1200 King County Courthouse
516 Third Avenue
Seattle, WA 98104

KING COUNTY

Signature Report

November 22, 2004

Ordinance 15081

Proposed No. 2004-0498.1 **Sponsors** Edmonds, Gossett and Phillips

AN ORDINANCE authorizing interlocal agreements between King County and King County cities and utilities in three King County groundwater management areas for the purpose of cooperatively funding and implementing groundwater science, policy, plan implementation and outreach activities in the East King County, Issaquah Creek Valley and Redmond Bear Creek groundwater management areas.

BE IT ORDAINED BY THE COUNCIL OF KING COUNTY:

SECTION 1. **Findings:**

A. The state Department of Ecology has identified and designated five groundwater management areas ("management areas") within King County.

B. With King County acting as lead agency, groundwater management plans ("management plans") for four of the management areas were completed and were certified by the state Department of Ecology in 2000.

C. Under RCW 90.44.420, affected local governments are charged with adopting regulations, ordinances and/or programs for implementing those provisions of the management plan which are within their respective jurisdictional authorities.

D. The King County council, in Ordinance 14214, codified as K.C.C. chapter 9.14, formally authorized the county's groundwater protection program and provided for the creation of four groundwater protection committees ("the committees").

E. The committees have identified their top priorities for implementation of their respective management plans and for groundwater protection generally within the management areas.

F. King County and a number of cities and utilities within the management areas have recognized that they have roles and responsibilities in addressing ground water issues and concerns and wish to work together to address and implement the committee's priorities and to protect groundwater in general (collectively, "the parties"). The parties are in agreement that King County's services will be utilized to conduct specific groundwater protection activities, including increased monitoring, enhanced coordination among the parties and improved policies and regulations.

G. The parties intend that, by working cooperatively to conduct the activities provided for in this agreement, they will be taking important steps on behalf of the public to protect the quantity and quality of groundwater in their respective management areas, which may be threatened by contaminant sources and increasing water supply demand.

H. The county, cities and public utilities are authorized to enter into an interlocal agreement pursuant to chapter 39.34 RCW, the Interlocal Cooperation Act.

SECTION 2. The county executive is hereby authorized to negotiate final versions of and to enter into interlocal agreements with the participating cities and utilities in the East King County, Issaquah Creek Valley and Redmond Bear Creek groundwater management areas, in substantially the same form as attached to this ordinance, for the purposes of cooperatively implementing and funding groundwater management area-specific services including scientific research, monitoring and

mapping, groundwater protection policy development, continued operation of the groundwater protection committees and groundwater-related education and outreach.

Ordinance 15081 was introduced on 10/25/2004 and passed by the Metropolitan King County Council on 11/22/2004, by the following vote:

Yes: 13 - Mr. Phillips, Ms. Edmonds, Mr. von Reichbauer, Ms. Lambert, Mr. Pelz, Mr. McKenna, Mr. Ferguson, Mr. Hammond, Mr. Gossett, Ms. Hague, Mr. Irons, Ms. Patterson and Mr. Constantine
No: 0
Excused: 0

KING COUNTY COUNCIL
KING COUNTY, WASHINGTON

Larry Phillips, Chair

ATTEST:

Anne Noris, Clerk of the Council

APPROVED this 24 day of November, 2004.

Ron Sims, County Executive

RECEIVED
2004 DEC -2 AM 9:1
KING COUNTY COUNCIL
CLERK

Attachments A. Interlocal Agreement for Groundwater Protection and Management Activities (East King County), B. Interlocal Agreement for Groundwater Protection and Management Activities (Issaquah Creek Valley), C. Interlocal Agreement for Groundwater Protection and Management Activities-Redmond Bear Creek

2004-498 Attachment A

INTERLOCAL AGREEMENT FOR GROUNDWATER PROTECTION AND MANAGEMENT ACTIVITIES

15081

This Agreement is entered into by King County, Washington, hereinafter referred to as "King County" or the "County," the City of North Bend, hereinafter referred to as "North Bend," the City of Snoqualmie, hereinafter referred to as "Snoqualmie," the City of Carnation, hereinafter referred to as "Carnation," and the City of Duvall, hereinafter referred to as "Duvall," collectively referred to as the "Parties," for the purpose of cooperatively conducting activities related to groundwater protection and management in the East King County Groundwater Management area.

WHEREAS, the Washington State Department of Ecology (DOE) has been authorized by RCW 90.44.400 and its implementing regulations, WAC 173-100, to identify and designate groundwater management areas for the purposes of protection of water quality, assurance of quantity, and efficient management of water resources to meet future needs, and;

WHEREAS, in 1989 DOE designated the East King County Groundwater Management Area (hereinafter "Management Area"), which includes the aquifers in the East King County area, and established the East King County Groundwater Advisory Committee to oversee development of a groundwater management plan, and;

WHEREAS, DOE designated the Seattle/King County Department of Public Health as the lead agency to work with stakeholders and potential implementing agencies to develop the East King County Groundwater Management Plan (hereinafter "Management Plan"), which was submitted to DOE in 1998 after a review and concurrence process was completed, and;

WHEREAS, the Management Plan was certified by the DOE in 2001 as consistent with the intent of WAC 173-100, and;

WHEREAS, under the provisions of RCW 90.44.420, affected local governments are charged with adopting regulations, ordinances and/or programs for implementing those provisions of the Management Plan which are within their respective jurisdictional authorities, and;

WHEREAS, in 2001, the King County Council, in Ordinance 14214, codified as part of King County Code 9.14, formally authorized the County's Groundwater

Protection Program and provided for the creation of the East King County Groundwater Protection Committee (hereinafter "Committee"), and;

WHEREAS, the current members of the Committee were appointed by the King County executive and confirmed by the King County Council in 2002, and have been routinely meeting since late 2002 to participate in implementation of the Management Plan, and;

WHEREAS, the Management Area lies within all or portions of King County and the cities of North Bend, Snoqualmie, Carnation and Duvall, each of which is a Party to this Agreement, and;

WHEREAS, the Parties are each considered to be an implementing agency for the Management Plan and for the specific management strategies identified within the Plan, and;

WHEREAS, each of the Parties has a role and responsibility in addressing groundwater issues and concerns in the Management Area, and;

WHEREAS, the current Committee has identified its top priorities for implementation of the Management Plan and for groundwater protection generally within the Management Area; and

WHEREAS, the Parties wish to work together to address and implement the Committee's priorities and to protect groundwater in general, and wish to use King County's services to conduct specific groundwater protection activities, including increased monitoring, enhanced coordination among the Parties, and improved policies and regulations, and;

WHEREAS, the Parties intend that by working cooperatively to conduct the activities provided for in this Agreement they will be taking important steps on behalf of the public to protect the quantity and quality of groundwater in the Management Area , which is threatened by contaminant sources and increasing water supply demand, and;

WHEREAS, pursuant to RCW 39.34, the Interlocal Cooperation Act, each of the Parties is authorized to enter into an agreement for cooperative action;

NOW THEREFORE, the Parties hereto agree as follows:

I. Purpose of the Agreement

The purpose of this Agreement is to provide the means by which the Parties will

cooperatively conduct and fund groundwater protection activities. These activities are listed below in four general subject matter areas and will be conducted in the years 2005 through 2007. They are more specifically described in the Scope of Work attached to this Agreement as Exhibit One and incorporated herein and are collectively referred to herein as the "Project." The four activities include:

1. providing staff support to the Committee;
2. evaluating land use and other policies affecting groundwater quality and quantity and recommending appropriate policy changes or additions for consideration by implementing agencies;
3. developing a steady-state groundwater model of the Management Area; and
4. conducting community education and outreach activities aimed at promoting groundwater awareness and protection.

II. Project Management

A. Project oversight will be conducted by a Project Management Team (hereinafter "PMT") consisting of one representative each from King County, North Bend, Snoqualmie, Carnation, and Duvall. Each Party will designate its respective PMT representative.

B. The PMT will meet at least three times per year as part of meetings of the Committee and will conduct additional meetings as needed to review Project progress, solicit and consider input on the Project from the Committee, and review Project expenditures per the Project budget, and consider possible changes to the Project Scope of Work.

C. The PMT may make needed changes to the Scope of Work to reflect emerging Project results and findings and to better meet Project objectives. Such changes shall not cause total annual Project costs as provided for in Exhibit One to be exceeded.

D. King County will perform day-to-day project management and direction and communicate with other PMT members as needed to conduct Project activities.

E. King County will schedule, facilitate, and provide summaries of all PMT meetings during implementation of the Project.

