Recharge Site
- ▲ McEvoy Spring Wells - Native Creek
- Manual Flow Measurements
- ⊙ Wells - Continuous Level Recorders
- ⊙ Wells - Manual Measurements
- ⊙ Springs (1933 Pipal Report)
- ⊙ Springs - Continuous Flow Recorders
- ▲ Flow Gauges - Streams and River
- ▲ Walla Walla Streams and Rivers



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Attachment 1. Project Layout, 690-350-0020(3)(a)(E) and (I) and 690-350-0020(3)(b)(B)

Prepared by Bernard Hewes, Licensed Engineer in the State of Oregon.

This project entails diverting water from an existing irrigation ditch to three pits to be excavated for the purpose of infiltrating the water into the shallow aquifer. Project features include a concrete check structure in the existing White Ditch, a concrete flow measuring flume, an open ditch, three excavated pits, pipes connecting the pits and an outflow ditch from the down stream pit.

These items were sized to handle 50 cubic feet per second (cfs) of water. This is the amount anticipated will be available from excess flow in the Walla Walla River and that the Hudson Bay District is able to deliver.

Data gathered to design the project consisted of a site topographic survey and installing two sites for testing the water infiltration capacity of the natural materials and determining the layers in the soil profile. In addition the Soil Survey of Umatilla County Area, Oregon was consulted. This is a US Dept. of Agriculture, Natural Resources Conservation Service publication giving general soils information.

The topographic survey data was used to prepare a topographic map with one foot contour intervals at a scale of 1" = 60'. This information was used to help determine the location of the project features.

Two test pits were excavated to a depth of 6'-7' each. A 24" diameter by 5' long section of corrugated metal pipe was set on end in the bottom of the pit and about one foot of fill placed around it to hold it in place. Water was pumped into the pipe at a rate that would sustain a water depth of one foot in the pipe. Both flow rate and total flow was measured. The test was run for 6.25 hours in the first pit and 3.5 hours for the second pit.

PIT #1

Soil profile:

0-12" sandy loam

12"-36" gravelly sandy loam, approximately 50% of the material volume is gravel size particles with an estimated D 50 size of about 0.75"

36"-48" sandy loam, in parts of the trench this layer does not exist

48"-?" gravelly sandy loam approximately 20% of the volume is gravel size particles

The inflow rate at the end of the test period was 4.0 gallons per minute (gpm). This resulted in an infiltration rate of 1.7 gpm/sq. ft./ foot of head.

PIT #2

Soil profile:

0"-13" gravelly sandy loam

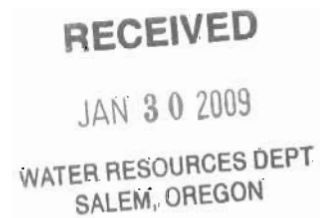
13"-39" cobbly sandy loam, the D50 of the gravel is approximately 1"

39"-52" gravelly sandy loam

52"-? sand gravel mix D 50 estimated to be about 0.25"

In this pit the inflow rate of 11.9 gpm was maintained for 3.5 hours and at no time did water puddle in the bottom of the pipe. The infiltration rate is in excess of 3.8 gpm/sq. ft.

The area needed for infiltrating the water was determined assuming an infiltration rate for the entire area of 3.0 gpm/sq.ft./ per foot of head. For an inflow rate of 50 cfs the infiltration area needs to be



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10/16/03

7480 square feet. The infiltration rate of 3.0 gpm/sq.ft. was chosen because the pits will be located in the area with soil surface texture similar to test pit #2.

Due to the possibility of fine soil particles plugging the infiltration area, unknowns concerning the long-term infiltration rate and that the amount of water available is not yet known extra infiltration area is being provided. Three separate pits with bottom dimensions of 50 feet X 100 feet are proposed. This will provide an infiltration area of 15,000 square feet.

The pits will be excavated to a depth of about 5 feet to get below the second sandy loam layer noted in both test pits. This will allow the water depth to be 2.5 feet - 3.5 feet. That will increase the rate of infiltration over the test values derived with one foot of water depth. The overall safety factor for the infiltration area is well over 2.

Inflow to the system will be measured with a ramp flume and continuously recorded. The ramp flume is sized to provide 5% flow rate accuracy over a flow range of 10 cfs-50 cfs

Any outflow from the last pit will be safely returned to the White Ditch through a 12-inch pipe. The pipe will be on a slope that will keep water from flowing out of White Ditch.

Engineering Attachments:

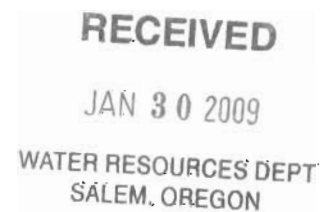
Attachment 1A: Location Map

Attachment 1B: Site Plan

Attachment 1C: Structure Details

Attachment 1D: Structure Reinforcing Steel

Attachment 1E: Signed and Stamped Copy of *Project Engineering Report*



Attachment 2. Water Rights Statement, 690-350-0020(3)(a)(F) and (G)

Water Right Applicant:

Hudson Bay District Improvement Co.

P.O. Box 110
Milton-Freewater, Oregon 97862
Project Contact: John Zerba, WBDIC Board Member
Telephone: (541)-938-6100
Operations Contact: Jon Brough, WBDIC District Manager
Telephone: (541)-520-2856
Recharge Project Manager (WWBWC), Bob Bower, Hydrologist
Telephone: (541)-938-2170

Source of Water:

Walla Walla River, a tributary of the Colombia River, within the Umatilla River Basin.

Purpose of Use:

Artificial Groundwater Recharge using water diverted during the fall, winter, and spring freshet flows on the Walla Walla River and utilizing the HBDIC recharge structure near Milton-Freewater, Oregon.

Proposed Period of Use:

November 1 through May 15 and as Further limited below

Point of Diversion Location:

~~NE 1/4 NW 1/4, Section 1, SW 1/4 NE 1/4 Section 12, T5N, R35E, W.M.; DIV. PT. 1 - 910 Feet South and 700 Feet West from North 1/4 Corner Section 1; DIV. PT. 2 - 1030 Feet North and 900 Feet East From the Center 1/4 Corner Section 12.~~

Minimum Instream Flow Information:

When water is diverted under this permit, the use is further limited to times when there is, at a minimum, the following streamflows in the Tum-a-lum branch (mainstem) of the Walla Walla River, between the Little Walla Walla River diversion and Nursery Bridge Dam and flowing past Nursery Bridge Dam.

Utilizing the Minimum Perennial Streamflows information (table 1, page 31) in OWRD Umatilla Basin Report (OWRD, 1988) and HBDIC's current winter water diversion permit (Permit Number 53662) the following represent the minimum instream flows at Nursery Bridge Dam:

- November – 64 cfs
- December through January – 95 cfs
- February through May 15 – 132 cfs

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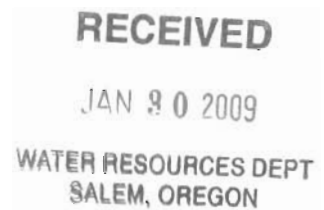
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Nursery Bridge is located just downstream of Nursery Bridge and is downstream of the Little Walla Walla Diversion, the East Side Canal and the District's Canal, also described as point of diversion 1 in this application.

In order for diversion to occur under this permit, the above described streamflows must be met in the Tum-a-lum branch of the Walla Walla River, between the Little Walla Walla River diversion and Nursery Bridge Dam and following past Nursery Bridge Dam (see OWRD permit (Permit Number 53662 for operating and maintenance requirements for this station). Said streamflows shall be measured at the gauging station described below. In the event the primary gage experiences mechanical difficulties, stream flows at Nursery Bridge Dam shall be calculated by subtracting from the streamflows at Little Walla Walla Diversion (Cemetery Bridge) from those streamflows recorded at either the WWBWC gauge at Grove School Bridge or a combination of streamflows at OWRD's North and South Fork stations (#s).



Attachment 3. Land Use Approval, 690-350-0020(3)(a)(H)

The HBDIC recharge project staff has consulted with both the Umatilla County Planning department and the current landowner (Hulette Johnson). Attached you will find two documents addressing the anticipated land use and zoning issues needed for construction and operation of this project. The first (Attachment 3A) a Land Use Form approved by the Umatilla County Planning Department. This was originally submitted as a requirement in the funding request to the Oregon Watershed Enhancement Board. The second Attachment (Attachment 3B) was is a lease agreement between the HBDIC and the current landowner and water right holder, Hulette Johnson.

Land Use Attachments

Attachment 3A: Umatilla County Land Use Approval
Attachment 3B: Lease Agreement with Landowner

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Attachment 4. Proposed Test Program, 690-350-0020(3)(b)(A)

Introduction

The Walla Walla Basin Watershed Council (WWBWC), in cooperation with the Hudson Bay Improvement District (HBID), has proposed to test shallow aquifer recharge at a site located adjacent to the Hudson Bay Canal in section 33, T6N, R35E. At the test site a series of three infiltration pits will be built. Water will be supplied to these pits via a diversion from the canal. Recharge activities are proposed for winter and spring months when the Walla Walla River (the source of water for the canal) is at peak annual flows. The proposed shallow aquifer recharge testing will be done under an ASR Testing Limited License granted by Oregon Water Resources Department (OWRD) (OAR 690-350-0020).

Preliminary Test Site-Specific Hydrogeologic Characterization

Site-specific hydrogeologic characterization is designed to identify and define local conditions to provide a technical basis for designing the monitoring which will be used to evaluate testing. For this project a number of characterization needs are outlined in the 3 July 2003 hydrogeologic assessment letter report (Attachment 6). These needs include determining the physical properties of the geologic units underlying the test site, investigating the presence of a possible semi-confined aquifer in the upper part of the suprabasalt aquifer system, identifying aquifer hydraulic properties, and establishing suprabasalt aquifer baseline conditions, including seasonal variation, for groundwater depth, flow direction, and quality. These, and other site characterization issues, will be addressed using test site-specific hydrogeologic characterization data collected predominantly using:

1. Test pits, boreholes, and wells constructed for the direct observation of subsurface conditions
2. Infiltration tests (constant and falling head) designed to evaluate spatial variability at a site both laterally and vertically (note, the water source for this activity may require a temporary permit)
3. Aquifer testing and water level measurements to evaluate baseline aquifer physical conditions before testing
4. Surface and ground water quality data collected to evaluate the affect (if any) of test site operation on area groundwater quality
5. Well and canal records describing water use in the project area
6. Water flow metering at the test site that indicates surface water in-flow and out-flow during testing

At this time, geophysical investigations are not being considered because of the lack of subsurface control and ground truth data that could be used to constrain geophysical interpretations. The following sections describe proposed soils, geologic, hydrogeologic, surface water, and water quality characterization for this project.

Soil Characteristics

The HBDIC recharge project will be constructed by excavating the top 5 feet (72 inches) of soil from each of the recharge pits (See Engineering Design Report, ATTACHMENT 1). Test Pits constructed and evaluated in the Engineering Design Report provide site-specific soil profile information. Additionally, the "Soil Survey of Umatilla County Area, Oregon, (USDA, 1988) provides some general information about soil in the upper 60 inches at the project site. The two soils

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present at the site are: Freewater (29A) and Cowsly (22C). As the entire soil layer will be removed during construction, it was not found useful to further characterize the specific soil properties further.

Geology

Geologic features control the physical characteristics of aquifer hosting materials, and therefore the distribution and movement of groundwater through an aquifer. Understanding the nature and occurrence of these features, both regionally and locally, provide constraints on testing, data interpretation, monitoring, mitigation, and final design. The objective of geologic characterization is to develop a three dimensional physical framework that describes the materials hosting the vadose zone and groundwater at the test site. Within this framework, or conceptual model, the nature and distribution of those factors thought to control groundwater movement and distribution will be evaluated.

Site-specific geologic characterization will be accomplished largely through the analysis of data collected during the drilling of several proposed boreholes at the site and comparison of that data to information collected during the preparation of the hydrogeologic assessment report. A minimum of three boreholes are proposed for the immediate vicinity of the test site. One of these boreholes will be located on the inferred up-gradient side of the test site, two will be located on the inferred down-gradient side (Attachment 5C). As testing progresses, additional boreholes may be drilled to collect additional characterization, testing, and/or monitoring data. Subsurface hydrogeologic conditions will be interpreted via drilling cuttings and spilt-spoon sample logging.

The project hydrogeologic assessment identified work needed to complete site-specific hydrogeologic characterization. Hydrogeologic characterization targets, and the rationale for them, are described below.

It is likely that the uppermost, unconfined part of the shallow aquifer system, is hosted by predominantly uncemented alluvial gravel beneath the test site. However, it is not clear from the available data how deep the alluvial gravels extend and what their properties are beneath the test site. Identifying the three-dimensional extent of these strata is critical to the proposed testing because water probably will move more rapidly through these uncemented strata, both downwards and laterally, than in the deeper, more cemented Mio-Pliocene conglomerate that comprises the majority of the shallow aquifer system in the area.

Area data indicates that, if present, the unconfined part of the shallow aquifer system at the site may be relatively thin and underlain by a semi-confined zone at depths of less than 75 feet. Characterization will identify if this semi-confined zone is actually present, and if found, the nature of the confining layer separating it from the overlying unconfined zone and the basic hydrologic properties of the semi-confined zone. Knowing the nature and extent of the confined aquifer underlying the site is critical in evaluating if the proposed recharge will affect this deeper aquifer. If data collected indicates that the project could potentially affect this deeper aquifer, monitoring will need to be designed to not only assess shallower unconfined aquifer impacts but deeper confined aquifer impacts as well.

The nature and distribution of the confining layer atop the confined aquifer should be identified in order to support evaluation of the thickness and distribution of the unconfined aquifer (if present). If the unconfined aquifer is absent, or only present seasonally, we will still need to identify the nature and extent of the confining layer because, just as it inhibits upward movement of groundwater, it will restrict the downward movement of recharge water. Knowing where the confining layer is will provide information on where recharge water may potentially collect atop this layer and where it will potentially spread to.

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Mapping for the assessment identified a potential depression in the top of the older Mio-Pliocene conglomerate below the western end, and west of, the test site. The depth, shape, and orientation of this feature will need to be evaluated because it will effect how the aquifer(s) underlying the test site responds to the testing. If an unconfined aquifer indeed underlies the site, this depression may act as a "reservoir" for water introduced into this aquifer. Alternatively, it may serve as a recharge pathway, hydrologically connecting the upper, unconfined part of the suprabasalt aquifer system with deeper, confined parts of the aquifer system.

Hydrogeology

Piezometers and/or observation wells will be constructed in the borings drilled for geologic characterization. If additional geologic characterization boreholes are drilled (either close to or more distal from the test site) one or more of these also may be converted to observation wells. All but one of the boreholes converted to monitoring wells will be completed as 2-inch observation wells that fully penetrate the unconfined aquifer (if present) or above the confining layer (if unconfined aquifer not present). At least one of the geologic characterization boreholes should be of sufficient size to accommodate a 4-inch diameter well which will be used for aquifer testing.

Test site-specific hydrogeologic work would be done, in large part, concurrently with the site-specific geology work. The hydrogeologic assessment concluded that the following information must be collected for the uppermost part of the suprabasalt system at the test site:

1. Depth, thickness, and lateral and vertical extent of the vadose zone and the uppermost aquifer(s) underlying a site.
2. Nature and effect of perching layers (if any) in the vadose zone.
3. Aquifer and vadose zone physical and hydrologic properties - including, grain size, matrix content, induration, hydraulic conductivity, transmissivity, and porosity
4. Groundwater flow direction and velocity, including both spatial and temporal variation
5. Anthropomorphic effects, primarily changes in groundwater pumping, surface water (including canals), and irrigation activities.

For characterization it is important to build monitoring (or observation) wells in such a way as to provide means for accurately measuring the target aquifer. Well construction considerations are listed below:

1. Most project observation wells will probably be 2 inch-diameter piezometer type installations. These should be built to ensure that they are monitoring the anticipated aquifer targets, and we recommend building to well construction standards and avoiding cost cutting measures designed to get more/cheaper wells (these commonly result in poorly built wells unsuitable for collection of the high quality data we feel is necessary to support the project).
2. For aquifer testing, a 4 inch-diameter observation well is the minimum recommended diameter and at least one such well should be built.
3. The minimum number of observation wells at the test site is 3, one up-gradient and 2 down-gradient. If funding can be procured we recommend that more than 3 observation wells be installed. Most, if not all, of these additional observation wells could be built in geotechnical borings drilled for geologic characterization.

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In addition to the observation wells built near the test site, it seems likely that observation wells will eventually need to be built more distant from the site. The purpose of these observation wells would be to more accurately trace the down gradient migration of recharge water away from the test site. A minimum of 3 more distant observation wells, 1 up-gradient and 2 down-gradient is again recommended. These might include at least some previously built groundwater supply wells that would be available for use. However, these should only be used if construction details can be verified and if they are not being used as water supply wells. Access to offsite observation well drilling locations will need to be acquired from willing landowners. The WWBWC currently has a network of existing wells that could be used for the purpose of tracking the recharge water distally from the site.

Aquifer testing designed to collect aquifer hydraulic property data will be part of site characterization. During aquifer testing, the 2-inch observation wells will be monitored to observe the effects of testing on the surrounding aquifer. Aquifer testing would include an 8-hour step-drawdown test to establish probable sustainable yields in the suprabasalt aquifer, followed by a 24 to 72 hour constant discharge test. Water level data collected during aquifer testing will be analyzed using standard analysis techniques.

Combining the interpretations developed in the completed hydrogeologic assessment with the drilling and testing data collected during site-specific characterization, a conceptual model of test site hydrogeologic conditions will be prepared.

Surface Water

One of the main objectives of the project is to increase surface water quantity (base flow) and improve its quality (temperature). To document that, surface water bodies that the project may influence need to be identified and monitoring points on them established and characterized (includes collection of baseline data). These locations will be used as monitoring locations during subsequent testing.

The hydrogeologic assessment identified three, down gradient, spring-feed streams, Goodman Spring Branch, Johnson Creek, and Dugger Creek, which are most likely to be affected by recharging the shallow aquifer. During test-site specific characterization these streams will be examined and monitoring points identified. At these points stream conditions will be photographed and stream conditions documented prior to the initiation of testing that will include the following parameters:

Flow volume and discharge

Water temperature

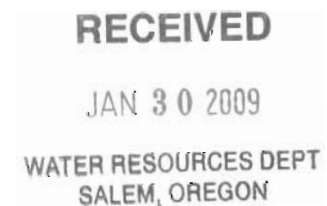
Water quality (temperature)

Hydrophilic plants and habitat quality

Sampling frequency will be designed to collect enough data to demonstrate the range of conditions likely at the monitoring points so that site background conditions can be documented enough to provide an adequate baseline to measure test results against.

Water Quality

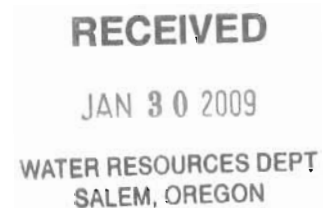
Both surface and groundwater quality at the test site, and at likely down-gradient discharge points, needs to be documented. There are several reasons for this, including:



1. We do not want to introduce contaminated water into the shallow aquifer via recharge activities and violate antidegradation rules. We need to establish background water quality parameter concentrations and monitor source-water quality periodically during testing and operations.
2. Certain source-water conditions (e.g., turbidity) have the potential to degrade or even “plug” the recharge system. From an operational standpoint, one would monitor for those conditions and halt test operations when the source-water exceeded those conditions.
3. Up-gradient groundwater quality needs to be monitored so that the effects of recharge on water quality can be differentiated from those water quality conditions caused by recharge activities, including leaching of vadose zone constituents by recharge water.

Sampling Quality Assurance and Quality Control (QA/QC) protocols will need to be established and followed for characterization and later monitoring. QA/QC for the project, which is described in Attachment 5, includes:

- Sampling equipment
- Measurement techniques for field parameters
- Decontamination procedures
- Well purging guidance for groundwater samples
- Sampling methods
- Chain of custody and sample handling procedures
- Record keeping
- QA/QC guidelines



Characterization Conclusions

With the completion of site-specific characterization, updated monitoring and test plans will be prepared if necessary. These monitoring and test plans will be based on the results of the characterization effort which includes the generation of a site conceptual groundwater flow model that describes probable aquifer conditions, suprabasalt aquifer water level(s) and groundwater flow direction(s) (including seasonal variations), and discharge points for recharge water.

Preliminary Test Site Operation Plan

The objective of proposed artificial groundwater recharge testing to be done under the limited license is to evaluate the feasibility of restoring diminished shallow aquifer water levels and increasing decreased spring creek flows using infiltration pits and winter high flow water diverted from the Walla Walla River to these pits. Testing will be done over five years. If testing indicates shallow aquifer recharge and spring creek flow restoration is feasible using infiltration, test results will be used to design and implement larger scale artificial groundwater recharge at this, and potentially other sites in the area. Testing **will not include** removal of stored water by pumping or other artificial means.

This preliminary test plan describes how the test site will be operated during testing. Elements included in the preliminary test plan include: (1) site construction, (2) test operations, (3) mitigation activities, and (4) reporting. The preliminary test plan may be modified as testing proceeds.

Site Construction

The basic layout of the test site is shown on Figure 1. The site, located adjacent to the Hudson Bay Canal, will consist of three infiltration pits excavated approximately 3 feet into Quaternary alluvial gravel which immediately underlies the test site (Attachment 6). Water will be delivered to the pits via a diversion structure in the canal. Any water that does not infiltrate into the ground from these pits will be returned to the canal via a return ditch or pipe.

More detailed site construction information describing: (1) test site survey and layout (2) specifications for pits/basins/pits used for infiltration (3) water supply design (including diversion from canals if appropriate) (4) monitoring points (both on and off site) and (5) site access controls (fences, etc.) are described in detail in Attachment 1, (1A-1E), Engineering Design.

Test Operations

Test operations describe how the site will be used during testing and possible reasons for changing the test as new data and information is collected during the test. Test operations include:

1. Test timing, including timing of recharge and monitoring frequencies
2. Quantities of water used
3. Outside influences that effect test, including weather (probably freezing), elevated river turbidity, river flooding, trip wires for identifying potential offsite impacts before they occur so they can be mitigated and or testing suspended to prevent worsening conditions
4. Responsible parties for diversion and delivery of water, operation of test, monitoring, and data review
5. Permissions required to access offsite monitoring points

These are discussed further in the following paragraphs.

Test Timing, Monitoring, and Water Quantities

Testing is tentatively planned to begin in the winter of 2003/2004 and continue for 5 years. Test operation will generally be conducted in the winter when Walla Walla River flows are at their highest and irrigation activities are at their lowest. A maximum of approximately 50 cfs will be delivered to the test site during normal operation. However, in the event minimum Walla Walla River flows are not meet, water will not be diverted from the river for test site use. Depending on stream flows in any given year, recharge water may be delivered as early as December to as late as March/April. In addition, in the event of prolonged freezing weather, test site operation may be temporally suspended to avoid ice damage to the canal diversion on the Walla Walla River, the canal system itself, and/or the recharge pits and related structures.

Water quantities delivered to the test site will be monitored via a gauge at the diversion from the canal into the test site. The return canal from the test site back into the canal will also be monitored to determine the quantity of water that leaves the test site (if any) because it did not infiltrate into the ground. Based on this monitoring data, and estimated evaporation loses that could occur during operation; water quantities discharged to the ground will be calculated.

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Groundwater levels in the immediate vicinity of the test site will be monitored before, during, and following recharge test events via three (at a minimum) observation wells constructed during characterization, potentially via existing water wells in the area if any can be found that can be used for shallow aquifer water level monitoring, and potentially with new observation wells built as the test progresses. During the recharge test event, tentatively scheduled for the winter/spring of 2003/2004 water levels will be measured as follows:

1. Throughout the calendar year water levels will be measured at least weekly, beginning with the granting of the limited license.
2. In the month prior to the anticipated start of recharge activity and in the month following the termination of recharge, water levels will be measured daily.
3. During recharge water levels will be measured daily, at a minimum.

Based on preliminary engineering design studies (Attachment 1) and the hydrogeologic assessment (Attachment 6) most, if not all, of the water delivered to the test site will probably infiltrate into the ground. However, because this project is a test project, the current plan is to initially operate the test site at approximately half capacity. The quantity of water discharged to the site will than be increased or decreased as experience and observations dictate. Final operating quantities will determined based on test results.

Water quality data will also be collected before, during, and following recharge events. Parameters to be collected, sampling timing, and other water quality monitoring information are presented in the Monitoring Plan (Attachment 5).

Outside Influences

The primary currently identified outside influences on testing are Walla Walla River flow levels, freezing conditions, source water turbidity levels, and increased groundwater water levels resulting from testing that impact surface activities and conditions. The likely effects of these on testing, and possible mitigation actions to be implemented during testing, are as follows:

Low flows in the Walla Walla River will impact testing because the use of Walla Walla River water for recharge will be conditional, based on river flows exceeding a certain threshold. When flows do not, water will not be delivered to the test site and testing will not occur.

High Walla Walla River flows may also effect testing. In the event of high flow during a flood or rapid snow melt event, turbidity will generally increase. The repeated delivery of turbid water to the test site infiltration pits may eventually lead to plugging of pore space and reduced infiltration capacity. To mitigate against this, delivery of recharge water may be terminated or scaled back during high flow events. Alternatively, the pits may be periodically re-excavated to remove these fines. The preferred mitigation strategy for dealing with this will be based on monitoring and performance data collected during testing.

The effects of freezing on the test are outlined earlier in this Attachment and repeated here. In the event of prolonged freezing weather, test site operation may be temporally suspended to avoid ice damage to the canal diversion on the Walla Walla River, the canal system itself, and/or the recharge pits and related structures and to avoid the risk of ice jams forming in the canal, backing up water in the canal, and causing flooding adjacent to the canal.

It is possible that recharge testing could cause groundwater levels to reach the ground surface at locations where human activity and habitat is negatively impacted. One of the main purposes of

groundwater level monitoring is to identify increasing water levels in the test site area in order to: (1) directly observe the effects of recharge on water levels (2) use these observations (in conjunction with characterization data) to evaluate whether or not recharge is having an impact on groundwater levels that could lead to surface problems, and (3) identify when and where this type of problem may occur. If water level monitoring data suggest increased groundwater levels are approaching the ground surface and that flooding of low lying areas seems possible, the quantity of recharge test water being delivered to the infiltration pits will be reduced or, if necessary, terminated.

Responsible Parties and Access Permission

The test will be managed primarily by the Hudson Bay District Irrigation Company, lead by John Brough, Operations Manager, and the Walla Walla Basin Watershed Council (WWBWC) technical staff, lead by Mr. Bob Bower, Hydrologist. HBDIC and WWBWC staff (or a subcontractor working for the HBDIC and WWBWC) will compile monitoring and testing data, prepare reports as necessary to meet license requirements, and in consultation with Hudson Bay Irrigation District (HBDIC) staff make decisions regarding timing and quantity of water delivered to the site and when to suspend recharge activities. Submittal of all monitoring reports to OWRD will be the responsibility of HBDIC and WWBWC staff. The HBDIC and WWBWC may choose to subcontract report preparation and delivery to a subcontractor.

HBDIC staff will be responsible for operating all facilities associated with removing recharge test water from the Walla Walla River and delivering it to the test site, including operation of the diversion structure which routes water from the canal into the pits. HBDIC staff also will maintain all equipment associated with water delivery and pit operation, including reexcavation of the pits, if necessary.

Mitigation

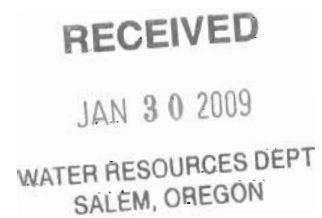
As stated above, one of the objectives of monitoring is to identify likely unintended consequences of recharge testing before they occur. When the precursors to these consequences, such as changing water quality detrimental to aquatic habitat or groundwater levels rising to close to the surface in areas where shallow groundwater is not desired, can be detected soon enough via monitoring, recharge activities will be modified and/or terminated to mitigate against these effects.

Reporting

Data and observations collected during testing, including monitoring data, will be compiled into reports. The basic objective of these reports will be to describe what was done during the test, what was observed at the monitoring points, interpret the data collected, and recommend changes to testing, monitoring, and mitigation plans. These reports will be produced annually. Based on the proposed recharge schedule, annual reports will be submitted to OWRD in the summer following each winter recharge test.

More frequent reporting will be done when monitoring reveals the presence of an undesired effect from testing. If monitoring reveals that undesired consequences of testing are likely to occur, WWBWC staff (or designated representative) will report the monitoring information to OWRD staff.

At the conclusion of the 5-year recharge testing done under the limited license a final report will be prepared. The final reports will describes the project, data colleted during testing and monitoring, interpretations of how well the recharge project worked in achieving project goals, and recommendations for future operations. The final report will be submitted to OWRD in the summer following the fifth annual winter recharge event.



Attachment 5. Proposed Monitoring Program, 690-350-0020(3)(b)(A)

Overview of Basin Wide Monitoring Plan

In 2003, the WWBWC expanded its watershed monitoring strategy to include collecting basin line information for the numerous spring-creeks and district ditches spread out across the Walla Walla River valley (Oregon). Starting in June 2003, many new flow stations (15-minute stage and temperature recorders) were installed at or near the sources of nearly all the springs in the Oregon portion of the system (Figure 2). The WWBWC monitoring program has a total of 28 continuous flow stations with additional 15 continuous static well recorders with many more manual measurement locations. The objectives of this monitoring (specifically for the spring-creek and shallow aquifer system) is to accomplish the following:

1. Be able to discern between Walla Walla River Water (coming from districts water rights and use) and spring waters (emerging strictly from the shallow aquifer). It is understood that the application of irrigation water will undoubtedly show up as spring returns, but this monitoring is intended as a beginning to understanding this complicated system.
2. Collect baseline information on spring flow as it relates to seasonal and yearly fluctuations.
3. Many of the spring-creek monitoring stations were sited based on the presence of historical data collected by Piper (USGS, 1933). Where Piper had collected spring-creek flow, we attempted to locate our gauges as near as possible to his historic data sites. The intention is to allow us the ability to compare and contrast historical and current spring-creek conditions based on a significant period of time. Most of these Piper's original sites were located upstream of any irrigation with draws, making them key locations for us in this type of comparison.
4. Monitor water table levels continuously for daily, seasonal and yearly fluctuations and timing. Some of the wells being recorded have periods of record dating back to the 1930s, allowing us some opportunity to understand any long-term changes in the aquifer system.

Recharge Project Monitoring Plan

The proposed ground water recharge project exists inside this larger monitoring network and it is expected that this will help provide useful information in testing of the proposed testing (see below). Some of the sites shown in this larger network were specifically located to provide proximal and distal pre-construction and operation information for this project (Figure 2). Site specific monitoring includes observation wells and surface monitoring stations (Attachment 5B).

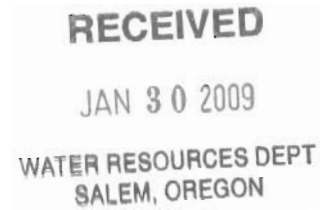
Monitoring for the site-specific proposed testing is designed to meet four basic objectives. These are to identify: (1) changes in the natural system caused by factors other than those related to testing, (2) changes in the natural system caused by the testing (track the test performance), (3) potential problems caused by the testing that may require modification or termination of the test and/or mitigation actions, and (4) events that effect test operations, such as a freezing or a flooding. To meet these objectives, monitoring will track:

1. Source water quality and volume coming onto the test site
2. Up-gradient groundwater water quality
3. Up-gradient groundwater level changes to provide the information needed to differentiate recharge test effects from other, natural and artificial, effects on the groundwater levels beneath test site

4. Down-gradient groundwater quality and levels, both near and distal to the test site
5. Surface water discharge and quality changes

Four basic types of monitoring points are planned for this project:

1. Source water
2. Test site groundwater
3. Distal groundwater
4. Surface water (e.g., springs).



Monitoring data collected at these points during testing will be evaluated against what is known about pre-test conditions to identify testing effects on the surrounding environment, differentiate those effects from others in the environment, and identify when changes in test operations appear necessary. Pre-test conditions will be determined during the planned site-specific characterization activities described in Attachment 4 and are partially described in the preliminary hydrogeologic assessment (Attachment 6).

This preliminary monitoring plan discusses monitoring activities to be undertaken at the four types of monitoring points and sampling and QA/QC protocols.

Sampling and Analysis Program

The groundwater-monitoring program proposed for the test project is outlined in the following sections. Annual reporting is proposed and a Water Quality Analysis Report will be prepared following five years of testing.

As stated in the introduction, four types of monitoring are proposed: (1) source water at the test site (2) site-specific groundwater (3) distal groundwater and (4) surface water (springs).