F. The PMT will reach its decisions by consensus, considering input from the Committee where appropriate. Issues that cannot be resolved by the PMT will be referred to the Division Director of the King County Water and Land Resources Division and the appropriate City Managers.

III. Responsibilities

Each of the Parties shall:

A. Designate one representative to serve on the PMT and participate in PMT meetings.

B. Maintain its appointed representation on the Committee.

C. Provide for use in the Project any groundwater-related data it has that would be appropriate to share and would facilitate accomplishment of the Project goals.

D. Participate in the Groundwater Policy Working Group as outlined in the Scope of Work.

E. Consider revising its groundwater protection policies and regulations to increase groundwater protection when and where it deems appropriate as recommended by the Committee.

F. Where appropriate, utilize public outreach tools developed as part of the Project to increase public awareness of groundwater issues.

G. Pay for its share of Project costs as provided for below and in Exhibit One.

King County shall have the following additional responsibilities:

A. Provide day-to-day Project management.

B. Perform Project tasks as provided for in Exhibit One, including providing for subcontracted services where needed.

IV. Costs

A. The Parties agree to share costs incurred by King County to conduct Project activities as described in Exhibit One. Total estimated Project costs are $564,944 for the years 2005-2007.

B. Estimated Project costs for each year, by activity, are described in Exhibit One.

C. The Parties agree to pay for Project costs according to the percentages specified in Exhibit One on page ten. Project cost shares will not exceed amounts indicated without written agreement of the Parties.

D. Total Project costs shall include all those costs incurred by King County in completing the Project, including costs for staff persons, overhead, supplies, contractors, and equipment.

V. Billing and Payment

A. King County shall bill each of the other Parties quarterly on itemized invoices for that Party's share of Project costs.

B. The Parties shall review and approve of the invoices and forward payment to King County within 60 days of receipt of invoice.

C. The Parties represent that funds for service provision under this Agreement have been appropriated and made available. To the extent that such service provision requires future appropriations beyond current appropriation authority, the Parties' obligations are contingent upon the appropriation of sufficient funds to complete the activities described herein. If no such appropriation is made, this Agreement will terminate.

VI. Duration, Termination, and Amendment

A. This Agreement is effective upon signature by the Parties and remains in effect until June 30, 2008.

B. A Party may end its participation in the Project and withdraw from this Agreement upon 90 days' written notice to the other Parties, and paying its share of costs for the Project to the end of the quarter in which termination occurs.

C. This Agreement may be amended, altered, clarified, or extended only by the written agreement of the Parties hereto.

D. This Agreement is not assignable by any Party, either in whole or in part.

E. This Agreement is a complete expression of the terms hereto and any oral or written representations or understandings not incorporated herein are excluded. The Parties recognize that time is of the essence in the performance of the provisions of this Agreement. Waiver of any default shall not be

deemed to be a waiver of any subsequent default. Waiver of breach of any provision of this Agreement shall not be deemed to be a waiver of any other or subsequent breach and shall not be construed to be a modification of the terms of the Agreement unless stated to be such through written approval by the Parties which shall be attached to the original Agreement.

VII. Counterparts

This Agreement may be executed in counterparts.

VIII. Indemnification and Hold Harmless

The Parties agree to the following:

Each Party shall protect, defend, indemnify, and save harmless the other Parties, their officers, officials, employees, and agents, while acting within the scope of their employment as such, from any and all costs, claims, judgments, and/or awards of damages, arising out of, or in any way resulting from, that Party's own negligent acts or omissions. Each Party agrees that its obligations under this subparagraph extend to any claim, demand, and/or cause of action brought by, or on behalf of, any of its employees or agents. For this purpose, each Party, by mutual negotiation, hereby waives, with respect to the other Parties only, any immunity that would otherwise be available against such claims under the Industrial Insurance provisions of Title 51 RCW. In the event that any Party incurs any judgment, award, and/or cost arising therefrom, including attorneys' fees, to enforce the provisions of this Article, all such fees, expenses, and costs shall be recoverable from the responsible Party to the extent of that Party's culpability.

IN WITNESS WHEREOF, the Parties hereto have executed this amendment on the _____ day of _____, 2004____.

Approved as to Form

King County:

By: _____
Title: Deputy Prosecuting Attorney

By: _____
Title: King County Executive

Approved as to Form

City of North Bend:

By: _____

By: _____

Title: _____

Title: _____

Approved as to Form

City of Snoqualmie:

By: _____

By:

Title: _____

Title: _____

Approved as to Form

City of Carnation:

By: _____

By: _____

Title: _____

Title: _____

Approved as to Form

City of Duvall:

By: _____

By: _____

Title: _____

Title: _____

Exhibit A

15081

EAST KING COUNTY GROUNDWATER MANAGEMENT AREA

PROPOSED SCOPE OF WORK FOR GROUNDWATER PROTECTION SERVICES, 2005-2007

SUMMARY OF SERVICES AND ESTIMATED COSTS

I. WATER RESOURCES EVALUATION

GROUNDWATER MONITORING (2005)

Geographic scope is entire GWMA

- Maintain the current King County ambient monitoring program to collect groundwater quality samples.
- Conduct two "snapshot" water-level surveys, each over a one-week period.
- Align the two water levels with the seasonal fluctuations.
- Compile groundwater data from previous studies.
- Estimate the total number of, spatial distribution of, and likely consumption rates for exempt wells.

Estimated Monitoring Cost, 2005.....$89,000

EAST KING COUNTY GROUNDWATER DATA WEB PAGES (2005)

Geographic scope is entire GWMA

- Compile available groundwater data for the East King County Groundwater Management Area (GWMA).
- Develop GWMA groundwater data Web pages on the King County Web site.

Estimated Web Site Cost, 2005.....$21,000

2005 Estimated Cost – Groundwater Monitoring and Web Pages: $110,000

THREE-DIMENSIONAL GEOLOGIC DATABASE AND MAPPING (2006)

Geographic scope will be a subarea within the GWMA

- Select the study area, which will be a portion of the GWMA.
- Collect subsurface geologic data (such as borehole or well logs) for the study area from current sources.
- Provide a database that includes both groundwater data and a list of boring logs in the study area.
- Perform geologic field mapping in the study area.
- Develop and verify geologic units for interpretation of maps and cross-sections in the study area.
- Update previous geologic mapping (to a 1:24,000 scale) and create geologic cross-sections in the study area.
- Provide a table that indicates a high, medium or low susceptibility to groundwater contamination for each reinterpreted geologic unit in the study area.

2006 Estimated Cost – Geologic Database and Mapping: $89,000

DEVELOPMENT OF A GROUNDWATER MODEL TO ASSESS WATER BALANCE (2007)

Geographic scope will be a subarea (same as mapping subarea) within the GWMA

- Quantify recharge and discharge rates.
- Map aquifer parameters.
- Prepare data for model input.
- Design the model grid; assign aquifer properties and boundary conditions.
- Run model simulations.
- Calibrate the model and submit a report.

2007 Estimated Cost – Groundwater Model: $106,000

Water Resources Evaluation Total Estimated Cost, 2005-2007:	$305,000

II. POLICY AND PLAN IMPLEMENTATION

GROUNDWATER PROTECTION COMMITTEE AND ILA MANGEMENT (2005-2007)

- Maintain an East King County Groundwater Protection Committee membership roster.
- Facilitate appointments for vacant committee seats.
- Handle committee logistics such as scheduling meetings and guest speakers, securing facilities, and posting public notices.
- Staff and support regular meetings of the committee.
- Develop meeting agendas in partnership with committee chairs.
- Produce meeting notes.
- Distribute notes, agendas, and other communications to committee members and interested parties.
- Serve as the liaison between the committee and the groundwater protection service providers.
- Manage and oversee completion of ILA services.
- Convene an ILA management group as needed.
- Coordinate routine status reports of progress on the ILA scope of work.
- Facilitate committee review of work performed under the ILA.

Estimated Annual Cost – Committee and ILA Management:	$38,935

POLICY ANALYSIS (2005-2007)

- Research and analyze groundwater policy issues identified by the East King County Groundwater Protection Committee, such as golf course standards, mining best management practices (BMPs), stormwater management, wastewater and on-site sewage system maintenance and design issues, exempt well protections, subdivision standards, and water conservation BMPs.
- Develop policy guidance for implementing agencies in topical areas of interest to the committee.
- Draft model ordinance and/or BMPs for specific areas of interest to the committee.
- Provide administrative support to the policy subcommittee of the groundwater protection committee or to the interagency policy work group.