(1) Source Water at Test Site

Source water monitoring will be at the point of diversion onto the test site. Monitoring will include both water quantity and quality. The volume of water delivered to the test site will be monitored via a gauge at the diversion. Water quality samples will be collected at the gauge.

Proposed monitoring frequency is as follows:

Gauge data will be recorded 15-minute readings via a continuous recording data logger. Rating measurements and tables will be generated for each surface flow site and continuously checked for shifts.

Three source water quality-sampling events are proposed for each yearly seasonal recharge period. They are proposed for approximately: (1) one month prior to the projected beginning of the recharge period (2) during the mid part of the recharge period and (3) approximately one month following the end of the recharge period. The exact timing of these will be based on predicted Walla Walla River flows and may vary from year-to-year. OWRD and ODEQ staff will be notified by WWBWC staff of pending sampling events at least two weeks prior to each sampling event.

The results of source water quality monitoring will be used to determine if modifications to test operations are warranted. During testing different sampling frequencies may be tried to identify those that are most effective.

(2) Site Groundwater

Site groundwater monitoring, consisting of the collection of water quality and water level data, will be conducted at the three observation wells built during characterization. The purpose of site groundwater monitoring is to establish water quantity and quality impacts from testing to groundwater in the immediate vicinity of the site. In addition, up-gradient monitoring will be used to differentiate test impacts from those caused by other activities not controlled by the testing.

Proposed monitoring frequency is as follows:

Water levels will be measured weekly throughout the year when recharge testing is not underway.

In the month prior to, during, and the month following the yearly seasonal recharge period, water levels will be collected daily (at a minimum) for the first year of testing. Measurement frequency during subsequent years will be based on previous observations and proposed in annual reports.

Three groundwater quality sampling events are proposed for each yearly seasonal recharge period. They are proposed for approximately: (1) one month prior to the projected beginning of the recharge period (2) during the mid part of the recharge period and (3) approximately one month following the end of the recharge period. The exact timing of these will be based on predicted Walla Walla River flows and may vary from year-to-year. OWRD and ODEQ staff will be notified by WWBWC staff of pending sampling events at least two weeks prior to each sampling event.

The proposed locations of site-specific groundwater observation wells are shown on Figure 1. The results of groundwater quality and level monitoring will be used to determine if modifications to test operations are warranted. During testing different sampling frequencies may be tried to identify those that are most effective.

(3) Distal Groundwater

Distal groundwater monitoring, consisting of the collection of water quality and water level data, will be conducted at observation wells more distal from the test site than the site observation wells. Initially, during the first year of recharge testing, these wells will probably be previously constructed water supply wells that can be used by WWBWC staff and can be shown to be open to only the shallow aquifer. If funding for new wells can be procured for subsequent years, dedicated distal groundwater observation wells may be built to improve the monitoring coverage.

A minimum of 3 distal observation wells will be used, 1 up-gradient and 2 well down-gradient. The locations of these will be determined during site specific characterization currently planned for the winter of 2003. Monitoring frequency is the same as proposed for site-specific groundwater monitoring. Figure 5B shows the approximate site locations for the site-specific observation wells.

Distal monitoring will be used to identify longer term quantity impacts from testing. This includes the formation and migration of a groundwater mound and recharge water plume at, and away from, the test site, towards intended and unintended receptors. Up-gradient monitoring will be a part of this so that testing effects can be differentiated from offsite events. Sampling frequency will be determined from characterization data and modified as more is learned during testing.

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(4) Surface Water (Springs)

The WWBWC is currently monitoring most of the surface springs, creeks and rivers of Oregon's lower Walla Walla River basin (See Figure 2.) While this project will specifically Surface water monitoring in Dugger, Johnson and Goodman Spring-Creeks will be done to identify the effects of recharge on flow. This monitoring will include the collection of both water quality (specifically temperature), flow and habitat improvements (photo-documentation). As with groundwater monitoring, surface water monitoring will need up-gradient and pre-project condition monitoring information so that effects unrelated to test site operations/testing can be differentiated from those due to testing. Pre-project surface flow monitoring was started during the 2003 summer irrigation season at Dugger and Johnson Spring-Creeks in the form of a continuous.

Sampling Parameters

Sampling methods are specified in the following sections. The chemical monitoring parameters are to be conducted on a two-tiered system. Level 1 monitoring will be conducted during all three water quality-monitoring events (each recharge period). Consistently elevated concentrations of nitrate will be initiate the level 2 chemical analysis. Samples will be tested for chemicals in the level 2 list. Operation of the recharge project will depend on the absence/presence of the chemical parameters on this list. ATTACHMENT 5B describes the specific method and documents used to determine the level 1 and 2 chemical parameters (pesticides, herbicides, insecticides, fungicides, etc.) listed below.

Monitoring is proposed for the following parameters:

Physical Parameters (all monitoring types)

Static water level (in observation and WWBWC network well)

Standard field parameters, including pH, turbidity, electrical conductance, and temperature

Flow (in cubic feet per second)

Chemical Parameters --Level 1 (On-site monitoring only)

Total nitrogen as nitrate (screening parameter for Level 2 Chemical screening)

TKN

Total dissolved solids

Chemical oxygen demand

Chloride

Orthophosphate

Fecal Coliforms (Presence/absence only)

Chemical Parameters --Level 2 (On-site monitoring only)

Rubigan (Fenarimol)

Ridomil (Metalxyl)



Sythane/Rally (Myclobutanil)

Devrinol (Napropamide)

DDD-DDE-DDT

Elgetol (DNOC sodium salt)

Alar/B-Nine (Daminozide)

Lindane (Lindane)

Sampling dates will be coordinated for all monitoring points used in the project.

This list of analytes was selected to optimize routine sampling to address constituents commonly of concern (nutrients and salt) and provide prompt indication of potential impacts by analyzing for anions (nitrate and chloride) that are known as groundwater tracers (DEQ, 1995). Additional parameters will be proposed for future sampling if the results of the initial proposed sampling indicate this is necessary.

Sampling Procedure

Equipment and sampling procedures proposed for recharge test monitoring are provided in the following sections.

Equipment

This section lists the equipment for groundwater monitoring.

Submersible pump (*Grundfos* or similar) or dedicated bailers/sampling line

Temperature measuring instrument (*Vemco* data logger)

pH and conductivity meter(s) with calibration reagents

Water level and flow meters (*Tru-traks*, *In-situ Mini-trolls*, *Stevens 420 loggers*, 0.01 foot resolution required)

Shipping cooler with ice packs or ice

Five-gallon pail marked at the 5-gallon level, stopwatch

Laboratory supplied sample containers with appropriate preservatives

Tap water, deionized water, phosphate-free soap, cleaning brushes, field note book, log sheets

Water Level

An electronic water level meter will be used to measure the depth to groundwater in each observation well to the nearest 0.01 foot. Static water levels must be measured at the indicated reference point prior to purging any water from the well. The reference points will be on the top of the observation well casings. The static water levels in all wells should be measured on the same day for each site. Coordination with quarterly sampling of other wells in the vicinity should be attempted. Accumulation of sediment in the well should also be checked by lowering a weighted tape to the bottom of the well, reading the depth at the well casing's reference point, and comparing this value to the as-built well depth.

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Decontamination

All non-disposable field equipment that may potentially come in contact with any soil or water sample shall be decontaminated in order to minimize the potential for cross-contamination between sampling locations. Thorough decontamination of all sampling equipment shall be conducted prior to each sampling event. In addition, the sampling technician shall decontaminate all equipment in the field as required to prevent cross-contamination of samples collected in the field. The procedures described in this section are specifically for field decontamination of sampling equipment. At a minimum, field-sampling equipment should be decontaminated following these procedures:

1. Wash the equipment in a solution of non-phosphate detergent (Liquinox[®] or equivalent) and distilled/deionized water. All surfaces that may come in direct contact with the samples shall be washed. Use a clean Nalgene and/or plastic tub to contain the wash solution and a scrub brush to mechanically remove loose particles. Wear clean latex or plastic gloves during all washing and rinsing operations.
2. Rinse twice with distilled/deionized water.
3. Dry the equipment before use, to the extent practicable.

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Purging and Field Parameters (On site wells only)

Sufficient water will be purged to ensure that the sample collected represents water from the geological formation. Borehole volumes are calculated as the volume of water in the casing and the volume of water in the filter pack.

During purging, measure pH, temperature, and electrical conductivity of the water removed. At a minimum, these parameters are measured at the start of purging and after each successive borehole volume is removed. Temperature should be measured first because it changes most rapidly. Purging continues until at least three borehole volumes have been purged and the field parameters are established to within ± 10 percent over three consecutive measurements. At this point, the observation well is considered adequately purged and can be sampled.

Occasionally, observation wells installed in low permeability formations may be purged nearly dry (within 6 inches of bottom of well) prior to stabilization of groundwater parameters and prior to purging at least three borehole volumes. If this happens at least one set (more if possible) of purge water groundwater parameters (pH, temperature, EC) need to be measured. Sample collection can be done after the water level has recovered at least 75 percent of the drawdown ensuring most of the well water is from the formation. Prior to groundwater sample collection several measurements are required as explained above. These include static water level and total depth, pH, temperature, and electrical conductivity.

All field instruments should be calibrated each day prior to sample collection. Instrument calibration and maintenance should precisely follow the manufacturers recommended procedures. Electrical conductivity and pH standards used to calibrate the instruments should be within the range encountered at the monitoring sites. Calibration records should be recorded on the sample collection forms.

Water Sampling

Samples will be collected after sufficient water has been purged according to the procedure described above. Samples will be collected from the discharge end of the pump hose after the flow rate has been reduced to less than approximately 0.2 gallons per minute. Discharge from a bailer should be controlled to minimize agitation and aeration. Sample containers should be sealed with tape, labeled, and immediately placed in a cooler with ice. Sample containers should be filled completely to eliminate head space. Sample containers should be provided by the analytical laboratory and should be requested at least one week in advance of the sampling. The containers should be appropriate for

the parameters analyzed and all shipping coolers should have chain-of-custody seals placed on them prior to shipping.

One additional sample should be collected from one of the sample points for quality control purposes. This sample should be evaluated as a "blind duplicate."

Sample Preservation and Holding Time. Samples should be stored immediately after collection in an ice chest containing sufficient ice to cool the samples to 4 degrees Celsius ($^{\circ}\text{C}$). Use "blue ice" if possible. If water ice must be used, the ice should be sealed in plastic bags, as should the sample bottles. Samples should remain cooled at 4°C and delivered to the laboratory within 24 hours of collection. Sample receipt at the laboratory must be sooner if analysis includes parameters with a shorter holding time. Care should be taken to prevent excessive agitation of samples or breakage/leakage of containers. Samples should be analyzed within the specified holding time for each constituent.

Resampling

In accordance with OAR 340-40-030(5), resampling is done if monitoring indicates a significant increase (or decrease for pH) in the concentration of a monitored parameter at a sampling point. Determining if a significant increase in parameter concentration has occurred is customarily done either by assessing concentrations in relation to established concentration limits or by using a statistical analysis. Since background or baseline conditions have yet to be established for the test site a concentration limit has not been set and insufficient data exists upon which to base a statistical analysis. The criteria to guide resampling decisions will be reevaluated in subsequent test project annual reports.

Chain of Custody and Sample Handling

A chain-of-custody form should be completed and signed by the sampler on the day samples are collected. The chain-of-custody form must be signed by laboratory personnel upon receipt and any other individuals that maintain custody of the samples in the interim. Coolers should be sealed and shipped or driven to the lab as soon as possible. The method of shipping (bus, next day air, etc.) is usually determined by the parameter having the shortest holding time. In any case, shipping times of more than 24 hours should not be used as the cooler(s) may warm and compromise sample quality.

Field Records and Data Validation

All field notes, analytical results, and other pertinent data associated with the project should be maintained in a secure location and be archived for at least a five-year period. Data validation for both field and lab Quality Assurance and Quality Control (QA/QC) will be performed using a checklist. All pertinent information with respect to QA/QC will be checked.

The following items are included on the QA/QC review checklist:

1. Field data sheets (or notebooks) and observations (observations are used to check for potentially erroneous data) will be reviewed to make sure they are completely filled out.
2. Chain-of-custody forms will be completed, being signed by all sample handlers.
3. Holding times for all constituents will be met.
4. Field blind duplicate results will be evaluated to make sure they are compatible.
5. Laboratory method blanks, matrix spike, matrix spike duplicates, and surrogate percent recovery data supplied by the analytical laboratory will be evaluated to make sure they are compatible.

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Data Reporting and Statistical Analysis

The following procedures for reporting analysis are proposed for this project.

Record Keeping

All field notes, laboratory results, critical calculations, and published reports will be maintained at the WWBWC office for a period of five years following completion of the final testing and monitoring report. If possible, both paper and electronic copies will be maintained.

Evaluation

Monitoring data and observations should be evaluated when they are received from the sampler and laboratory.

Materials to be received include:

Field monitoring and sample collection records

Original laboratory reporting sheets

Data evaluation will include:

1. Verification of analytical methods and detection limits, along with the date the analysis was performed
2. Review of document handling, sampling and analytical problems, and actions taken to correct any problems
3. Summarizing water level data in tabular and/or graphical form
4. Summarizing water quality analytical results in tabular form and/or graphical form
5. Performing data validation checks, as appropriate to the data set
6. Identifying any significant increases in parameter concentrations (will be done later in project only after enough data has been collected to warrant)

Annual Review and Reporting

All monitoring activities performed during the previous monitoring year will be included in an annual report to be submitted to OWRD during the summer following the preceding seasonal recharge period. The annual report will present the following information:

Water quality data, including duplicate sample results in tabular form and time-series plots for specific parameters

Water level data, including hydrographs showing water level changes over time

Basic statistical parameters for each parameter of interest: mean, median, maximum, minimum, standard deviation, number of data points, and number of non-detects

Evaluation of all field and laboratory data, including observed changes and groundwater flow direction and gradient

Discussion and conclusions, including recommended changes to recharge testing

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The methods needed to evaluate water quality and water level data will depend on the objectives of the evaluation. In general, the principal objective is to evaluate whether or not recharge tests have affected groundwater levels and quality. Evaluation methods include: a comparison of water quality data with a concentration limit or with background water quality; comparison of water quality over time; or comparison of water quality between up-gradient and down-gradient wells. For the test site, insufficient data are available for a statistical analysis to be performed because concentration limits have not yet been established. Until that time, evaluation of dataset trends will be solely qualitative, but revisited in each annual report until a database has been compiled that is sufficient for statistical analysis.

Final Recharge Test Project Report

At the conclusion of five years of recharge testing under the limited license a final report will be prepared. The report will contain the data collected for the test project; analysis and interpretation of that data (including statistical analysis as appropriate), and a recommendation for proposed future artificial groundwater recharge activities at the test site. The report will be complete enough to serve as supplemental material to a permanent artificial groundwater recharge permit under OAR 690-350-0110, if such a permit is sought following completion of the test project.

Monitoring Plan Attachments

Attachment 5A. Methodology Water Quality Assessment and Evaluation

Attachment 5B. Figure 5A Map of On-site Recharge Well Locations

Attachment 5C Chemicals of interest for Hudson Bay Recharge Project

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Attachment 6. Site Hydrogeology, 690-350-0020(3)(b)(C), (E), and (G) (attached)

Attachment 7. Source Water Quality, 690-350-0020(3)(b)(D)

Overview

This project will utilize winter-spring flow from the Walla Walla River as the *source* water for recharge during the project operation. The time period that Walla Walla River water will be used is November 15th through May 15th. A review of existing reports and data was conducted to identify any areas of concern regarding source water quality for the recharge project. What little information that exists for source water quality conditions is discussed below.

In 2003, the WWBWC tracked turbidity levels through a winter storm event (1/27/3 through 2/3/3) and found turbidity levels to be a potential issue on the Walla Walla River (mainstem) during peak flow events (WWBWC, Unpublished data). Turbidity could be problematic for project operations, as it may act to decrease the rate of infiltration by plugging and layering the bottom of the recharge pits. Turbidity may also be a preliminary screen for fecal contamination issues, as bacteria may use the large particles as a vector for mobilization.

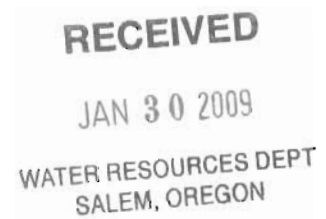
The other known source water quality information was obtained from the Environmental Protection Agencies STORET database. STORET provided some historical water quality data that showed several parameters (circa 1960s) that were accounted for in the recharge project's monitoring plan (ATTACHMENT 5). STORET data that was collected nearest to the source water POD at the Little Walla Walla Diversion (*NE 1/4 NW 1/4, Section 1, SW 1/4 NE 1/4 Section 12, T5N, R35E, W.M.; DIV.PT. 1*) is attached in table form as ATTACHMENT 7A.

From the review of all known source water information, the parameters that appeared to be of concern are:

1. Fecal Coliforms
2. Turbidity

There was no other relevant information found for source water quality conditions. The monitoring plan covers the establishment of source water quality conditions during operation of the recharge facility. This will insure safe water quality conditions for the recharge project.

Attachment 7A Source Water Quality Information



Resources and References:

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- Jenkins, J. J., Thomson P. A., 1999, January. *OSU Extension Pesticide Properties Database*. Oregon State University Extension EM 8709
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- U.S. Geological Survey 1996, July. Fact Sheet 171-96: Article: The Nitrate Connection. US Government Printing Office 774-398/20006 Region NO. 8

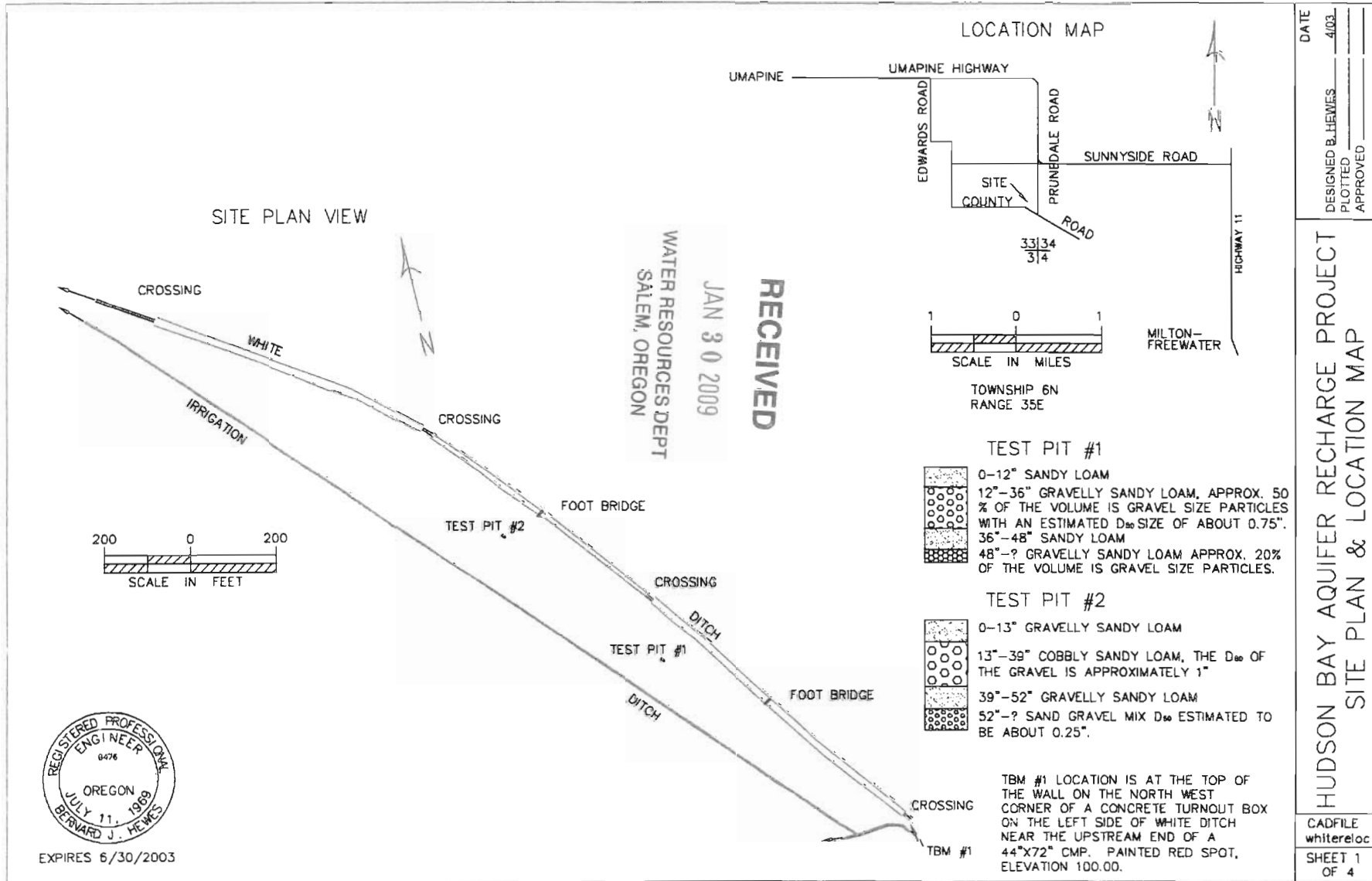
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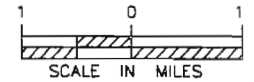
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LOCATION MAP



TOWNSHIP 6N
RANGE 35E

TEST PIT #1

- 0-12" SANDY LOAM
- 12"-36" GRAVELLY SANDY LOAM, APPROX. 50% OF THE VOLUME IS GRAVEL SIZE PARTICLES WITH AN ESTIMATED D₅₀ SIZE OF ABOUT 0.75".
- 36"-48" SANDY LOAM
- 48"-? GRAVELLY SANDY LOAM APPROX. 20% OF THE VOLUME IS GRAVEL SIZE PARTICLES.

TEST PIT #2

- 0-13" GRAVELLY SANDY LOAM
- 13"-39" COBBLY SANDY LOAM, THE D₅₀ OF THE GRAVEL IS APPROXIMATELY 1"
- 39"-52" GRAVELLY SANDY LOAM
- 52"-? SAND GRAVEL MIX D₅₀ ESTIMATED TO BE ABOUT 0.25".

TBM #1 LOCATION IS AT THE TOP OF THE WALL ON THE NORTH WEST CORNER OF A CONCRETE TURNOUT BOX ON THE LEFT SIDE OF WHITE DITCH NEAR THE UPSTREAM END OF A 44"x72" CMP. PAINTED RED SPOT, ELEVATION 100.00.

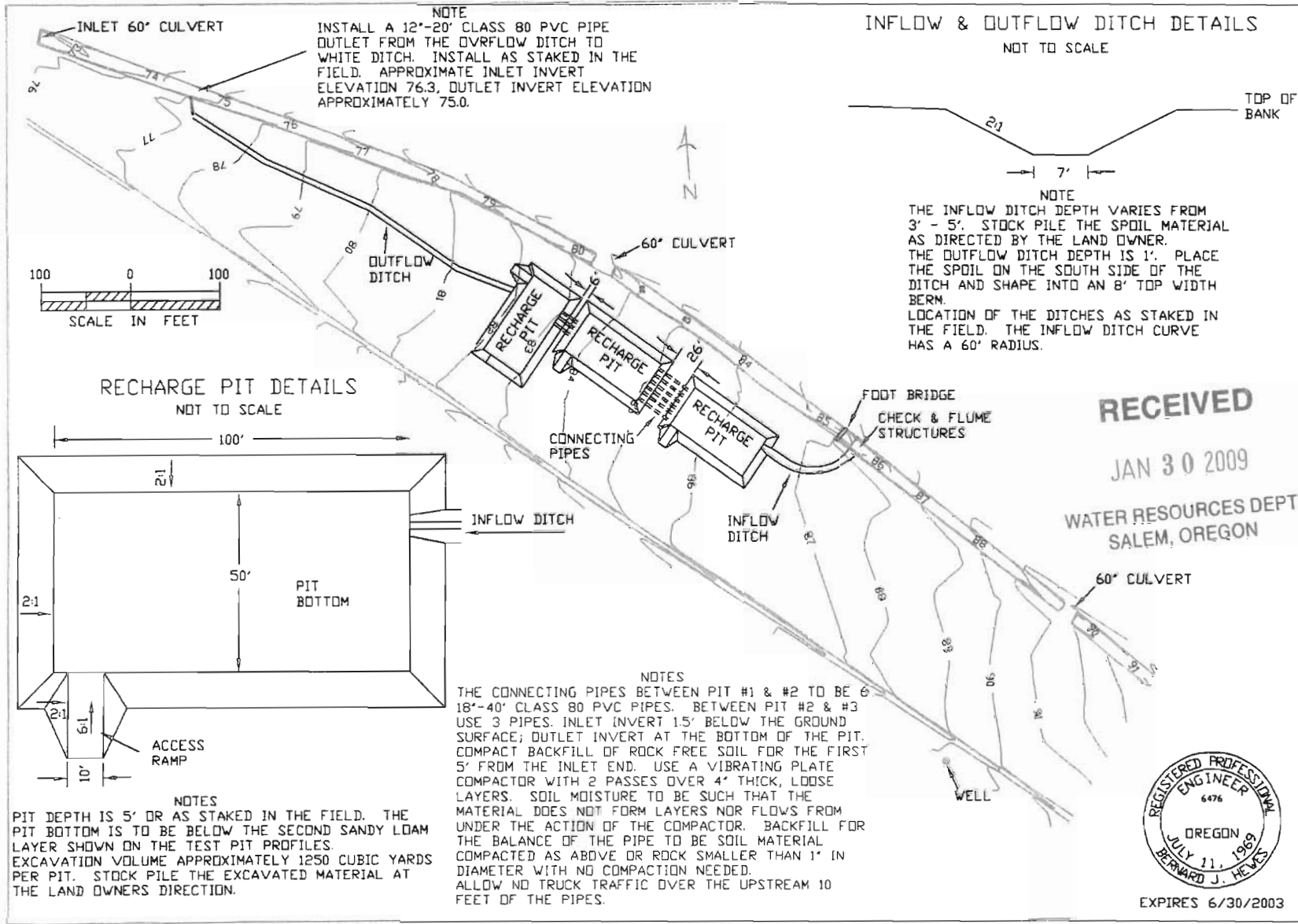
DATE	DESIGNED	PLOTTED	APPROVED
	B. HEWES		

HUDSON BAY AQUIFER RECHARGE PROJECT
 SITE PLAN & LOCATION MAP

CADFILE
whitereloc
SHEET 1
OF 4



EXPIRES 6/30/2003



DATE _____
DESIGNED B. HEWES _____ 4/03
PLOTTED _____
APPROVED _____

HUDSON BAY AQUIFER RECHARGE PROJECT
SITE PLAN

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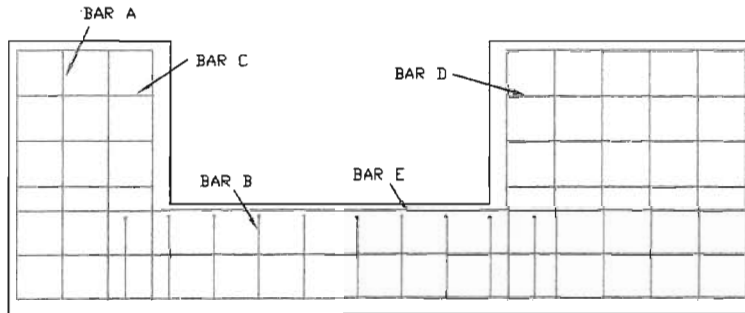
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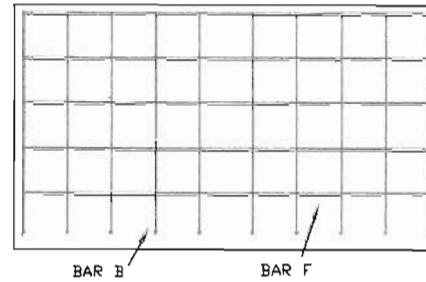
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CHECK STRUCTURE ELEVATION VIEW



APRON PLAN VIEW



REINFORCING STEEL SCHEDULE

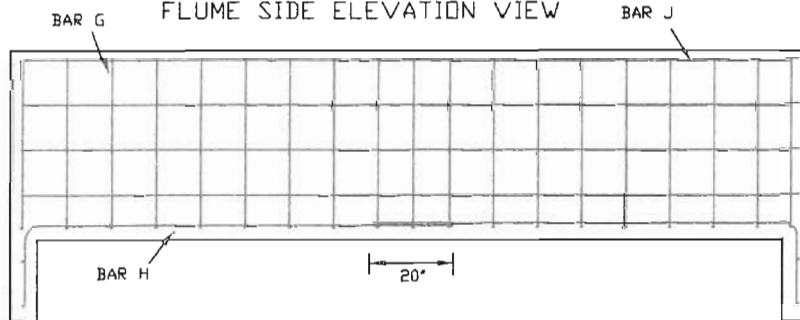
BAR NO.	SHAPE	A	B	C
CHECK				
A	10 STRAIGHT	4'-7"	-	-
B	10 ALB	1'-7"	4'-1"	-
C	4 STRAIGHT	2'-6"	-	-
D	4 STRAIGHT	4'-6"	-	-
E	3 STRAIGHT	13'-8"	-	-
F	5 STRAIGHT	7'-8"	-	-
FLUME				
G	19 ALB JC	3'-1"	7'-6"	3'-1"
H	20 ALB	1'-6"	8'-1"	-
I	4 STRAIGHT	7'-6"	-	-
J	8 STRAIGHT	14'-6"	-	-

NOTES
ALL BARS TO BE NUMBER 4.
BARS TO BE PLACED IN THE CENTER OF THE
WALLS AND FLOOR.
NEED 820 LINEAL FEET OF REINFORCING BARS
WITHOUT ANY WASTE.

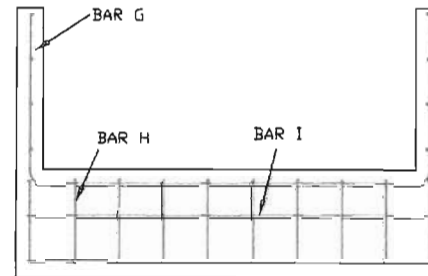


EXPIRES 6/30/2003

FLUME SIDE ELEVATION VIEW



FLUME END WALL ELEVATION VIEW



DATE _____
DESIGNED B. HEWES 403
PLOTTED _____
APPROVED _____

HUDSON BAY AQUIFER RECHARGE PROJECT
STRUCTURE REINFORCING STEEL

CADFILE
whitekst
SHEET 4
OF 4

HUDSON BAY AQUIFER RECHARGE PROJECT

ENGINEERING REPORT

This project entails diverting water from an existing irrigation ditch to three pits to be excavated for the purpose of infiltrating the water into the shallow aquifer. Project features include a concrete check structure in the existing White Ditch, a concrete flow measuring flume, an open ditch, three excavated pits, pipes connecting the pits and an outflow ditch from the down stream pit.

These items were sized to handle 50 cubic feet per second (cfs) of water. This is the amount anticipated will be available from excess flow in the Walla Walla River and that the Hudson Bay District is able to deliver.

Data gathered to design the project consisted of a site topographic survey and installing two sites for testing the water infiltration capacity of the natural materials and determining the layers in the soil profile. In addition the Soil Survey of Umatilla County Area, Oregon was consulted. This is a US Dept. of Agriculture, Natural Resources Conservation Service publication giving general soils information.

The topographic survey data was used to prepare a topographic map with one foot contour intervals at a scale of 1" = 60'. This information was used to help determine the location of the project features.

Two test pits were excavated to a depth of 6'-7' each. A 24" diameter by 5' long section of corrugated metal pipe was set on end in the bottom of the pit and about one foot of fill placed around it to hold it in place. Water was pumped into the pipe at a rate that would sustain a water depth of one foot in the pipe. Both flow rate and total flow was measured. The test was run for 6.25 hours in the first pit and 3.5 hours for the second pit.

PIT #1

Soil profile:

0-12" sandy loam

12"-36" gravelly sandy loam, approximately 50% of the material volume is gravel size particles with an estimated D_{50} size of about 0.75"

36"-48" sandy loam, in parts of the trench this layer does not exist

48"-?" gravelly sandy loam approximately 20% of the volume is gravel size particles

The inflow rate at the end of the test period was 4.0 gallons per minute (gpm). This resulted in an infiltration rate of 1.7 gpm/sq. ft./ foot of head.