Estimated Annual Cost – Policy Analysis:	$31,148

Total Estimated Annual Cost – Management and Policy Analysis:	$70,083

Policy and Plan Implementation Total Estimated Cost, 2005-2007:	$210,249

III. EDUCATION AND OUTREACH

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EDUCATIONAL AND COMMUNICATIONS SERVICES (2005-2007)

- Maintain a comprehensive list of relevant educational materials.
- Maintain groundwater education Web pages on the King County Web site.
- Work with the East King County Groundwater Protection Committee to identify key education and outreach messages, and design public workshops if appropriate.
- Work with education and outreach staff from the Groundwater Management Area to coordinate development and distribution of materials.
- Work with water utilities to share best educational materials.
- Represent groundwater issues at local events, fairs and festivals.

Estimated Annual Cost – Educational and Communication Services:	$16,565

Education and Outreach Total Estimated Cost, 2005-2007:	$49,695

EAST KING COUNTY GROUNDWATER MANAGEMENT AREA

PROPOSED SCOPE OF WORK FOR GROUNDWATER PROTECTION SERVICES, 2005-2007

DETAIL OF SERVICES AND ESTIMATED COSTS

Groundwater is important to the East King County Groundwater Management Area (GWMA) for the following two key reasons:

- Nearly the entire population of the GWMA relies on groundwater as its source of drinking water supply – 13 of the 15 large water purveyors in the area rely on groundwater.
- Groundwater is essential for sustaining habitat in the area's rivers and wetlands.

These crucial groundwater supplies can be precarious. In 2001, the Lake Alice West system had to replace its only well, apparently due to effects of the Nisqually Earthquake earlier that year. In addition, much of the area uses on-site sewage treatment (septic) systems, which discharge directly to groundwater. In densely populated areas such as Carnation, there has been concern about possible impacts to groundwater quality.

And while some of the large rivers are sustained to some extent by snowmelt, most of their tributaries completely depend on groundwater storage to continue their flows through the dry summer months. Fish need the cold water from groundwater to migrate and spawn.

The East King County Groundwater Protection Committee has been discussing priorities for the King County Groundwater Protection Program in its GWMA. The committee has worked to identify top priorities with the expectation that implementing agencies will use these priority statements to guide their provision of groundwater protection services.

Key implementing agencies are the four valley cities (Carnation, Duvall, North Bend, and Snoqualmie), the King County Department of Natural Resources and Parks (DNRP), the King County Department of Development and Environmental Services, Public Health - Seattle & King County, water purveyors, and the Washington State Department of Ecology.

Based on direction from the groundwater protection committee, King County proposes a water resources evaluation, policy and plan implementation services, and education and outreach in the East King County Groundwater Management Area.

I. WATER RESOURCES EVALUATION

PRIORITIES AND OBJECTIVES

The East King County Groundwater Protection Committee identified the following as the most important groundwater data issues:

- Maintain the current ambient monitoring program.
- Identify trends in water quality and quantity.
- Analyze the impacts of land-use changes.

To address these priorities, King County proposes that the committee invest in a three-year water resources evaluation for the Groundwater Management Area ("Study Area"). This evaluation would consist of the following work items, broken out by year:

- 2005 – groundwater monitoring; development of GWMA groundwater data Web pages

- 2006 – development of a three-dimensional database and cross-sections of the mapping study area's (a subarea within the Study Area) geology
- 2007 – development of a regional-scale steady-state groundwater flow model to assess water balance.

This water resources evaluation would provide data to inform decision-makers about the impact of land-use changes, water withdrawals, and climate change on groundwater supplies within the Study Area. This data set could be used to help develop a long-term monitoring strategy for groundwater in the Study Area and identify future needs, if any, for more detailed modeling.

EXISTING SOURCES OF GROUNDWATER DATA

There are a number of existing sources of groundwater data for the GWMA:

- A 1995 study of the GWMA by the U.S. Geological Survey, along with the Area Characterization work for the East King County Groundwater Management Plan, provide the overall basis of the hydrogeology of the GWMA, although the data for variable conditions (water levels and water quality) are not current.
- Ambient groundwater monitoring by DNRP has updated the water quality and water level data for many of the wells covered by the management plan, but there are many other wells that could not be included in this update.
- A limited number of hydrogeologic studies have been conducted in the GWMA, mainly for purveyors such as the Ames Lake Water Association and the City of Snoqualmie. Hydrogeologic wellhead protection plans have been developed for purveyors such as Ames Lake, the Fall City systems (WD 127, Ruth, and Plum Creek), River Bend, and Sallal, although it is uncertain how many of these plans were based on new information. A solicitation to the purveyors may provide new reports on the hydrogeology of the GWMA.
- The Snoqualmie Ridge development has had a number of monitoring wells installed to assure that groundwater impacts are minimized.
- The Washington State Department of Ecology has made its well log data available via the Internet, a capability that was not possible at the time of the previous studies.

These data are not comprehensive or completely up to date. In order to address the priorities listed above and meet the stated objectives, it will be necessary to collect new data as well as to compile the existing data sets.

PROPOSED SERVICES

DNRP should maintain and expand its collection of groundwater data in conjunction with purveyors, both through the East King County Regional Water Association as well as individually. Next, DNRP should analyze this data further to define variations in terms of location, aquifer properties (depth), time, and adjacent (upgradient) land uses.

GROUNDWATER MONITORING (2005)

The four main tasks required to complete the groundwater monitoring are described below.

Task 1: Maintain Ambient Monitoring Program

Groundwater quality samples and water levels would be collected from a large number of wells within the Study Area in 2005. Some of the well locations to be sampled were previously included in King County's ambient monitoring; others will be added to supplement the data set or to focus on specific issues. Water quality data from the ambient wells would be supplemented with data submitted by water purveyors to the Washington State Department of Health.

Task 2: Conduct Water Level Surveys

Two "snapshot" water level surveys will be conducted, each over a one-week period. For this survey, water levels will be taken in as many of the wells previously used in the USGS study of the region as possible. King County will identify and select these wells (based on historic location data), obtain access to the wells from the well owners, and have the wellhead surveyed to allow calculation of water level elevations.

Task 3: Align Water Levels

The two water levels will be aligned with the seasonal fluctuations to obtain both a representative (annual average) level as well as an estimate of the seasonal fluctuation.

Data on water levels derived from the monitoring would later be used to calibrate the steady-state model. Groundwater quality data would be used to assess potential changes over time, assess possible sources for the constituents/contaminants, and inform the development of a long-term monitoring strategy. Again, data from purveyors would be used to supplement the data from the ambient wells.

Task 4: Exempt Well Estimations

To the extent possible, the new and existing data and the field surveys will be used to estimate the total numbers of, spatial distribution of, and likely consumption rates for exempt wells in the GWMA.

EAST KING COUNTY GROUNDWATER DATA WEB PAGES (2005)

The two main tasks that are required to complete the Web pages are described below.

Task 1: Compile Data

Compile available groundwater data for the GWMA.

Task 2: Web Site Development

Develop GWMA groundwater data Web pages on the King County Web site.

THREE-DIMENSIONAL GEOLOGIC DATABASE AND MAPPING (2006)

In 2006, DNRP will contract with GeoMapNW at the University of Washington (formerly the Seattle-Area Geologic Mapping Project) to perform geologic mapping of a portion of the East King County Groundwater Management Area. The five main tasks required to complete the mapping are described below.

Task 1: Define Study Area

Because of the cost of this activity, only a portion of the management area will be mapped during the 2006 timeframe. The exact extent and location of this mapping will be developed in conjunction with GeoMapNW, but it is anticipated that the mapping study area will be in the upper Snoqualmie River basin (above Snoqualmie Falls) because of the following:

- There are issues in the upper Snoqualmie River basin, such as the possible development of the North Bend aquifer for water supply and the possible impacts to groundwater from mining activities.
- The upper basin is relatively isolated from the lower basin systems, and there are possible cross-basin interactions such as with Rattlesnake Lake and the Cedar River Municipal Watershed.
- Modeling (see the following work item – Groundwater Model) can proceed upstream to downstream in conjunction with surface water hydrologic modeling.

Before its initiation in 2006, the scope and benefits of this mapping study will be presented to other potential partners who may be willing to extend it further, such as into the middle basin (to Carnation).

Task 2: Collect Subsurface Geologic Data

Collect subsurface geologic data (such as borehole or well logs) for the study area from sources at King County, with cities and purveyors, in state agency offices in Olympia, and elsewhere.

Task 3: Provide Database

Provide a database that includes both groundwater information and a list of boring logs in the mapping study area.