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PIT #2

Soil profile:

0"-13" gravelly sandy loam

13"-39" cobbly sandy loam, the D_{50} of the gravel is approximately 1"

39"-52" gravelly sandy loam

52"-? sand gravel mix D_{50} estimated to be about 0.25"

In this pit the inflow rate of 11.9 gpm was maintained for 3.5 hours and at no time did water puddle in the bottom of the pipe. The infiltration rate is in excess of 3.8 gpm/sq. ft.

The area needed for infiltrating the water was determined assuming an infiltration rate for the entire area of 3.0 gpm/sq.ft./ per foot of head. For an inflow rate of 50 cfs the infiltration area needs to be 7480 square feet. The infiltration rate of 3.0 gpm/sq.ft. was chosen because the pits will be located in the area with soil surface texture similar to test pit #2.

Due to the possibility of fine soil particles plugging the infiltration area, unknowns concerning the long term infiltration rate and that the amount of water available is not yet known extra infiltration area is being provided. Three separate pits with bottom dimensions of 50 feet X 100 feet are proposed. This will provide an infiltration area of 15,000 square feet.

The pits will be excavated to a depth of about 5 feet to get below the second sandy loam layer noted in both test pits. This will allow the water depth to be 2.5 feet - 3.5 feet. That will increase the rate of infiltration over the test values derived with one foot of water depth. The overall safety factor for the infiltration area is well over 2.

Inflow to the system will be measured with a ramp flume and continuously recorded. The ramp flume is sized to provide 5% flow rate accuracy over a flow range of 10 cfs-50 cfs

Any outflow from the last pit will be safely returned to the White Ditch through a 12-inch pipe. The pipe will be on a slope that will keep water from flowing out of White Ditch.

By: *Bernard J. Hewes*
Bernard J. Hewes

Date: 8/21/03

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LAND USE INFORMATION SHEET

This information is needed to determine if the proposed project
complies with statewide planning goals and is compatible
with local comprehensive plans (ORS 192.180)

CITY/COUNTY LAND USE INFORMATION (to be completed by local planning official):

Please check below the one that applies: *Recharge Hudson Bay project*

- This project is not regulated by the local comprehensive plan and zoning ordinance.
- This project has been reviewed and is compatible with the local comprehensive zoning ordinance. (Please cite appropriate plan policies, ordinance section, and case numbers.)
152.056
- This project has been reviewed and is not compatible with the local comprehensive plan and zoning ordinance. (Cite appropriate plan policies, ordinance section, and case numbers).
- Compatibility of this project with the local planning ordinance cannot be determined until the following local approvals are obtained:

_____ Conditional Use Permit	_____ Development Permit
_____ Plan Amendment	_____ Zone Change
_____ Other	

An application has ___ has not ___ been made for the local approvals checked above.

* Signature of Local Official: *Patty Perry*
 Title: *Senior Planner* Date: *5-27-03*

Must be authorized signature from your local City/County Planning Department

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ATTACHMENT 5A: Methodology to Determine Chemical Constituents for Water Quality Assessment and Evaluation

Introduction:

The Artificial Groundwater Recharge rules (OAR 690-350-120) require both up front water quality and a water quality-monitoring plan. Further, for any recharge project the rules (OAR 690-350-120 (3) (b) require an applicant to either obtain a water quality permit (typically a water pollution control facility (WPCF) permit) or show that a permit is not necessary. Also, rules OAR 690-350-120 (3)(g) require a "Project Description Report" (ATTACHMENT 5) that outlines the proposed groundwater quality-monitoring plan. This attachment is intended to specifically help clarify the method by which the list of chemical constituents was determined.

Project Area Sample Chemical Review Methodology

Working with Tom Darnell, OSU Extension agent in Milton-Freewater, a chemical constituents review was conducted in order to determine what types of chemicals should be examined in the surface and groundwater monitoring for the project. Several steps were followed to determine which chemicals were of interest.

Review Steps

1. Reviewed the ODEO Report: *April 1999 Milton-Freewater Groundwater Quality Study: As part of the Statewide Groundwater Monitoring Program* (Richardson, et. al., 2000). Particular attention was focused on the constituents tested, testing protocol and timing, and the results-conclusions.
2. Reviewed *OSU Extension Pesticide Properties Database* and determined which were used in the Milton-Freewater area and a list was comprised. (Table 4A1, 4A2)
3. Determined which were currently and/or historically used in the area utilizing past chemical studies in the basin (see references). This included interviewing the current landowner on the site-specific history of chemical use on that property (see signed written statement below).
4. Determined which chemicals were important to monitor for during the recharge period (winter-spring). Considered each chemical's typical seasonal application period, solubility in water, soil half-life, and soil movement ratings.
5. Considered project design (top soil removed), and finalized list of chemicals of interest.

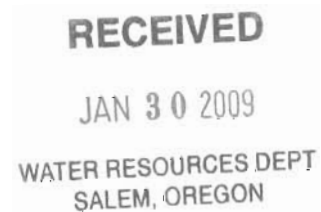
Final List of Chemicals to Monitor for Recharge Project

Chemicals Currently Used:

Rubigan (Fenarimol)
Ridomil (Metalxyl)
Systhane/Rally (Myclobutanil)
Devrinol (Napropamide)

Chemicals Historically Used:

DDD-DDF-DDT
Elgetol (DNOC sodium salt)
Alar/B-Nine (Daminozide)
Lindane (Lindane)



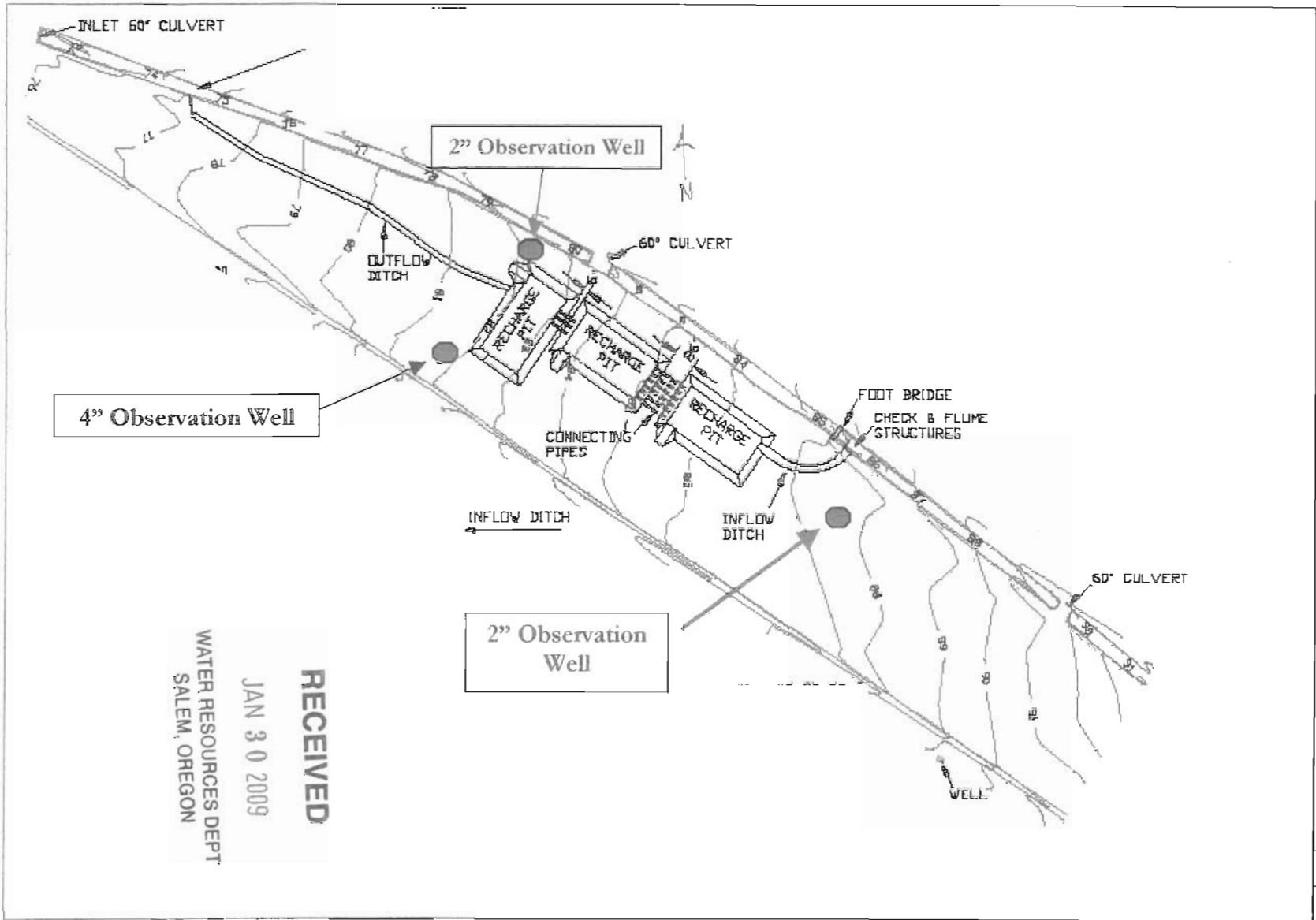
Laboratory Resources

Nitrate Analysis: Walla Walla County-City Health Department
310 W. Popular, P. O. Box 1753
Walla Walla, WA 99362
Telephone (509) 527-3290

Chemical Analysis: KUO Testing Labs, INC.
337 south 1st Avenue
Othello, WA 99344
Telephone: (509)-488-0118

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Attachment 5B Map of On-Site Monitoring Well Locations



DATE _____
 DESIGNED BY _____
 PLOTTED BY _____
 APPROVED BY _____

CAO FILE
 whiteplan
 SHEET 2
 OF 4

Attachment 50

History of Chemical¹ Use: Recharge Site Specific

Landowner Statement of Past Use:

"Gentleman,

I have been the owner of a certain parcel of land in the valley with an address known as 84140 Prunedale Rd., Milton-Freewater, Oregon, 97862.

I have owned this land since 1978 at which time we took over the existing orchard of apples and farmed it for two years at which time we began removing various blocks of trees and replanting with new varieties. In the past few years we raised Nursery Tree Stock and began leveling the land to its present condition, letting it lay in a dormant stage for a year and then planting cover crops to enrich the soil for a future cherry orchard.

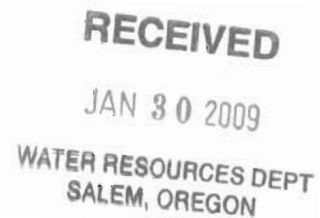
The pesticides applications were the normal tree fruit pesticides as allowed by regulations of the industry. The herbicide applications were Round-Up, Simazine and Paraquat. No other chemicals were used on this parcel of land during my ownership. If you should have other questions, please contact me at the following: (541)-278-6305, (509)-386-6175, or (541)-558-3752 or email at:

Hjohnson@co.umatill.or.us

Landowner: _____

Date: _____

10-17-03



¹ Chemical is defined here to include insecticides, fertilizers, herbicides, rodenticides, fungicides, and all other non-natural chemicals.

ATTACHMENT 7A: Source Water Quality Data

1STORET RETRIEVAL DATE 99/06/23
 402388 28AWALL03780
 46 01 08.6 118 24 45.1 4
 WALLA WALLA RIVER AT HWY 11 (MILTON-FREEWATER)
 41059 OREGON UMATILLA
 PACIFIC NORTHWEST 131007
 COLUMBIA RIVER BASIN BELOW YAKIMA RIVER
 21400000 17070102007 00
 0000 FEET DEPTH

Grey areas samples that correspond to Recharge Project

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INITIAL DATE	67/04/24	67/08/21	67/12/11	68/04/02	68/08/05	68/12/16	69/03/04	69/12/10	70/04/28
INITIAL TIME	1235	1400	1440	1615	1750	1100	1510	1145	930
MEDIUM	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
00010 WATER TEMP CENT	8	25.5	7	8.5	25	5	8.6	5	6
00011 WATER TEMP FAHN	46.4\$	77.9\$	44.6\$	47.3\$	77.0\$	41.0\$	47.5\$	41.0\$	42.8\$
00027 COLLECT AGENCY CODE	10	10	10	10	10	10	10	10	10
00070 TURB JKS: JTU	250	2		10	3	8		7	1
00080 COLOR PT-CO UNITS	20	4		3	5	3		1	3
00095 CNDUCTVY AT 25C MICROMHO	67	225	200	72	243	69	95		71
00300 DO MG/L	10.3	12.2	10.6	11.4	10.7	12.2	11.6	11.7	12.7
00301 DO SATUR PERCENT	89	150	89	99	131	95	99	94	105
00310 BOD 5 DAY MG/L	0.7	1.3	0.9	0.5	1.3	1.6	0.8	1.5	1.5
00400 PH SU	7.3	8.3	7.7	7.5	8.40L	7.2	7.6	7.5	7.5
00410 TALK CACO3 MG/L	30	108		33	105	30		54	31
00500 RESIDUE TOTAL MG/L	518			99	184	101		118	87
00530 RESIDUE TOT NFLT MG/L	368	11		10	10	21		18	12
00610 NH3+NH4- N TOTAL MG/L	0.13	0.34		0.38	0.32	0.17		0.08	0.12
00612 UN-IONZD NH3-N MG/L	.0004\$	.036\$		.002\$	.040\$	.0003\$		.0003\$	.0005\$
00619 UN-IONZD NH3-NH3 MG/L	.0005\$	.043\$		.002\$	.049\$	.0004\$		.0004\$	.0006\$
00620 NO3-N TOTAL MG/L	0.03	0.02		0.07	0.38	0.54		0.73	0.13
00660 ORTHOPO4 PO4 MG/L	0.06	0.16		0.1	0.18	0.56		0.16	0.03
00760 SWL PBI MG/L	1K	1K	29	1K					
00940 CHLORIDE TOTAL MG/L	2			1	8	2		2	1
00945 SULFATE SO4-TOT MG/L	8	33		4	14	4		6	3
22413 HARDNESS TOTLDISS WTR MG/L	28			37	99	35		49	24
31505 TOT COLI MPN CONF /100ML	620	2400	7000	60	230	2300	620	450K	620
31615 FEC COLI MPNECMED /100ML			230						60
31677 FECSTREP MPNADEVA /100ML								240	

ATTACHMENT 7A: Source Water Quality Data

INITIAL DATE	70/07/13	70/11/30	71/05/11	71/08/16	72/02/28	72/08/30	73/02/12	73/06/13	73/09/24
INITIAL TIME	1400	1645	2000	1620	1610	1130	845	1055	1400
MEDIUM	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
00010 WATER TEMP CENT	24	5.5	15.5	26	9	20.5	2.5	16.5	16
00011 WATER TEMP FAHN	75.2\$	41.9\$	59.9\$	78.8\$	48.2\$	68.9\$	36.5\$	61.7\$	60.8\$
00027 COLLECT AGENCY CODE	10	10	10	10	10	10	10	10	10
00070 TURB JKSN JTU		5	3	1	28	2	15	3	2
00080 COLOR PT-CO UNITS		0	1	2	10	5	5	5	0
00094 CNDUCTVY FIELD MICROMHO							90		

INITIAL DATE	70/07/13	70/11/30	71/05/11	71/08/16	72/02/28	72/08/30	73/02/12	73/06/13	73/09/24
INITIAL TIME	1400	1645	2000	1620	1610	1130	845	1055	1400
MEDIUM	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
00095 CNDUCTVY AT 25C MICROMHO	236	66	51	200	67	221	87		
00300 DO MG/L	12.5	11.5	9.5	14.2	11	12.5	12.9		11.5
00301 DO SATUR PERCENT	151	95	99	172	97	137	97	117.0\$	115.0\$
00310 BOD 5 DAY MG/L	2	0.7	0.8	2.3	0.7	0.9	1.4		
00400 PH SU	8.6	7.5	7.3	8.9	7.1	8.4	7.3		
00410 T ALK CACO3 MG/L		29	21	96	23	92	29	82	95
00500 RESIDUE TOTAL MG/L		89	75	172	280	170	100	153	164
00530 RESIDUE TOT NFLT MG/L		12	12	4	106	8	32	10	3
00610 NH3+NH4 N TOTAL MG/L		0.34	0.06	0.66	0.09	0.14	0.04	0.1	0.17
00612 UN-IONZD NH3-N MG/L		.001\$	.0003\$	.215\$	.0002\$	.013\$	.00008\$		
00619 UN-IONZD NH3-NH3 MG/L		.002\$	.0004\$	.261\$	.0002\$	.016\$	.00010\$		
00620 NO3-N TOTAL MG/L		0.02	0.1	0.15	0.3	0.51	0.14	0.36	0.39
00625 TOT KJEL N MG/L							0.2		
00650 T PO4 PO4 MG/L							0.3		
00660 ORTHOPO4 PO4 MG/L		0.06	0.09	0.13	0.09	0.04	0.09	0.1	0.14
00930 SODIUM NA,DISS MG/L					2.4		2.8		
00935 PTSSIUM K,DISS MG/L					2		1.5		
00940 CHLORIDE TOTAL MG/L		1	0.7	5	0.8	3	1	6	4
00945 SULFATE SO4-TOT MG/L		3	.1K	11	3	11	2	6	4
22413 HARDNESS TOTLDISS WTR MG/L		26	19	80	22	84	28	71	79
31505 TOT COLI MPN CONF /100ML	230	2400	2400	230	620	620	290		
31615 FEC COLI MPNECMED /100ML	230	45K	45K	45K	45K		60		