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Task 4: Perform Geologic Field Mapping and Updates

Perform geologic field mapping in the mapping study area to aid in the development and verification of geologic units for interpretation of maps and cross-sections, using these data to update previous geologic mapping (to a 1:24,000 scale) and create geologic cross-sections. Produce new map with this new information.

Task 5: Create Susceptibility Table

Provide a table that indicates a high, medium or low susceptibility to groundwater contamination for each reinterpreted geologic unit in the mapping study area. This would allow for future revision to King County's existing mapping of "areas of susceptibility to groundwater contamination." This revision would include unincorporated and incorporated areas. Data can be furnished to cities for their use as they wish (for example: updating their Critical Aquifer Recharge Area mapping).

DEVELOPMENT OF A GROUNDWATER MODEL TO ASSESS WATER BALANCE (2007)

A regional-scale steady-state groundwater flow model will be developed to give a groundwater budget for the mapping study area completed in 2006 (see the previous work item). It is anticipated that this model (termed a "Phase 1 Model") will be developed in the MODFLOW format developed by the U.S. Geological Survey. MODFLOW is a finite-difference groundwater flow model capable of modeling in one, two or three dimensions. In this case, the Phase 1 Model will be a three-dimensional model that describes the basic flow patterns of groundwater and provides annual average estimates of water supply for the mapping study area.

There are three main reasons to develop a Phase 1 Model:

- to give initial water budget estimates and groundwater flow patterns of the mapping study area
- to guide future data collection and management efforts in the mapping study area
- to assist in the design and development of a Phase 2 Model of the mapping study area (if warranted).

The six main tasks required to complete the steady-state model are described below.

Task 1: Quantify Recharge and Discharge Rates

This task will quantify the geographic distribution of recharge/discharge rates over the model area (same area as the mapping study area). Recharge quantities would be estimated using the method applied by Bidlake (2001) in Kitsap County, Washington. An inventory of the pumping rates on a monthly basis at all Group A wells and other non-exempt (significant) wells would provide the primary estimates of discharge, plus a preliminary estimate of discharges and recharges for exempt wells and on-site sewage treatment systems. Discharge/recharge quantities from streams and springs would be estimated using previously published results and stream gauge data. Stream flows, water surface elevations, and possible gaining or losing reaches of the Snoqualmie River and other rivers will be derived from surface water data and modeling. Inflows from bedrock surfaces along the valley edges will be estimated from simple runoff models, localized estimates of the nature of the colluvial materials along the valley wall, and meteorological data.

The following data sources would be compiled to complete this task:

- land-use map
- vegetation cover
- precipitation distribution (time and space)
- surface geology and soils
- stream flow data and possible surface water models
- pumping rates at Group A wells
- pumping rates on a monthly basis at other non-exempt wells
- estimates for withdrawal at private, exempt wells and for recharge via septic systems.

Task 2: Map Aquifer Parameters

Maps showing the distribution of transmissivity and storativity for each aquifer within the model area would be developed. These values would mostly come from available aquifer pump tests, published reports, stratigraphic data from the three-dimensional geologic database, and specific capacity (bailer or pump test) data from Washington State Department of Ecology well logs.

Task 3: Prepare Data for Model Input

Data requirements for the Phase 1 Model will include hydrogeologic information such as aquifer thickness and distribution, groundwater and stream levels, recharge and discharge quantities, and aquifer properties. The Phase 1 Model will primarily use data from the three-dimensional geologic database, combined with other data from published reports and available well logs (updated for any necessary stratigraphic reinterpretations).

Task 4: Design Model Grid and Assign Aquifer Properties and Boundary Conditions

The modeling grid will be designed based on the hydrogeologic features of the subsurface. Physiographic features include the uplands, valleys and streams, and interpretations of bedrock structures. The numbers of layers and the grid spacing would be defined following the completion of the three-dimensional geologic mapping in 2006. Each grid cell within the model would need to be assigned appropriate hydraulic aquifer parameters. These include hydraulic conductivity and storativity for each aquifer found within the individual grid cells.

Task 5: Run Model Simulations

Steady-state model simulations would be performed once input was completed.

Task 6: Calibrate Model and Submit Report

Model calibration would involve changing input parameters until the model results matched field observations. Comparisons would be made between model-simulated conditions and field conditions for selected data. A Phase 1 Model development and calibration report will be prepared. King County Groundwater Protection Program staff would develop the Phase 1 Model.

WATER RESOURCES EVALUATION DELIVERABLES

Table 1. Proposed Water Resources Evaluation Deliverables by Year

Year	Deliverables
2005	• Update to the groundwater monitoring sample and analysis plan • GWMA groundwater data Web pages • Snapshot surveys of water levels • Compilation of groundwater data from various previous studies
2006	• Groundwater monitoring report • 3-D database of geologic information • Updated geology and susceptibility maps • Geologic cross-sections
2007	• Water level contour maps • Steady-state groundwater flow model • Final groundwater modeling report

WATER RESOURCES EVALUATION ESTIMATED COSTS

The total estimated cost for the Water Resources Evaluation is $305,000 over three years.

Table 2. Estimated Water Resources Evaluation Costs by Year

Year	Work Item	Labor (FTE)*	Material, Lab, or Consultant Costs	Total Cost
2005	Groundwater Monitoring	0.35	$40,000	**$89,000**

2005	Development of Web Pages	0.15	----------	**$21,000**
2006	3-D Geologic Mapping	0.10	$75,000	**$89,000**
2007	Groundwater Model	0.75	$1,000	**$106,000**
	TOTAL	**1.35**	**$106,000**	**$305,000**

*Labor costs are based on $140,000 per FTE per year; labor costs may vary.

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Exhibit A

Total EKC Groundwater Program three-year financial overview

EKC Groundwater ILA Services
Budget

Year:		2005	2006	2007	annual FTE	
Water Resources Evaluation						
	Groundwater Monitoring	$89,000	$0	$0	0.35	(.0 in '06 & '07)
	Web Pages	$21,000	$0	$0	.15	(.0 in '06 & '07)
	Geologic Mapping	$0	$89,000	$0	0.10	(.0 in '05 & '07)
	Groundwater Model	$0	$0	$106,000	0.75	(.0 in '05 & '06)
	Water Resources Evaluation subtotal	**$110,000**	**$89,000**	**$106,000**	*Variable* **.10 to .75**	
Policy and Plan Implementation						
	GWPC & ILA Management	$38,935	$38,935	$38,935	0.20	
	Policy Analysis /workgroup	$31,148	$31,148	$31,148	0.20	
	Policy/Plan subtotal	**$70,083**	**$70,083**	**$70,083**	**0.40**	
Education and Outreach						
	Public Awareness & communication	$16,565	$16,565	$16,565	0.10	
	Education subtotal	**$16,565**	**$16,565**	**$16,565**	**0.10**	
Total EKC Program Budget		**$196,648**	**$175,648**	**$192,648**	**$564,944**	

Project Cost Shares

Partner	2005 Cost Share Percentage	2005 Estimated Cost ($)	2006 Cost Share Percentage	2006 Estimated Cost ($)	2007 Cost Share Percentage	2007 Estimated Cost ($)	TOTAL ESTIMATED COST ($)
King County	68%	130,000	74%	130,000	68%	130,000	$390,000
City of North Bend	8%	15,000	6.5%	11,500	8%	15,000	$41,500
City of Snoqualmie	8%	15,000	6.5%	11,500	8%	15,000	$41,500
City of Carnation	8%	15,000	6.5%	11,500	8%	15,000	$41,500
City of Duvall	8%	15,000	6.5%	11,500	8%	15,000	$41,500
Totals	100%	$190,000	100%	$176,000	100%	$190,000	$556,000
Addl $ to be allocated		*$6,648*	-	*($352)*	-	*$2,648*	*$8,944*
Grand Total		***$196,648***		***$175,648***		***$192,648***	***$564,944***

2004-198 Attachment B

INTERLOCAL AGREEMENT
FOR GROUNDWATER PROTECTION AND MANAGEMENT ACTIVITIES

15081

This Agreement is entered into by King County, Washington, hereinafter referred to as "King County" or the "County," the City of Issaquah, hereinafter referred to as "Issaquah," the City of Sammamish, hereinafter referred to as "Sammamish," and the Sammamish Plateau Water and Sewer District, hereinafter referred to as the "District," collectively referred to as the "Parties," for the purpose of cooperatively conducting activities related to groundwater protection and management in the Issaquah Creek Valley Groundwater Management area.