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ATTACHMENT 7A: Source Water Quality Data

1STORET RETRIEVAL DATE 99/06/23
 402389 28AWALL04860
 45 54 13.6 118 22 02.9 4
 WALLA WALLA RIVER U/S MILTON-FREEWATER
 41059 OREGON UMATILLA
 PACIFIC NORTHWEST 131007
 COLUMBIA RIVER BASIN BELOW YAKIMA RIVER
 21400000 17070102011 00
 0000 FEET DEPTH

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INITIAL DATE	67/04/24	67/08/21	67/12/11	68/04/03	68/08/06	68/12/16	69/03/04	69/12/10
INITIAL TIME	1300	1520	1700	810	905	1030	1540	1055
MEDIUM	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER
00010 WATER TEMP CENT	6	21	5	6.5	16	5	6.4	3
00011 WATER TEMP FAHN	42.8\$	69.8\$	41.0\$	43.7\$	60.8\$	41.0\$	43.5\$	37.4\$
00027 COLLECT AGENCY CODE	10	10	10	10	10	10	10	10
00070 TURB JKSJ JTU	5	7	15	2	5	9	12	2
00080 COLOR PT-CO UNITS	6	2	4	4	4	3	2	0
00095 CNDUCTVY AT 25C MICROMHO	59	180	69	57	93	57	63	
00300 DO MG/L	11.2	8.7	11.9	11.6	9.7	11.1	11.6	12.9
00301 DO SATUR PERCENT	94	101	98	98	102	87	99	100
00310 BOD 5 DAY MG/L	0.6	0.8	1.1	0.6	0.4	0.2	0.7	1.2
00400 PH SU	7.4	7.5	7.5	7.3	7.3	7	7.5	7.7
00410 TALK CACO3 MG/L	26	32	32	26	40	16	27	33
00500 RESIDUE TOTAL MG/L	89	101	83	113	98	92	81	67
00530 RESIDUE TOT NFLT MG/L	2	8	6	7	22	26	7	6
00610 NH3+NH4- N TOTAL MG/L	0.14	0.17	0.32	0.12	0.18	0.11	0.06	0.03
00612 UN-IONZD NH3-N MG/L	.0005\$	.002\$	.001\$	.0003\$	.001\$	.0001\$	.0003\$	.0002\$
00619 UN-IONZD NH3-NH3 MG/L	.0006\$	.003\$	.002\$	.0004\$	.001\$	.0002\$	.0003\$	.0002\$
00620 NO3-N TOTAL MG/L	0.01	0.02	0.02	0.03	0.04	0.39	0.3	0.12
00660 ORTHOPO4 PO4 MG/L	0.02	0.1	0.1	0.07	.01K	0.01	0.11	0.1
00760 SWL PBI MG/L	8	1K	1					
00940 CHLORIDE TOTAL MG/L	1	5	1	1	6	2	2	0.8
00945 SULFATE SO4-TOT MG/L	3	0.6	4	2	15	3	1	3
22413 HARDNESS TOTL DISS WTR MG/L	23	36	29	24	32	25	26	31
31505 TOT COLI MPN CONF /100ML	230	620	210	230	620	210	60	60
31615 FEC COLI MPNECMED /100ML			210					
31677 FECSTREP MPNADEVA /100ML								5K

ATTACHMENT 7A: Source Water Quality Data

INITIAL DATE	74/05/06	74/07/30	74/11/11	75/05/27	75/07/08	75/11/10
INITIAL TIME	1420	1745	1630	1930	1745	1745
MEDIUM	WATER	WATER	WATER	WATER	WATER	WATER
00010 WATER TEMP CENT	10.5	20.5		10.5	27	4.7
00011 WATER TEMP FAHN	50.9\$	68.9\$		50.9\$	80.6\$	40.5\$
00027 COLLECT AGENCY CODE	10	10	10	10	10	10
00070 TURB JKSN JTU	7	2	1	1	2	1.0K
00080 COLOR PT-CO UNITS	5	5	1K	5	15	1K
00094 CNDUCTVY FIELD MICROMHO	49	80		55	170	80
00095 CNDUCTVY AT 25C MICROMHO	53	90		54	195	72
00300 DO MG/L	10.8	9		10.8	8.7	11.9
00301 DO SATUR PERCENT	101	103		102	106	95
00310 BOD 5 DAY MG/L	1	0.3		0.6	3	0.4
00400 PH SU	7.5	8		7.3	8	7.7
00410 T ALK CACO3 MG/L	17	34	33	20	65	34

INITIAL DATE	74/05/06	74/07/30	74/11/11	75/05/27	75/07/08	75/11/10
INITIAL TIME	1420	1745	1630	1930	1745	1745
MEDIUM	WATER	WATER	WATER	WATER	WATER	WATER
00500 RESIDUE TOTAL MG/L	62	76	68	64	180	87
00530 RESIDUE TOT NFLT MG/L	39	4	1K	5	38	3
00610 NH3+NH4- N TOTAL MG/L	0.03	0.02	0.06	0.01	0.19	0.02
00612 UN-IONZD NH3-N MG/L	.0002\$	.0008\$		.00004\$	.012\$	.0001\$
00619 UN-IONZD NH3-NH3 MG/L	.0002\$	.0010\$		.00005\$	.014\$	.0001\$
00620 NO3-N TOTAL MG/L	0.01	0.05	0.06	0.1	0.72	0.12
00650 T PO4 PO4 MG/L	0.2	0.2		0.3	0.5	0.1
00660 ORTHOPO4 PO4 MG/L	0.01	0.14	0.08	0.09	0.08	0.11
00930 SODIUM NA,DISS MG/L	2.1	3		2.4	8.4	3
00935 PTSSIUM K,DISS MG/L	1.6	2.4		1.3	3.5	2
00940 CHLORIDE TOTAL MG/L	0.4	0.9	1	1	6	1
00945 SULFATE SO4-TOT MG/L	2	1	2	2	8	2
22413 HARDNESS TOTLDISS WTR MG/L	14	27	27	19	60	27
31505 TOT COLI MP/N CONF /100ML	60	7000L		230	7000	2400
31615 FEC COLI MP/NECMED /100ML	45K	620		45	7000	230

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SALEM, OREGON

LAND LEASE

1. PARTIES

The parties to this Lease are HULETTE M. JOHNSON, SHIRLEY A. JOHNSON, and H. MARC JOHNSON, hereinafter referred to as Landlord, and HUDSON BAY DISTRICT IMPROVEMENT COMPANY, and Oregon Non-profit Improvement District, hereinafter referred to as Tenant.

2. DATE

This Lease will begin the first of the following month, after the Tenant has obtained a water right certificate for the purpose of ground water recharge for this site from the State of Oregon.

3. DESCRIPTION OF LEASED PREMISES

Landlord leases to Tenant and Tenant leases from Landlord, under the terms and conditions stated herein, the real property in Umatilla County, State of Oregon, described in Exhibit "A" attached hereto and by such reference incorporated herein.

4. TERM OF LEASE

The term of this Lease will be from the date of this lease for a period of five(5) years. Tenant shall have the option to renew this lease with notice to Landlord of not less than 90 days prior to the end of the initial term and any renewal terms for future additional five year terms upon the mutual agreement of renegotiated rental terms for each renewal period.

5. POSSESSION

The Tenant shall be granted possession of the property upon execution of this document by all parties, together with the receipt of the initial lease payment as prescribed in RENT.

6. RENT

Tenant shall pay advance annual rent payments in the amount of three thousand six hundred dollars(\$3,600) plus annual assessment for irrigation water for surface water rights delivered by Tenant to 84140 Prunedale Road, beginning with INV # 1276C for 2003. Landlord shall pay same assessment to Tenant upon receipt of said annual assessment payment from Tenant. Tenant shall make each annual payment for the term of this lease to Landlords address, 52833 Sunquist Road, Milton-Freewater, Oregon, 97862, or otherwise as notified. The initial payment shall be due on the date this agreement is executed by Tenant and Landlord, and Tenant it therefore granted possession to said real property.

7. INSURANCE

Tenant shall maintain liability insurance on the leased property in an amount acceptable to the Landlord and shall provide proof of such insurance naming Landlords as additional insureds. Tenant shall also be responsible for necessary insurance on laborers. Tenant shall also be responsible for insurance coverage on personal property kept or installed upon this leased premises.

8. USE OF PREMISES

Tenant agrees that they will use the property for ground water recharge/storage, ponding.

9. LANDLORDS OBLIGATIONS

Landlord shall install electricity, pump, collection pond and mainline with the assistance of Tenant necessary to connect the source of irrigation water provided by Tenant to the existing delivery systems of Landlord's.

If there is a mortgage or other encumbrance on said premises, Landlord covenants to keep same in good standing, at all times, to make payments when due and not to suffer or permit default in said encumbrance.

Landlord shall pay all property taxes upon the real property subject to this lease in a timely manner.

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10. TENANT'S OBLIGATIONS

Tenant shall provide all labor and materials for the construction of the ground water recharge pond, Landlord's irrigation collection pond and pumping station or other improvements required by Tenant, including maintenance of bridges and culverts.

Tenant shall pay all taxes of any kind and necessary insurance for labor to maintain to maintain improvements including any increase in property taxes as a result of said improvements as made by Tenant.

Tenant shall pay for all maintenance and operation of improvements constructed on said premises.

Tenant agrees that earth material excavated from the recharge pond shall be placed along the edges of the recharge area to produce a basin-like pond. Excess material shall be placed in other areas of Landlord's property as directed by Landlord and spread evenly where located so that agricultural activities may continue.

Tenant upon termination of lease, shall replace all soil to a level topography using stored material from the sides of said 'recharge' pond, together with other off site soil as approved by Landlord, necessary to return the recharge pond to a level premise ~~for agricultural growing activities.~~

Tenant shall pay for all costs incurred for control of noxious weeds and vegetation around perimeter of ponding areas, and shall spray the perimeter of said pond including the banks of the Hudson Bay Canal and the Pleasantview Canal including bridges and culverts to maintain a clean ground cover as directed by Landlord

Tenant shall provide signage for trespass prevention and notice of man-made hazard upon premises at the commencement of work efforts at the recharge area.

Tenant shall install any and all fences and gates necessary as may be required by an insurance company or others around the recharge pond.

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11. LIENS

Tenant shall pay, as due, all claims for work done on and for services rendered or materials furnished to the leased premises incurred and owing by Tenant and shall keep the premises free of any liens resulting from acts of the Tenant.

12. COVENANTS OF TITLE

Landlord covenants that he is the owner of the above described property free of any encumbrance that would impair or interfere with Tenant's rights under this Lease, and that Landlord has full right and authority to lease the premises described herein.

13. WASTE

Tenant shall not commit or permit to be committed any waste, strip, damage to or misuse of the premises.

14. INDEMNIFICATION

Tenant shall indemnify, hold harmless and defend Landlords from all claims, loss or liability arising out of or related to any activity of Tenant on the leased premises or any condition of the leased premises in the possession or under the control of the Tenant.

15. ASSIGNMENT

No part of the leased property may be assigned, mortgaged, or subleased, nor may a right of use of any portion of the property be conferred on any third person by any other means without the prior written consent of Landlord. This provision shall apply to all transfers to and by trustees in bankruptcy, receivers, administrators, executors, and legatees. No consent in one instance shall prevent the provision from applying to a subsequent instance.

16. DEFAULT

The following shall be events of default:

Failure to pay rent when due.

Failure of either Landlord or Tenant to comply with any other term or condition or fulfill any other obligation of this Lease within twenty(20) days after written notice by Landlord or Tenant specifying the nature of the default with reasonable particularity.

Abandonment by the Tenant of the property

If the default is of such a nature that it cannot be completely remedied within the twenty-day period and the defaulting party thereafter proceeds with reasonable diligence and in good faith to effect the remedy as soon as practicable, default shall not be declared unless the defaulting party ceases to effect the remedy.

17. TAXES

The Landlord shall pay all real property taxes for real property for the term of this Lease. Tenant shall be liable to pay any taxes, personal or real, incurred as a result of improvements placed upon the leased premises.

18. NONWAIVER

Waiver by either party of strict performance of any provision of this Lease shall not be a waiver of or prejudice the party's right to require strict performance of the same provision in the future or of any other provision of this Lease.

19. ATTORNEY FEES

If suit or action is instituted in connection with any controversy arising out of the Lease, the prevailing party shall be entitled to recover, in addition to costs, such sums as the Court may adjudge reasonable as attorney fees.

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20. SUCCESSION

Subject to the above-stated limitations on transfer of Tenant's interest, this Lease shall be binding upon and inure to the benefit of the parties, their respective successors and assigns.

21. INSPECTION OF PREMISES

The Landlord reserves the right to themselves and their agents to go upon the premises at reasonable and proper times to inspect the same for the purpose of determining that the Lease is being properly observed and that all of the terms of this lease are being performed by the Tenant.

22. IMPROVEMENTS

Any improvements to the real property by Tenant shall remain the property of the Landlord upon termination of this Lease, unless the Tenant obtains the written consent of Landlord to remove said improvements prior to the time the improvements are placed on the property. However, Tenant shall be responsible for refilling the recharge "pond" as set forth in paragraph 10 above.

23. TERMINATION

The Tenant agrees to deliver the property to the Landlord at the end of the term of this Lease and in as good a condition as when accepted, and pursuant to paragraph 10 above.

24. TIME IS OF THE ESSENCE

The parties acknowledge and agree that time is of the essence with respect to all of the terms, conditions, and provisions of this Lease.

25. NOTICES

Any notice required or permitted under this Lease shall be given when actually delivered or when deposited in the United States Mail as certified mail, addressed as follows:

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LANDLORD: HULETTE M. JOHNSON, et., al.
52833 Sunquist Road
Milton-Freewater, Oregon 97862

TENANT: HUDSON BAY DISTRICT IMPROVEMENT
COMPANY
P.O. Box 110
Milton-Freewater, Oregon 97862

26. WATER DUES

The annual irrigation water dues as billed to Landlord by Tenant shall be paid by Landlord to Tenant as billed. As part of the rent agreement in paragraph 6 above, Tenant shall pay Landlord an equal amount of said water dues within thirty(30) days of receipt of said water dues from Landlord, during the term of this Lease and any renewals thereof.

27. CAPTIONS AND HEADINGS

The captions and headings throughout this Lease are for convenience and reference only and the words contained therein shall in no way be held or deemed to define, limit, describe, explain or modify the meaning of any provisions of or the scope or intent of this Lease.

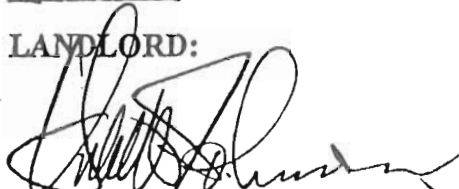
28. ENTIRE AGREEMENT

This document is the entire, final, and complete agreement of the parties pertaining to the Lease of the premises described herein, and supersedes and replaces all written and oral agreements theretofore made or existing by and between the parties or their representatives in so far as the premises are concerned.

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IN WITNESS WHEREOF, the parties have executed this Lease on the 15th day of October, 2003.

LANDLORD:

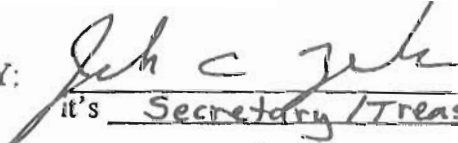

HULETTE M. JOHNSON,


SHIRLEY M. JOHNSON


H. MARC JOHNSON

TENANT:

HUDSON BAY IMPROVEMENT CO.

BY: 
it's Secretary/Treasurer

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STATE OF OREGON)
)ss.
County of Umatilla)

On this 15th day of Oct 2003 personally appeared before me the above named HULETTE M. JOHNSON, SHIRLEY M. JOHNSON, and H. MARC JOHNSON and acknowledged the foregoing to be a voluntary act and deed.