WHEREAS, the Washington State Department of Ecology (DOE) has been authorized by RCW 90.44.400 and its implementing regulations, WAC 173-100, to identify and designate groundwater management areas for the purposes of protection of water quality, assurance of quantity, and efficient management of water resources to meet future needs, and;

WHEREAS, in 1986 DOE designated the Issaquah Creek Valley Groundwater Management Area (hereinafter "Management Area"), which includes the Issaquah Valley Aquifer, and established the Issaquah Creek Groundwater Advisory Committee to oversee development of a groundwater management plan, and;

WHEREAS, DOE designated the Seattle/King County Department of Public Health as the lead agency to work with stakeholders and potential implementing agencies to develop the Issaquah Creek Valley Groundwater Management Plan (hereinafter "Management Plan"), and;

WHEREAS, in 1996 the King County Department of Natural Resources replaced the Seattle/King County Department of Public Health as the lead agency in connection with the development of the Management Plan;

WHEREAS, the Management Plan , after completion of a review and concurrence process by local stakeholders, governments and service providers, was submitted to DOE in March 1999 for review and certification, and;

WHEREAS, the Management Plan was certified by the DOE in 2000 as consistent with the intent of WAC 173-100, and;

WHEREAS, under the provisions of RCW 90.44.420, affected local governments are charged with adopting regulations, ordinances and/or programs for implementing those provisions of the Management Plan which are within their respective jurisdictional authorities, and;

WHEREAS, in 2001, the King County Council in Ordinance 14214, codified as King County Code 9.14, formally authorized the County's Groundwater Protection Program and provided for the creation of the Issaquah Creek Valley Groundwater Protection Committee (hereinafter "Committee"), and;

WHEREAS, the current members of the Committee were appointed by the King County executive and confirmed by the King County Council in 2002, and have been routinely meeting since January 2003 to participate in implementation of the Management Plan, and;

WHEREAS, the Management Area lies within all or portions of the City of Sammamish, the City of Issaquah, unincorporated King County, and the Sammamish Plateau Water and Sewer District, each of which is a Party to this Agreement, and;

WHEREAS, the Parties are each considered to be an implementing agency for the Management Plan and for the specific management strategies identified within the Plan, and;

WHEREAS, each of the Parties has a role and responsibility in addressing groundwater issues and concerns in the Management Area, and;

WHEREAS, the current Committee has identified its top priorities for implementation of the Management Plan and for groundwater protection generally within the Management Area; and

WHEREAS, the Parties wish to work together to address and implement the Committee's priorities and to protect groundwater in general, and wish to use King County's services to conduct specific groundwater protection activities, including increased monitoring, enhanced coordination among the Parties, and improved policies and regulations, and;

WHEREAS, the Parties intend that by working cooperatively to conduct the activities provided for in this Agreement they will be taking important steps on behalf of the public to protect the quantity and quality of groundwater in the Management Area, which is threatened by contaminant sources and increasing water supply demand, and;

WHEREAS, pursuant to RCW 39.34, the Interlocal Cooperation Act, each of the Parties is authorized to enter into an agreement for cooperative action;

NOW THEREFORE, the Parties hereto agree as follows:

I. Purpose of the Agreement

The purpose of this Agreement is to provide the means by which the Parties will cooperatively conduct and fund groundwater protection activities. These activities are listed below in four general subject matter areas and will be conducted in the years 2005 through 2007. They are more specifically described in the Scope of Work attached to this Agreement as Exhibit One and incorporated herein and are collectively referred to herein as the "Project." The four activities include:

1. providing staff support to the Committee;
2. evaluating land use and other policies affecting groundwater quality and quantity, and recommending appropriate policy changes or additions to implementing agencies for adoption;
3. developing a steady-state groundwater model of the Management Area; and
4. conducting community education and outreach activities aimed at promoting groundwater awareness and protection.

II. Project Management

A. Project oversight will be conducted by a Project Management Team (hereinafter "PMT") consisting of one representative each from King County, Issaquah, Sammamish and the District. Each Party will designate its respective PMT representative.

B. The PMT will meet at least three times per year as part of meetings of the Committee and will conduct additional meetings as needed to review Project progress, solicit and consider input on the Project from the Committee, and review Project expenditures per the Project budget, and consider possible changes to the Project Scope of Work.

C. The PMT may make needed changes to the Scope of Work to reflect emerging Project results and findings and to better meet Project objectives. Such changes

shall not cause total annual Project costs as provided for in Exhibit One to be exceeded.

D. King County will perform day-to-day project management and direction and communicate with other PMT members as needed to conduct Project activities.

E. King County will schedule, facilitate, and provide summaries of all PMT meetings during implementation of the Project.

F. The PMT will reach its decisions by consensus, considering input from the Committee where appropriate. Issues that cannot be resolved by the PMT will be referred to the Division Director of the King County Water and Land Resources Division, the appropriate City Managers, and the District Manager for final resolution.

III. Responsibilities

Each of the Parties shall:

A. Designate one representative to serve on the PMT and participate in PMT meetings.

B. Maintain its appointed representation on the Committee.

C. Provide for use in the Project any groundwater-related data it has that would be appropriate to share and would facilitate accomplishment of the Project goals.

D. Participate in Groundwater Policy Working Group activities as outlined in the Scope of Work.

E. Consider revising its groundwater protection policies and regulations to increase groundwater protection when and where it deems appropriate as recommended by the Committee.

F. Where appropriate, utilize public outreach tools developed as part of the Project to increase public awareness of groundwater issues.

G. Pay for its share of Project costs as provided for below and in Exhibit One.

King County shall have the following additional responsibilities:

A. Provide day-to-day Project management.

B. Perform Project tasks as provided for in Exhibit One, including providing for subcontracted services where needed.

IV. Costs

A. The Parties agree to share costs incurred by King County to conduct Project activities as described in Exhibit One. Total estimated Project costs are $360,000 for the years 2005-2007.

B. Estimated Project costs for each year, by activity, are described in Exhibit One.

C. The Parties agree to pay for Project costs according to the percentages specified in Exhibit One on page ten. Project cost shares will not exceed amounts indicated without written agreement of the Parties

D. Total Project costs shall include all those costs incurred by King County in completing the Project, including costs for staff persons, overhead, supplies, contractors, and equipment.

V. Billing and Payment

A. King County shall bill each of the other Parties quarterly on itemized invoices for that Party's share of Project costs.

B. The Parties shall review and approve of the invoices and forward payment to King County within 60 days of receipt of invoice.

C. The Parties represent that funds for service provision under this Agreement have been appropriated and made available. To the extent that such service provision requires future appropriations beyond current appropriation authority, the Parties' obligations are contingent upon the appropriation of sufficient funds to complete the activities described herein. If no such appropriation is made, this Agreement will terminate.

VI. Duration, Termination, and Amendment

A. This Agreement is effective upon signature by the Parties and remains in effect until June 30, 2008.

B. A Party may end its participation in the Project and withdraw from this Agreement upon 90 days' written notice to the other Parties, and paying its share of costs for the Project to the end of the quarter in which termination occurs.

C. This Agreement may be amended, altered, clarified, or extended only by the written agreement of the Parties hereto.

D. This Agreement is not assignable by any Party, either in whole or in part.

E. This Agreement is a complete expression of the terms hereto and any oral or written representations or understandings not incorporated herein are excluded. The Parties recognize that time is of the essence in the performance of the provisions of this Agreement. Waiver of any default shall not be deemed to be a waiver of any subsequent default. Waiver of breach of any provision of this Agreement shall not be deemed to be a waiver of any other or subsequent breach and shall not be construed to be a modification of the terms of the Agreement unless stated to be such through written approval by the Parties which shall be attached to the original Agreement.

VII. Counterparts

This Agreement may be executed in counterparts.

VIII. Indemnification and Hold Harmless

The Parties agree to the following:

Each Party shall protect, defend, indemnify, and save harmless the other Parties, their officers, officials, employees, and agents, while acting within the scope of their employment as such, from any and all costs, claims, judgments, and/or awards of damages, arising out of, or in any way resulting from, that Party's own negligent acts or omissions. Each Party agrees that its obligations under this subparagraph extend to any claim, demand, and/or cause of action brought by, or on behalf of, any of its employees or agents. For this purpose, each Party, by mutual negotiation, hereby waives, with respect to the other Parties only, any immunity that would otherwise be available against such claims under the Industrial Insurance provisions of Title 51 RCW. In the event that any Party incurs any judgment, award, and/or cost arising therefrom, including attorneys'

fees, to enforce the provisions of this Article, all such fees, expenses, and costs shall be recoverable from the responsible Party to the extent of that Party's culpability.

IN WITNESS WHEREOF, the Parties hereto have executed this amendment on the _____ day of _____, 2004.

Approved as to Form

By: _____
Title: Deputy Prosecuting Attorney

King County:

By: _____
Title: King County Executive

Approved as to Form

By: _____
Title: _____

Sammamish Plateau Water and Sewer District:

By: _____
Title: _____

Approved as to Form

By: _____
Title: _____

City of Issaquah:

By:
Title: _____

Approved as to Form

By: _____
Title: _____

City of Sammamish:

By: _____
Title: _____

Exhibit A

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ISSAQUAH CREEK VALLEY GROUNDWATER MANAGEMENT AREA

PROPOSED SCOPE OF WORK FOR GROUNDWATER PROTECTION SERVICES, 2005-2007

SUMMARY OF SERVICES AND ESTIMATED COSTS

I. WATER RESOURCES EVALUATION

THREE-DIMENSIONAL HYDROGEOLOGIC MAPPING

This effort will be contracted to GeoMapNW at the University of Washington (formerly the Seattle-Area Geologic Mapping Project); DNRP will provide project management and oversight. Only a portion of the Issaquah Creek Valley Groundwater Management Area will be mapped – it is anticipated that the mapping area will be an area south of the City of Issaquah including the "Gap" and upper basin of Issaquah Creek.

- Compile existing boring data for the study area.
- Enter data for the study area into a georeferenced database.
- Estimate hydrogeologic data and susceptibility factors for the study area.

Estimated Cost – Hydrogeologic Mapping:	$82,390

ISSAQUAH CREEK VALLEY GROUNDWATER DATA WEB PAGES

- Compile available groundwater data for the Issaquah Creek Valley Groundwater Management Area (GWMA) from all available sources.
- Develop GWMA groundwater data Web pages on the King County Web site.
- Update the Web pages when new information becomes available.

Estimated Cost – Web Site:	$22,400

EXEMPT WELL IMPACT ASSESSMENT

- Develop data and approach.
- Apply approach for exempt wells.
- Apply similar approach for larger (permitted) wells.

Estimated Cost – Exempt Well Impact:	$21,000

GROUNDWATER MODEL VALIDATION, COMPARISON, AND EXTENSION

- Compile data and conduct initial model assessment.
- Validate models and planning.
- Develop plans for further modeling and monitoring.

Estimated Cost – Groundwater Model:	$33,600

Water Resources Evaluation Total Estimated Cost, 2005-2007:	**$159,390**

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II. POLICY AND PLAN IMPLEMENTATION

GROUNDWATER PROTECTION COMMITTEE AND ILA MANAGEMENT

- Maintain an East King County Groundwater Protection Committee membership roster.
- Facilitate appointments for vacant committee seats.
- Handle committee logistics such as scheduling meetings and guest speakers, securing facilities, and posting public notices.
- Staff and support regular meetings of the committee.
- Develop meeting agendas in partnership with committee chairs.
- Produce meeting notes.
- Distribute notes, agendas, and other communications to committee members and interested parties.
- Serve as the liaison between the committee and the groundwater protection service providers.
- Manage and oversee completion of ILA services.
- Convene an ILA management group as needed.
- Coordinate routine status reports of progress on the ILA scope of work.
- Facilitate committee review of work performed under the ILA.

Estimated Cost – Committee and ILA Management ($25,435/year):	$76,305

GROUNDWATER POLICY WORK GROUP

- Convene a multi-agency work group to research and draft groundwater protection policy and model legislation.
- Handle logistics for the work group, such as scheduling meetings, securing facilities, and posting public notices.
- Set agendas; track work group goals, schedule and progress; maintain a mailing list.
- Research and analyze groundwater policy issues identified by the Issaquah Creek Valley Groundwater Protection Committee, such as exempt wells, stormwater, Low Impact Development, and cross-jurisdictional coordination on aquifer protection.
- Develop policy guidance for implementing agencies in topical areas of interest to the committee.

Estimated Cost – Policy Work Group ($25,435/year):	$76,305

Policy and Plan Implementation Total Estimated Cost, 2005-2007:	**$152,610**

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III. EDUCATION AND OUTREACH

PUBLIC AWARENESS

- Expand public awareness of key groundwater issues identified by the Issaquah Creek Valley Groundwater Protection Committee and/or the Issaquah Creek Valley Policy Work Group.
- Utilize a variety of mediums – such as public events, newsletter articles, brochures, information sheets, Web-based information, and workshops – to convey key messages.

Estimated Cost – Public Awareness ($10,000/year):	$30,000

NATURAL YARD CARE

- Select neighborhood(s) in partnership with the Issaquah Creek Valley Groundwater Protection Committee.
- Solicit participants.
- Conduct training workshops on Natural Yard Care, plus added GWMA-specific topics like Low Impact Development or stormwater.
- Conduct participant surveys both before and after training.
- Share survey results with the Issaquah Creek Valley Groundwater Protection Committee.

Estimated Cost (one series/year) – Natural Yard Care ($6,000/series):	$18,000

Education and Outreach Total Estimated Cost, 2005-2007:	**$48,000**

TOTAL FOR ALL SERVICES 2005-2007:	**$312,000**

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Exhibit A

ISSAQUAH CREEK VALLEY GROUNDWATER MANAGEMENT AREA

PROPOSED SCOPE OF WORK FOR GROUNDWATER PROTECTION SERVICES, 2005-2007

DETAIL OF SERVICES AND ESTIMATED COSTS

Groundwater is important to the Issaquah Creek Valley Groundwater Management Area (GWMA) for the following two key reasons:

- Almost the entire population of the GWMA relies to a great extent on groundwater as its source of drinking water supply. Of the 10 Group A purveyors with defined service areas, all but two (KCWD 90 and Cedar River Water and Sewer, both along the edges of the Groundwater Management area) use mostly or solely groundwater. However, some large sections of the management area have no water service providers designated. Residences outside of these defined water system service areas must obtain supplies from groundwater via approximately 16 other Group A systems, 245 Group B systems, or individual exempt wells.
- Groundwater is essential for sustaining habitat in the area's rivers and wetlands.

Groundwater supplies can be precarious. For example, when drought conditions reduced the flow in the North Fork Issaquah Creek, flows needed to be diverted from water supply wells to restore some flow to the system. In addition, a large part of the area is designated rural and uses on-site sewage treatment (septic) systems, which discharge directly to groundwater.

All the rivers in the GWMA depend completely on groundwater storage (rather than snowmelt) to continue their flows through the dry summer months. Fish need the cold water from groundwater to migrate and spawn.

The Issaquah Creek Valley Groundwater Protection Committee has been discussing priorities for the King County Groundwater Protection Program in its GWMA. The committee has worked to identify top priorities with the expectation that implementing agencies will use these priority statements to guide their provision of groundwater protection services.

Key implementing agencies are the City of Issaquah, the City of Sammamish, the King County Department of Natural Resources and Parks (DNRP), the King County Department of Development and Environmental Services, Public Health - Seattle & King County, water purveyors, and the Washington State Department of Ecology.

Based on direction from the groundwater protection committee, King County proposes a water resources evaluation, policy and plan implementation services, and education and outreach to help protect this groundwater in the Issaquah Creek Valley Groundwater Management Area.

I. WATER RESOURCES EVALUATION

PRIORITIES AND OBJECTIVES

The Issaquah Creek Valley Groundwater Protection Committee identified the following as some of the most important groundwater data issues:

- Characterize area geology/hydrogeology.
- Assess possible interactions among different aquifers, such as across the "gap" between the upper and lower Issaquah Creek Basins, and between surface water and groundwater.

- Update, link, validate, and extend separate previous groundwater models already developed for purveyors.
- Estimate numbers of exempt wells and their impact.
- Develop updated CARA maps.

A major limitation with the existing data is its fragmentation – data that has been developed for one purveyor has generally not been available to others. A second constraint is that data have been compiled mostly in limited areas, such as in the main Issaquah Valley where the largest water supply wells are located. DNRP will compile groundwater/geologic data from previous studies, including modeling studies. While it will ultimately be valuable to gather new data through monitoring, and to develop new groundwater models, such efforts will be delayed until later years.

The compilation will include use of three-dimensional mapping techniques developed by the University of Washington research group GeoMapNW. It will also include use of data from purveyors, GeoMapNW, and the Washington State Department of Ecology to estimate numbers and distribution of, and consumption by, exempt wells and other (permitted) groundwater users. The existing groundwater models will be assessed against new data and understandings in order to develop combined and more comprehensive model applications. Finally, all the data will be made available to the public via technical Web pages on the King County Web site.