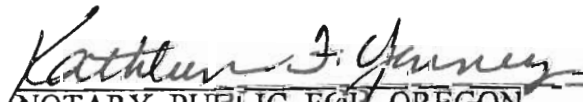

NOTARY PUBLIC FOR OREGON

My commission expires: 9-24-2004

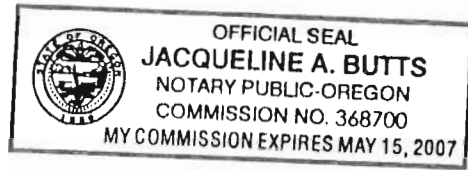
STATE OF OREGON)
)ss.
County of Umatilla)

On this 15th day of Oct 2003, personally appeared before me the above named John C. Zerba in his capacity as Secretary/Treasurer of HUDSON BAY IMPROVEMENT CO. and acknowledged the foregoing to be a voluntary act.




NOTARY PUBLIC FOR OREGON
My Commission expires: 9-24-2004

STATE OF OREGON)
)ss
County of Umatilla)



On this 22 day of October 2003, personally appeared before me the above named it. Marc Johnson, and acknowledged the foregoing to be a voluntary act and deed.



NOTARY PUBLIC FOR OREGON

My commission expires May 15, 2007.

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TRACT I:

Township 6 North, Range 35, East of the Willamette Meridian:
Section 33: A tract of land located in the South Half of the
Northeast Quarter, and being a portion of that tract of land
conveyed to William J. Jackson, by Deed recorded in Book 369,
Page 267, Deed Records, and being described as follows, to-wit:

Commencing at the quarter section corner on the line between
Sections 33 & 34; running thence North 20 chains; thence West
33-16/100 chains; thence Southeasterly 32-16/100 chains, more or
less, to a point on the center line; running East and West through
said Section 33, said point being 7 chains West of the point
of beginning; thence East 7 chains to the point of beginning.
Excepting therefrom, beginning at the Northeast corner of the
Southeast Quarter of the Northeast Quarter of said Section 33;
and running thence South 45 rods; then West 35-5/9 rods; thence
North 45 rods; thence East 33-5/9 rods to the place of beginning.
All being East of the Willamette Meridian, Umatilla County, Oregon.
Subject to any and all water rights of way and roads.

TRACT III:

Beginning at the Northeast corner of the Southeast Quarter
of the Northeast Quarter of Section 33, Township 6 North, Range
35; running thence South 45 rods; thence West 35 and 5/9 rods;
thence North 45 rods; thence East 35 and 5/9 rods to the
place of beginning. Excepting therefrom that tract of land
conveyed to the State of Oregon, by and through its State
Highway Commission by deed recorded in Book 130, Page 573
of the Deed Records of Umatilla County, Oregon. Also, excepting
any portion of said premises lying within that strip of land
conveyed to Walla Walla and Columbia River Railroad Company, by
deed recorded in Book "D", Page 834 of the said Deed Records.
All being East of the Willamette Meridian, in the County
of Umatilla and State of Oregon;

Excepting any and all water rights of way.

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900
30.33 Ac.

7-14

1000
7.60 Ac.

1100
1.88 Ac.

240' ALK
801
9.78 Ac

NE 1/4 Sec. 33 T.6N. R.35E W.M.
UMATILLA COUNTY

1" = 200'

See Map GN 35 28

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875'
(Hodger-Edwards Rd.)

See Map GN 35 33D

800
3.26 Ac.

NO. 517

ORIGINAL

Attachment 88:

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WATER RESOURCES DEPT
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License No. _____

STATE OF OREGON

WATER RESOURCES DEPARTMENT

APPLICATION FOR LIMITED WATER USE LICENSE

Applicant(s): Hudson Bay District Irrigation Company

Contact Person: Jon Brough / John Zerba

Mailing Address: P.O. Box 110

Telephone No: 541 438-6105

I (We) make application for a Limited License to use or store the following described surface waters or groundwater-not otherwise exempt, or to use stored water of the State of Oregon for a use of a short-term or fixed duration:

1. SOURCE(S) OF WATER for the proposed use: Walla Walla River a tributary of Columbia River.

2. TOTAL AMOUNT OF WATER to be diverted: 50 cubic feet per second, or 50 gallons per minute. If water is to be used from more than one source, give the quantity from each: _____.

3. INTENDED USE(S) OF WATER: (check all that apply)
 Road construction or maintenance;
 General construction;
 Forestland and rangeland management; or
 Other: Artificial Groundwater Recharge.

4. DESCRIPTION OF PROPOSED PROJECT: Include a description of the intended place of use as shown on the accompanying site map, the method of water diversion, the type of equipment to be used (including pump horsepower, if applicable), length and dimensions of supply ditches and pipelines: See attached application document

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5. **PROJECT SCHEDULE:** (List day, month, and year)

Date water use will begin 11-04

Date project will be completed 11-09

Date need for water will be completed 11-09

NOTE: A completed water availability statement from the local watermaster, fees and a site map meeting the requirements of OAR 690-340-030 must accompany this request. The fee for this request is \$100 for the first point of diversion plus \$10 for each additional point of diversion. The license, if granted, will not be issued or replaced by a new license for a period of more than five consecutive years. The right granted will be subordinate to all other authorized uses that rely upon the same source, or water affected by the source, and may be revoked at any time it is determined the use causes injury to any other water right or minimum perennial streamflow.

REMARKS:

SIGNATURE of Applicant: *Jul C. Paul*
Title: Sec - Perm

DATE: 10-23-08

I certify that I have examined the foregoing application and accompanying data, and hereby grant a Limited License to use said water as described in the application, subject to all water rights of record, and subject to any valid public interest concerns which may become evident.

This license shall be in effect beginning _____, 20____, and shall expire _____, 20____.

WITNESS my hand this _____, 20____.

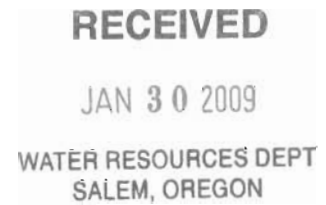
Paul R. Cleary
Water Resources Department
Director

The licensee shall give notice to the Department (Watermaster) at least 15 days in advance of using the water under the Limited License and shall maintain a record of use. The record of use shall include, but need not be limited to, an estimate of the amount of water used, the period of use and the categories of beneficial use to which the water is applied. During the period of the Limited License, the record of use shall be available for review by the Department upon request.

The application was first received at the Water Resources Department at Salem, Oregon, on the _____ day of _____, 20____, at _____ o'clock, ____M.

2/5/04

To: Department of Environmental Quality
Eastern Region Pendleton Office
700 SE Emigrant, Suite 330
Pendleton, OR 97801



ATTENTION: Phil Richardson, (OWRD File # LL-758)

From: Hudson Bay District Irrigation Company (HBDIC)
P.O. Box 110
Milton-Freewater, Oregon 97862

RE: Request for additional information; Artificial Ground Water Recharge Testing Project (OWRD File # LL-758)

To Whom It May Concern:

The purpose of this letter is to provide the additional information requested by ODEQ for the Artificial Ground Water Testing Project (Attachment 5A: Methodology to Determine Chemical Constituents For Water Quality Assessment and Evaluation and Attachment 5C: Chemicals of Interest for Hudson Bay Recharge Project). The following addresses each of the items requested in the 2/3/4 letter.

- Simazine has been included in Attachment 5C (see attached) along with the chemical properties needed to screen the chemical. If deemed appropriate, the chemical could be added to the final screening list. Also, ODEQ had sampled for this analyte during the 1999 study, and was found not to be a risk. (ODEQ, 1999).
- We concur that the four sampling events (once before, once shortly after, once during and once shortly before the end of the project) would be a more comprehensive way to screen for chemicals during the project. The final chemical list and their cost to process may pose some limitations as to the amount of samples we can collect. After we receive the final list, we can assess costs and notify ODEQ as to our financial constraints of adding a fourth sample.
- Nitrate has been used as a surrogate for solubility in other pesticides studies. However, we concur that unless it was possible to also know how it was applied and which chemicals most resembled its physical properties, that it may have less application for this project. We will still intend however to collect nitrate samples during recharge event(s) as a parameter of general water quality concern.

The additional information requested on the physical properties of the chemicals of concern is provided below.

Objective: In order to assess the **parameters of use** for each of the chemicals of concern (yellowed in Attachment 5C) in the project area. An assessment was conducted to better quantify the definition of "project area" and the types of crops/chemicals used over that area. The additional information requested on the chemicals of interest were:

- Application Method (see below)
- Time of year chemical applied (see below)
- Volume of chemical used per acre (see below)
- Concentration of chemical in application (see below)
- Percentage of project area receiving chemical (see below)
- Recharge site irrigation method (see below)
- Onsite use or offsite use (see below)
- Current or historic use (see Attachment 5C)

Collaborators: Bob Bower (Hydrologist/Artificial Recharge Testing Project Manager), WWBWC and Tom Darnell (Oregon State University Extension Agent).

Project Area: The project area was quantitatively defined to include the recharge testing site and the areas along that the ditch providing the surface recharge water. Total ditch length and land use was determined using a combination of recent aerial photographs (map wheel) and GIS mapping software. In order to calculate total project area, a 20-yard streamside buffer¹ was applied to both sides of the ditch for total area calculations.

- Total Length of Recharge Project area: 3.7 Miles
 - 2 miles in ag area (54% of total length)
 - 1.7 miles (46%) in Milton-Freewater city limits (no buffer value available).
- Total Ag chemical interest area: 14.6 acres
 - Apples: 5 acres
 - Cherries: 1.8 acres
 - Pasture/open ground: 7.7 acres (no chemicals of interest used)
 - Grapes: < 0.1 acre (minute use of chemicals of interest)
- Total of Project area with *potential* to receive chemicals: 47.3 % (city not included).

Specific area and use information:

APPLE ACRES

PRODUCT	SEASON	RATE/ACRE (MATERIAL)	%ACTIVE INGREDIENT	AI/ACRE	TOTAL AMOUNT ² 5 ACRES
Amid-Thin	May	.25 lb	8.4	.021 lb	.105 lb
Rally	April-May	5.0 oz	40.0	2.0 oz	10.0 oz
Rubigan	April-May	12.0 oz	12.0	1.44 oz	7.2 oz
Ridomil³	Oct	1.5 fl oz/1000sqft	49.0	32.0 oz	32.0 oz
Procure	April-May	12.0 oz	50.0	6.0 oz	30.0 oz
Intrepid	May	16.0 fl oz	22.6	3.6 oz	18.0 oz
Success	April	8.0 fl oz	22.8	1.8 oz	9.0 oz
Bayleton	April-May	6.0 oz	50.0	3.0 oz	15.0 oz
Provado	May	8.0 oz	17.4	1.4 oz	7.0 oz
Elgetol⁴	April	1.0 gal	N/A	N/A	N/A

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¹ A recent United States District Court decision (Case No. CO1-0132C) stated: "The Court further finds that 20-yard buffer zones for ground use... will substantially contribute to the prevention of jeopardy."

(<http://agr.wa.gov/PestFert/EnvResources/docs/FinalOrder01-22-04.pdf>)

² Total amount on five acres is the probable maximum amount of material (active ingredient). Actual use depends on variety, weather conditions and disease pressure. Rally, Rubigan, Procure and Bayleton are fungicides used to control apple scab and/or mildew. Apple orchards do not receive an application of each fungicide each season. The fungicides and insecticides are applied by air blast sprayer.

³ Ridomil is soil applied, either by hand gun or herbicide sprayer, at the base of the tree. Total amount used is figured on 20 percent of the soil surface treated.

⁴ Elgetol use was discontinued in 1986.

CHERRY ACRES

PRODUCT	SEASON	RATE/ACRE (MATERIAL)	%ACTIVE INGREDIENT	AI/ACRE	TOTAL AMOUNT ⁵ 1.8 ACRES
Success	March-April	7.0 fl oz	22.8	1.6 fl oz	2.88 fl oz
Rally	March-April	5.0 oz	40.0	2.0 oz	3.6 oz
Rubigan	March-April	9.0 oz	12.0	1.08 oz	1.9 oz
Procure	March-April	13.0 oz	50.0	6.5 oz	11.7 oz

OTHER PROJECT AREA ACRES

The other project areas were estimated not to have any of the chemicals of interested (yellowed, Attachment 5C). The portion of the ditch passing through the city of Milton-Freewater was not considered for the agricultural chemicals of interest. This portion of the ditch would predominantly be surrounded by lawns and gardens. The types of chemicals used in these areas would include three from our original list: Dacamine (2,4 D), Round Up and Diazinon. These chemicals not typically applied during the recharge project time period and were thus determined to pose little risk. No chemicals were estimated to be used on the pasture/open acreage areas.

Project site irrigation method: Landowner has informed us that sprinkler irrigation has been used at the recharge site.

Project area irrigation method: All of the project Ag areas are in sprinkler irrigation. The small parcel with grapes are on a drip irrigation system.

Onsite use or offsite use: A letter from the landowner described the onsite use in which Simazine was listed. This chemical has been added to the comprehensive list.

Current or historic use: The original Attachment 5A and 5C included an assessment and categorization of chemicals based on historic and current use.

Thank you for your time and attention.



John Brough, HBDIC Director

CC: Don Miller – OWRD
Tim Bailey – ODFW

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⁵ Total amount on 1.8 acres is the probable maximum amount of material (active ingredient). Actual use depends on pest populations and pressure and weather conditions. All pesticides are applied on ground by air blast sprayer.

2/5/14

ATTACHMENT 5A: Methodology to Determine Chemical Constituents for Water Quality Assessment and Evaluation

Introduction:

This attachment is intended to specifically help clarify the process by which the proposed list of chemical constituents were determined and to show that a ODEQ water quality permit will not be needed for this limited license groundwater recharge project.

Chemical Constituents Review Methodology

It should be **clearly reiterated** that during construction of the recharge pits/ponds, the top 60 inches (5 feet) of topsoil would be **removed**. This construction criteria assists the project in two ways: (1) it minimizes the chance of site specific chemicals being leached into the ground water during the recharge process, (2) it increases the rate at which recharge water can be applied by exposing the more transmissive substrate below this top soil layer.

Working with our local pesticides expert, (Tom Darnell, OSU Extension Agent in Milton-Freewater) a review was conducted to determine the types of chemicals to consider for during this project's water quality monitoring plan. A description of this review processed is presented below.

Chemical Review Process

1. Using the proposed water diversion time period (Nov 1st through May 15th), a comprehensive list of chemicals¹ was compiled for the project area. This included interviewing the current landowner on the site-specific history of chemical use on that property (see attached signed, written statement).
2. Chemicals were broken down into two classes: **current** chemicals were determined to be those that have been used in the past several years in the project area, and **historical** chemicals are not currently in use, but have were used at some point in the past. This "project area" is defined as the area starting at the Little Walla Walla diversion (on the Walla Walla River) through the lands adjacent to the ditch network to the project site. **Attachment 5C** lists this comprehensive list of chemicals in table form.
3. Reviewed the ODEQ Report: *April 1999 Milton-Freewater Groundwater Quality Study: As part of the Statewide Groundwater Monitoring Program* (Richardson, et. al., 2000). ODEQ's well # UMA298 is located proximal to the proposed recharge site which provides excellent preexisting information for this project. **Attached** is a copy of the results and conclusions from that study.
4. Using information from OSU Pesticides database (and several other websites), the complete list of chemicals was further screened based on a set of sequential screening steps. Chemicals were selected for the final monitoring list if they appeared to meet all of the criteria listed below.

- a. Currently and Historically used chemicals were chosen if:
 - i. Soil $\frac{1}{2}$ life = > period when last used, and if
 - ii. Pesticide Movement Rating² > or = **moderate**, and if
 - iii. ODEQ **did not** sample for it in 1999 study (UMA 298 well)

5. Exception to above selection process

- a. ODEQ sampled and found a "positive" detection of **Dathal & Metabolites** as a part of the Phenoxyherbicide screen tests (ODEQ, 1999). The results noted:

"Dacthal and its metabolites were detected in six samples as part of the Phenoxyherbicide screen. The maximum concentration detected (24.6 micrograms per liter) was much less than the 4,000 micrograms per liter healthy advisory level. Therefore, the concentration of dacthal and metabolites is not believed to represent problems to human health or the environment." (ODEQ, 1999)

¹ Chemicals defined to include fungicides, herbicides, miticides, pesticides, and growth regulators.

² The Pesticide Movement Rating as reported in OSU report, (OSU, 1999)

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The plan is to test for this group of chemicals during the water quality monitoring portion of this project.

6. The final step in the review process was to evaluate if the final list of chemicals were "testable". Two private water quality-testing laboratories (Kuo and Edge Analytical) were contacted and asked if they were able to test for these chemicals in water samples. The results are noted in attachment 5C.

Screening process conclusions:

The final list of chemicals for testing is shown below. Screening and/or testing information for the chemicals Myclobutanil (Systhane, Rally), Triflumizole (Procure), Triadimefon (Bayleton), Imidacloprid (Provado), Methoxyfenozide (Intrepid), and Spinosad (Success) was not available at the time this document was completed. If this information becomes available in the future, and shows evidence that they should not or cannot be screened for, they would be dropped from the final testing list. Chemicals can also be added or deleted from the final list per request by ODEQ review staff.

Proposed List of Chemicals to Monitor for Recharge Project

Fenarimol (Rubigan)
DNOC sodium salt (Elgetol)
Metalxyl (Ridomil)
DCPA, (Dacthal @ Metabolites)
1-Naphthaleneacetamide (Amid-thin)
Myclobutanil (Systhane, Rally)
Triflumizole (Procure)
Triadimefon (Bayleton)
Imidacloprid (Provado)
Methoxyfenozide (Intrepid)
Spinosad (Success)

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Pre-conditions: Using Nitrate as the Indicator

Agricultural fertilizers are the primary source of nitrate in groundwater. Nitrate concentrations greater than 2-3 mg/L in well water indicate that chemicals applied to the land surface are reaching the ground water system, so detection of pesticides in these wells may be more likely. This relationship between nitrate concentration and pesticide detection may help identify wells at risk for contamination by pesticides. Laboratory analysis for nitrate is simpler and less costly than analysis of pesticides. Consequently, many more Central Columbia Plateau wells have been sampled for nitrate. (See attached report and *Reyer, S.J. and Jones, J.L., 1995, Nitrate concentrations in ground water of the Central Columbia Plateau: U.S. Geological Survey Open-File Report 95-445, 4 p.*)

After the monitoring wells and recharge facility has been constructed and before operation of the project, a **preconditions water quality test** will be conducted of all chemical constituents (Levels 1 and 2 from Attachment 5 Monitoring Plan). Samples will be collected from the (1) source water entering project site, (2) upgradient on-site observation well, and (3) one of the two down gradient on-site observation wells.

Working in consultation with ODEQ staff, nitrate concentrations collected from this preconditions water quality test will be used along with other published information in order to determine a Warning Concentration Level (WCL). This warning concentration level will be used to screen water quality during and after operation of the recharge project. If concentrations exceed this level, operation of the recharge facility will be stopped and a Level II water quality sampling will be done on both surface and groundwater location to determine if chemicals are present. Working with ODEQ, results will be reviewed and any operation changes will be implemented to avoid chemical contamination of the groundwater.

Laboratory Resources

Nitrate Analysis: Walla Walla County-City Health Department
310 W. Popular, P. O. Box 1753
Walla Walla, WA 99362
Telephone (509) 527-3290

Chemical Analysis: KUO Testing Labs, INC.
337 south 1st Avenue
Othello, WA 99344
Telephone: (509)-488-0118

Edge Analytical
1151 Knudson
Burlington, WA 98233
(360) 757-1400
(800) 755-9295

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References and additional chemical resources used for the screening process:

Darnell, T., Topielec, R. 1996, October. *Nitrates and Bacteria in Groundwater: A Second Look, Milton-Freewater Area, Umatilla County, Oregon*. Oregon State University Extension Service Water Quality Program.

Darnell, T. Hart, J. Vomocil, Jim. 1989. *Nitrates and Bacteria in Groundwater: Milton-Freewater, Umatilla County Oregon*. Oregon State University Extension Service.

Darnell, T., Montgomery, M. L., Witt, J. M., 1989, July. *Pesticides in Groundwater: Milton-Freewater, Umatilla County, Oregon*. Oregon State University

U.S. Geological Survey 1996, July. *Fact Sheet 171-96: Article: The Nitrate Connection*. US Government Printing Office 774-398/20006 Region NO. 8

Kerle, E.A., Vogue, P. A., Jenkins, J. J., 1996, October. *Understanding pesticide persistence and mobility for groundwater and surface water protection*. Oregon State University Extension EM 86561

Jenkins, J. J., Thomson P. A., 1999, January. *OSU Extension Pesticide Properties Database*. Oregon State University Extension EM 8709

Cooperative Extension Washington State University. 2002. *2002 Crop Protection Guide for Tree Fruits in Washington*. Washington State University EB0419.

Richerson, P., Cole, D. 2000, June *April 1999 Milton-Freewater Groundwater Quality Study: As part of the Statewide Groundwater Monitoring Program*. State of Oregon Department of Environmental Quality

<http://www.cdpr.ca.gov/docs/publicreports/5698.pdf>

<http://www.fruit.wsu.edu/labels/insecticides.htm#S>

<http://ace.orst.edu/info/extoxnet/>

<http://www.pesticideinfo.org/Index.html>

Attachment B

ATTACHMENT B: RECORD OF USE (2004-2008)

Recharge Seasons	Period of Operation	Hours of Diversion (actual)	Total Water Use ON HBDIC Recharge Site (acre-feet)	Water Use: Little Walla Walla Diversion to HBDIC Recharge (Conveyance Loss) (acre-feet)
Spring 2004	4/8/4 to 5/14/4	888	409	714
2004-2005	12/1/4 to 2/3/5	672	388	540
2004-2005	3/27/5 to 4/30/5	720	650	579
2005-2006	11/1/5 to 5/15/6	2544	2,813	2,046
2006-2007	11/1/6 to 5/15/7	3072	3,278	2,470
2007-2008	11/14/7 to 3/25/7	2400	1,939	1,930
2007-2008	4/10/8 to 5/15/8	840	820	676
Total		11,136	10,297	8,955
			Sum of Recharge Project and Conveyance	19,252

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Attachment C

Attachment C: HBDIC Recharge On-Site Operations and Expansions (2004-2008)

Recharge Seasons	Period of Operation	Days of Operation (actual)	Peak Recharge Rate (cfs)	Site Expansion Phase	Infiltration Area		Total Recharge Volume (acre-feet)	Total Recharge Volume (Gallons x 1,000)	Total Recharge (acre-feet (season))
					(feet ²)	(acres)			
Spring 2004	4/8/4 to 5/14/4	37	8.0	I	15,000	0.3	409	133,273	409 (2004)
2004-2005	12/1/4 to 2/3/5	28	6.8	I	15,000	0.3	388	126,398	1038(2004-5)
2004-2005	3/27/5 to 4/30/5	30	12.1	II	47,420	1.1	650	211,803	
2005-2006	11/1/5 to 5/15/6	106	13.2	II	47,420	1.1	2,813	916,619	2813 (2005-6)
2006-2007	11/1/6 to 5/15/7	128	12.8	II	47,420	1.1	3,278	1,068,140	3278 (2006-7)
2007-2008	11/14/7 to 3/25/7	100	18.4	II	61,987	1.4	1,939	631,962	2759 (2007-8)
2007-2008	4/10/8 to 5/15/8	35	16.8	III	61,987	1.4	820	267,125	
Total		464					10,297	3,355,320	

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Attachment D

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**Final Order
Regarding Limited License Request 758**

Requested Water Use

On November 11, 2003 the Water Resources Department received completed LL request 758 from Hudson Bay District Irrigation Company for the use of 50.0 cfs from the Walla Walla River, located in the SW1/4, NE1/4, Section 12, Township 5 North, Range 35 East, W.M., for the purpose of artificial ground water recharge testing, for a period of five years, pursuant to ORS 537.143 and 537.144.

Department Review

The Department, in consultation with Oregon Department of Fish and Wildlife (ODFW), Oregon Department of Environmental Quality (ODEQ), and Confederated Tribes of the Umatilla Indian Reservation (CTUIR), has determined that the requested use may be approved as conditioned and limited below.

The use of water for artificial ground water recharge testing, as requested in limited license application 758, is a use allowed under ORS 537.143.

Sufficient water is available, as required under 690-340-0030(1)(b), for this short-term, fixed duration use. The Director may revoke the right to use water for any reason described in ORS 537.143(2).

The Department provided public notice of the application in the Department's weekly public notice as required by OAR 690-340-0030(2). The Department has received comments related to the issuance of the limited license. The authorization of limited license 758, as conditioned below, will satisfactorily address the issues raised in those comments.

Conditions and Limitations

The use of water from the Walla Walla River shall be limited to 50.0 cfs for the purpose of testing artificial ground water recharge during a testing season of November 1 through May 15. Water may only be diverted when there is adequate flow in the Walla Walla River to honor all existing water rights. When water is diverted under this limited license, the use is further limited to times when there is, at a minimum, the following streamflows in the Tum A Lum reach of the Walla Walla River, between the Little Walla Walla River diversion and Nursery Bridge Dam and flowing past

This is a final order in other than contested case. Pursuant to ORS 536.075 and OAR 137-004-080 and OAR 690-01-005 you may either petition the Director for reconsideration of this order or petition for judicial review of this order. As provided in ORS 536.075, this order is subject to judicial review under ORS 183.484. Any petition for judicial review of the order must be filed within the 60 day time period specified by ORS 183.484(2).

Nursery Bridge Dam: November - 64 cfs, December and January - 95 cfs, February to May 15 - 150 cfs. Nursery Bridge Dam is located just downstream of Nursery Bridge and is downstream of the Little Walla Walla diversion. The District 5 Watermaster, based on gage and/or streamflow measurements, shall make the determination that the above described streamflows are flowing past Nursery Bridge Dam. Diversion under this limited license shall cease when said streamflows are not being met.

Based on a review of water quality information generated during the term of this limited license or from other sources, ODEQ can require the licensee to terminate the diversion of water into the recharge area. If monitoring data or other information results in identification of potential water quality concerns ODEQ may require modifications to the existing limited license and/or require a permit to address the water quality concerns prior to reinitiating artificial ground water recharge.

The licensee shall install, maintain and operate fish screening and by-pass devices as required by the Oregon Department of Fish and Wildlife to prevent fish from entering the proposed diversion. See copy of enclosed fish screening criteria for information.

The use of water under a limited license shall not have priority over any water right exercised according to a permit or certificate, and shall be subordinate to all other authorized uses that rely upon the same source. The Director may be prompted by field regulatory activities or by any other reason to revoke the right to use water (ORS 537.143 (2) and OAR 690-340-0030 (6)).

The licensee shall give notice to the Watermaster at least 15 days, but no more than 60 days, in advance of using water. The notice shall include the location of the diversion, place of recharge, the quantity of water to be diverted and the intended use.

ORS 537.143(8) provides that a limited license cannot be issued for the same use for more than five consecutive years. This limited license provides for the maximum allowable time.

The licensee shall meter all water use and maintain a record of use, including the total number of hours of diversion and an estimate of the total quantity diverted. During the period of the limited license, the record of use shall be available for review by the Department upon request and shall be submitted to the Watermaster upon request.

Upon project completion, the licensee shall submit the record of use to the Water Resources Department.

The licensee shall conduct artificial ground water recharge testing in a manner consistent with the license application proposal. This includes monitoring the amount of water diverted from the Walla Walla River and the amount delivered to the recharge pits from the ditch.

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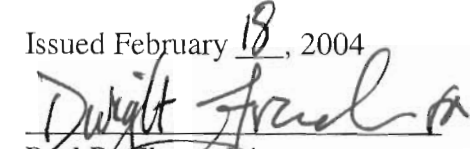
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This is a final order in other than contested case. Pursuant to ORS 536.075 and OAR 690-004-080 and OAR 690-01-005 you may either petition the Director for reconsideration of this order or petition for judicial review of this order. As provided in ORS 536.075, this order is subject to judicial review under ORS 183.484. Any petition for judicial review of the order must be filed within the 60 day time period specified by ORS 183.484(2).

Order

Therefore, pursuant to ORS 537.143 and ORS 537.144, limited license 758 is issued as conditioned and limited above.

Issued February 18, 2004


Paul R. Cleary, Director
Water Resources Department

Enclosures - limited license and fish screen criteria

cc: Tony Justus, Watermaster, District 5
Tim Bailey, ODFW
Phil Richerson, ODEQ
Rick George, CTUIR

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File

If you need further assistance, please contact the Water Rights Section at the address, phone number, or fax number below. When contacting the Department, be sure to reference your limited license number for better service.

Remember, the use of water under the terms of this limited license is not a secure source of water. Water use can be revoked at any time. Such revocation may be prompted by field regulatory activities or by any other reason.

Water Rights Section
Oregon Water Resources Department
158 12th ST NE
SALEM, OR 97310

Phone: (503)378-8455
Fax: (503)378-6203

FISH SCREENING CRITERIA FOR WATER DIVERSIONS

This summary describes ODFW fish screening criteria for all fish species.

Screen material openings for ditch (gravity) and pump screens must provide a minimum of 27% open area:

Perforated plate: Openings shall not exceed 3/32 or 0.0938 inches (2.38 mm).

Mesh/Woven wire screen: Square openings shall not exceed 3/32 or 0.0938 inches (2.38 mm) in the narrow direction, e.g., 3/32 inch x 3/32 inch open mesh.

Profile bar screen/Wedge wire: Openings shall not exceed 0.0689 inches (1.75 mm) in the narrow direction.

Screen area must be large enough not to cause fish impact. Wetted screen area depends on the water flow rate and the approach velocity.

Approach velocity: The water velocity perpendicular to and approximately three inches in front of the screen face.

Sweeping velocity: The water velocity parallel to the screen face.

Bypass system: Any pipe, flume, open channel or other means of conveyance that transports fish back to the body of water from which the fish were diverted.

Active pump screen: Self cleaning screen that has a proven cleaning system.

Passive pump screen: Screen that has no cleaning system other than periodic manual cleaning.

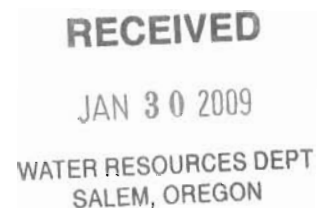
Screen approach velocity for ditch and active pump screens shall not exceed 0.4 fps (feet per second) or 0.12 mps (meters per second). The wetted screen area in square feet is calculated by dividing the maximum water flow rate in cubic feet per second (1 cfs = 449 gpm) by 0.4 fps.

Screen sweeping velocity for ditch screens shall exceed the approach velocity. Screens greater than 4 feet in length must be angled at 45 degrees or less relative to flow. An adequate bypass system must be provided for ditch screens to safely and rapidly collect and transport fish back to the stream.

Screen approach velocity for passive pump screens shall not exceed 0.2 fps or 0.06 mps. The wetted screen area in square feet is calculated by dividing the maximum water flow rate by 0.2 fps. Pump rate should be less than 1 cfs.

For further information please contact:

Bernie Kepshire
Oregon Department of Fish and Wildlife
7118 NE Vandenberg Avenue
Corvallis, OR 97330-9446
(541)757-4186 x255
bernard.m.kepshire@state.or.us



Attachment E

This page to be completed by the local Watermaster.

WATER AVAILABILITY STATEMENT

Name of Applicant: Hudson Bay District Irrigation Co. Application Number: _____

1. To your knowledge, has the stream or basin that is the source for this application ever been regulated for prior rights?

Yes No

If yes, please explain:

The Walla Walla River is typically short of water to serve all rights in July, August, September and October.

2. Has the stream or basin that is the source for this application ever been regulated for minimum stream flows?

Yes No

If yes, please explain:

3. Do you observe this stream system during regular fieldwork?

Yes No

If yes, what are your observations for the stream?

Typically there is extra water from November to June.

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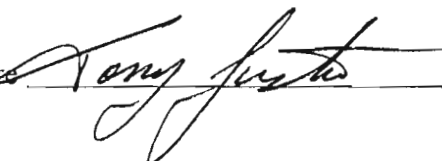
4. Based on your observations, would there be water available in the quantity and at the times needed to supply the development proposed by this application?

Yes No

What would you recommend for conditions on a permit that may be issued approving this application?

Limit diversion similarly to Hudson Bays permit #53662. Allow diversion when flows are in excess of 64cfs in November, 95cfs in December and January, and 132 cfs in February to May 15 each year.

5. Any other recommendations you would like to make?

Signature:  WM District #: 5 Date: 10/31/03