EXISTING SOURCES OF GROUNDWATER DATA

There are a number of existing sources of groundwater data for the GWMA:

- The Area Characterization work for the Issaquah Creek Valley Groundwater Management Plan provides the overall basis of the hydrogeology of the GWMA, although the data for variable conditions (water levels and water quality) are not current.
- Ambient groundwater monitoring by DNRP has updated the water quality and water level data for many of the wells covered by the management plan, but there are many other wells that might not be included in this update.
- A limited number of hydrogeologic studies have been conducted in the GWMA, mainly for purveyors such as the Northeast Sammamish Sewer and Water District. Hydrogeologic wellhead protection plans have been developed for the Northeast Sammamish Sewer and Water District as well as for other purveyors, although it is uncertain how many of these plans were based on recently acquired information. The large systems (City of Issaquah, and Northeast Sammamish Sewer and Water District) have electronic data compilation systems that record flows and water levels at frequent intervals. A solicitation to the purveyors may provide some new reports on the hydrogeology of the GWMA.
- Groundwater flow models have been developed for the City of Issaquah (Golder Associates, 1997) and for the the Sammamish Plateau Water and Sewer District (CDM consultants). Newer data since the models were developed will allow the existing models to be reassessed and validated.
- The Issaquah Highlands development has had a number of monitoring wells installed to assure that groundwater impacts are minimized. Recent slope stability problems have required reassessment of some of the parameters or analyses done for this existing development.
- The Washington State Department of Ecology has made its well log data available via the Internet, a capability that was not possible at the time of the previous studies. Other data sets are also available, including topographic mapping using LiDAR.

These data are not comprehensive or completely up to date. More significantly, the data are fragmented and have not been assessed in their totality. While it would be valuable to collect new data in order to address the priorities listed above and meet the stated objectives, it appears more important to first compile and assess the existing data.

PROPOSED SERVICES

To address the Issaquah Creek Valley Groundwater Protection Committee's data priorities, King County proposes that the committee invest in a three-year water resources evaluation for the groundwater management area ("study area"). This evaluation would ultimately provide data to inform decision-makers about the impact of land-use changes, water withdrawals, and climate change on groundwater supplies within the study area. This data set could

be used to help develop a long-term monitoring strategy for groundwater in the area and identify future needs for modeling.

To deal with the GWMA's disparate groundwater issues, it is necessary to re-evaluate all previous data in a critical way, using new methodologies where applicable. DNRP has the advantage, as does the University of Washington, of being an independent technical agency without regulatory threat to users. As such, DNRP can bridge the various authorities and data sources.

By first compiling data from the multiple sources into a single database location, DNRP will be able to reassess new approaches for the issues discussed above. The existing groundwater models can be validated using the newer data and methods, such as LiDAR mapping, that were not available when the models were initially developed. Data for the upper Issaquah Creek basin can be used to see what sort of groundwater flow regime may exist through the "Gap," and allow new boundary conditions to be applied to models in the main Issaquah valley.

DNRP will contract with the University of Washington research group GeoMapNW (formerly the Seattle-Area Geologic Mapping Project) to create three-dimensional (surface and subsurface) geologic mappings to characterize the mapping area's hydrogeology. This study provides the basis for eventual new groundwater modeling within the study area and can also be used to develop new susceptibility maps for CARA.

Because of limitations in funding, GeoMapNW will focus on updating the geologic data in an area south of the City of Issaquah including the "Gap" and upper basin of Issaquah Creek. Mapping of the other areas will be left for subsequent years. Because of the costs involved and the large areas of the GWMA without previous studies, it is necessary to break out these mapping efforts over several years. If additional partners or funding sources can be developed, the mapping effort will be accelerated and the geographic area extended. DNRP will work with the University of Washington to further prioritize and schedule their efforts.

Other sources of data compiled in the first year of the water resources evaluation (2005) will be used to develop an approach to estimate the number of exempt wells in the GWMA and to estimate their impact on the groundwater resources. This approach will be applied in the second year (2006). Similar estimates will be conducted on the larger, permitted groundwater withdrawals in 2007.

All the data that is developed in this water resources evaluation will be made available to the public via Web pages on the King County Web site. This will allow purveyors, members of the consulting community, and the interested public to utilize the data as it becomes available.

THREE-DIMENSIONAL HYDROGEOLOGIC MAPPING

This effort will be contracted to GeoMapNW at the University of Washington (formerly the Seattle-Area Geologic Mapping Project); DNRP will provide project management and oversight. Only a portion of the Issaquah Creek Valley Groundwater Management Area will be mapped – it is anticipated that the mapping area will involve an area south of the City of Issaquah including the "Gap" and upper basin of Issaquah Creek. The three main tasks required to complete the mapping are described below.

Task 1: Compile Data

Compile existing boring data for the mapping area.

Task 2: Enter Data

Enter data for the mapping area into a georeferenced database.

Task 3: Make Estimations

Estimate hydrogeologic data and susceptibility factors for the mapping area.

ISSAQUAH CREEK VALLEY GROUNDWATER DATA WEB PAGES

The three main tasks required to complete the Web pages are described below.

Task 1: Compile Data (2005)

Compile existing data for the Issaquah Creek Valley Groundwater Management Area from all available sources – purveyors, the Washington State Department of Health, the Washington State Department of Ecology, and others. Input the data into a georeferenced database.

Task 2: Develop the Web Site (2005)

Develop GWMA groundwater data Web pages on the King County Web site, which will provide public access to data and other information about the water resources evaluation.

Task 3: Update the Web Site (2006, 2007)

Update the Web pages when new information becomes available.

EXEMPT WELL IMPACT ASSESSMENT

The three main tasks required to complete the well assessment are described below.

Task 1: Develop Data and Approach (2005)

Pilot subareas for the assessment that are deemed to have the greatest informational value will be identified by King County staff and approved by the PMT. After compiling data from purveyors, the state departments of Ecology and Health, and earlier-developed data from GeoMapNW, the numbers of exempt wells in pilot subareas will be calculated. Data for each subarea will include the following (at a minimum):

- historic numbers of exempt wells installed, on an annual basis
- sizes of systems (number of connections) and consumption rates, both exempt and permitted
- numbers/locations of users on systems
- total number of residences
- residences with no identified water supply.

Field surveys may be necessary to validate this approach.

Data will be organized via GIS, using King County GIS coverages, to estimate the total number of developed residential parcels.

Task 2: Apply Approach for Exempt Wells (2006)

Apply methods developed in Task 1 to additional representative subareas, chosen on availability of data (e.g., billing lists) and results of pilot applications. Extrapolate to entire basins.

Task 3: Apply Similar Approach for Larger (Permitted) Wells (2007)

Data developed will allow estimation of actual consumption of larger Group B systems. Data from metered Group A systems, and users of irrigation, industrial, and agricultural water supplies will be included in this process.

GROUNDWATER MODEL VALIDATION, COMPARISON, AND EXTENSION

The two existing groundwater models (City of Issaquah, and Northeast Sammamish Sewer and Water District) will be assessed against newer data and hydrogeologic understanding. The three main tasks required to complete the modeling are described below.

Task 1: Compile Data and Conduct Initial Model Assessment (2005)

- Obtain and assess information about existing models. Data and concepts for the models will be compiled as part of the overall data compilation.
- Compare results and assumptions against newer data. New information from the areas surrounding the existing model areas (for example Issaquah and Sammamish Plateau model areas), including LiDAR topography, will be reviewed to assess model assumptions.
- Investigate flow conditions in adjacent geographic areas into the existing models, including along the Issaquah Creek "gap."

Task 2: Validate Models and Planning (2006)

The data and concepts for the models will be pared against actual data. Validation runs of the models will probably be required. Because models have proprietary components, additional consultant costs may be incurred as part of this task.

Task 3: Develop Plans for Further Modeling and Monitoring (2007)

Based on the results of Task 2, a plan will be developed for additional modeling in subsequent years. According to the data gaps that will (undoubtedly) be found, a monitoring plan will be prepared to fill in the necessary information.

WATER RESOURCES EVALUATION DELIVERABLES

Table 1. Water Resources Evaluation Proposed Deliverables by Year

Year	Deliverables
2005	• Compilation report for groundwater data from previous studies, including assessment of existing models • Initiation of geologic mapping (3-D database) • GWMA groundwater data Web pages • Approach to exempt well questions
2006	• Continuation of geologic mapping • Report of application of exempt well approach, and estimates of numbers and impacts • Validation report for existing groundwater models, and plan for combination and extension
2007	• 3-D geologic database of North and East Fork basins (including the Issaquah Highlands area) and the Sammamish Plateau to allow update of Sammamish Plateau models and allow City of Sammamish CARA development • Estimation of impacts from larger (permitted) withdrawals • Modeling and monitoring plan

WATER RESOURCES EVALUATION ESTIMATED COSTS

The total estimated cost for the Water Resources Evaluation is $159,390 over three years.

Table 2. Water Resources Evaluation Estimated Costs by Work Item

Work Item	Labor (FTE)*	Material, Lab, or Consultant Costs	Total Cost
Geologic Mapping	0.10	$68,390	$82,390
Groundwater Data Web Pages	0.16	----	$22,400
Exempt Wells Impact Assessment	0.15	----	$21,000
Groundwater Model Validation, Comparison, and Extension	0.24	----	$33,600
TOTAL	**0.65**	**$68,390**	**$159,390.00**

*Labor costs are based on $140,000 per FTE per year; labor costs may vary.

Table 3. Water Resources Evaluation Estimated Costs by Year

Year	Work Item/Task	Labor (FTE)*	Material, Lab, or Consultant Costs	Total Cost
2005	Geologic mapping – upper Issaquah Creek valley	0.05	$45,130	$52,130
2005	Compilation of data; initial Web pages	0.10	----	$14,000
2005	Exempt well approach	0.05	----	$7,000
	2005 Total	**0.20**	**$45,130**	**$73,130.00**
2006	Geologic mapping – North and East Forks, East Sammamish Plateau	0.0	$8,130	$8,130
2006	Web pages update and maintenance	0.03	----	$4,200
2006	Application of exempt well approach	0.10	----	$14,000
2006	Validation of existing model	0.12	----	$16,800
	2006 Total	**0.25**	**$8,130**	**$43,130.00**
2007	Geologic mapping – Lower Issaquah Basin	0.05	$15,130	$22,130
2007	Web pages update and maintenance	0.03	----	$4,200
2007	Development of modeling/monitoring plans	0.12	----	$16,800
	2007 Total	**0.20**	**$15,130**	**$43,130.00**
TOTAL		**0.65**	**$68,390**	**$159,390**

*Labor costs are based on $140,000 per FTE per year; labor costs may vary.

Total ICV Groundwater Program three-year financial overview

ICV Groundwater ILA Services
Budget

Year:		2005	2006	2007	annual FTE	
Water Resources Evaluation						
	Geologic Mapping	$52,130	$8,130	$22,130	0.05	(.0 in '06)
	Web Pages	$14,000	$4,200	$4,200	0.1	(.03 in '06, '07)
	Exempt Wells Impact Assessment	$7,000	$14,000	$0	0.05	(.10 in '06) plus UW
	Model Validation	$0	$16,800	$16,800	0.12	
	Water Resources Evaluation subtotal	**$73,130.00**	**$43,130.00**	**$43,130.00**	**0.32**	
Policy and Plan Implementation						
	GWPC & ILA Management	$25,435	$25,435	$25,435	0.15	
	Policy Work Group	$25,435	$25,435	$25,435	0.15	
	Policy/Plan subtotal	**$50,870.00**	**$50,870.00**	**$50,870.00**	**0.3**	
Education and Outreach						
	Public Awareness	$10,000	$10,000	$10,000	0.06	
	Natural Yard Care	$6,000	$6,000	$6,000	0.04	
	Education subtotal	**$16,000.00**	**$16,000.00**	**$16,000.00**	**0.1**	
Total ICV Program Budget		**$140,000**	**$110,000**	**$110,000**	**0.72**	

Project Cost Shares

Partner	2005 Cost Share Percentage	2005 Estimated Cost ($)	2006 Cost Share Percentage	2006 Estimated Cost ($)	2007 Cost Share Percentage	2007 Estimated Cost ($)	TOTAL ESTIMATED COST ($)
King County	36%	50,000	45%	50,000	45%	50,000	150,000
City of Sammamish	7%	10,000	9%	10,000	9%	10,000	30,000
City of Issaquah	36%	50,000	32%	35,000	32%	35,000	120,000
Sammamish Plateau Water and Sewer District	21%	30,000	14%	15,000	14%	15,000	60,000
Totals	100%	140,000	100%	$110,000	100%	$110,000	$360,000

15081 2004-498 Attachment C

INTERLOCAL AGREEMENT
FOR GROUNDWATER PROTECTION AND MANAGEMENT ACTIVITIES

This Agreement is entered into by King County, Washington, hereinafter referred to as "King County" or the "County," the City of Redmond, hereinafter referred to as "Redmond," the City of Woodinville, hereinafter referred to as "Woodinville," the City of Sammamish, hereinafter referred to as "Sammamish," and the Northeast Sammamish Sewer and Water District, hereinafter referred to as "Northeast Sammamish," the Woodinville Water District, hereinafter referred to as "Woodinville Water," and the Union Hill Water District, hereinafter referred to as "Union Hill," collectively referred to as the "Parties," for the purpose of cooperatively conducting activities related to groundwater protection and management in the Redmond-Bear Creek Groundwater Management area.

WHEREAS, the Washington State Department of Ecology (DOE) has been authorized by RCW 90.44.400 and its implementing regulations, WAC 173-100, to identify and designate groundwater management areas for the purposes of protection of water quality, assurance of quantity, and efficient management of water resources to meet future needs, and;

WHEREAS, in 1986 DOE designated the Redmond-Bear Creek Groundwater Management Area (hereinafter "Management Area"), and;

WHEREAS, DOE designated the Seattle/King County Department of Public Health as the lead agency to work with stakeholders and potential implementing agencies to develop the Redmond-Bear Creek Valley Groundwater Management Plan (hereinafter "Management Plan"), and;

WHEREAS, in 1996 the King County Department of Natural Resources replaced the Seattle/King County Department of Public Health as the lead agency in connection with the development of the Management Plan;

WHEREAS, the Management Plan , after completion of a review and concurrence process by local stakeholders, governments and service providers, was submitted to DOE in March, 1999 for review and certification, and;

WHEREAS, the Management Plan was certified by the DOE in 2000 as consistent with the intent of WAC 173-100, and;

WHEREAS, under the provisions of RCW 90.44.420, affected local governments are charged with adopting regulations, ordinances and/or programs for implementing those provisions of the Management Plan which are within their respective jurisdictional authorities, and;

WHEREAS, in 2001, the King County Council in Ordinance 14214, codified as part of King County Code 9.14, formally authorized the County's Groundwater Protection Program and in Ordinance 14276, codified as part of King County Code 9.14, formally provided for the creation of the Redmond-Bear Creek Groundwater Protection Committee (hereinafter "Committee"), and;

WHEREAS, the current members of the Committee were appointed by the King County executive and confirmed by the King County Council in 2002, and have been routinely meeting since December 2002 to participate in implementation of the Management Plan, and;

WHEREAS, the Management Area lies within all or portions of King County, the cities of Redmond, Sammamish, and Woodinville, the Northeast Sammamish Sewer and Water District, the Woodinville Water District, and the Union Hill Water District, each of which is a Party to this Agreement, and;

WHEREAS, the Parties are each considered to be an implementing agency for the Management Plan and for the specific management strategies identified within the Plan, and;

WHEREAS, each of the Parties has a role and responsibility in addressing groundwater issues and concerns in the Management Area, and;

WHEREAS, the current Committee has identified its top priorities for implementation of the Management Plan and for groundwater protection generally within the Management Area; and

WHEREAS, the Parties wish to work together to address and implement the Committee's priorities and to protect groundwater in general, and wish to use King County's services to conduct specific groundwater protection activities, including increased monitoring, enhanced coordination among the Parties, and improved policies and regulations, and;

WHEREAS, the Parties intend that by working cooperatively to conduct the activities provided for in this Agreement they will be taking important steps on behalf of

the public to protect the quantity and quality of groundwater in the Management Area , which is threatened by contaminant sources and increasing water supply demand, and;

WHEREAS, pursuant to RCW 39.34, the Interlocal Cooperation Act, each of the Parties is authorized to enter into an agreement for cooperative action;

NOW THEREFORE, the Parties hereto agree as follows:

I. Purpose of the Agreement

The purpose of this Agreement is to provide the means by which the Parties will cooperatively conduct and fund groundwater protection activities. These activities are listed below in four general subject matter areas and will be conducted in the years 2005 through 2007. They are more specifically described in the Scope of Work attached to this Agreement as Exhibit One and incorporated herein and are collectively referred to herein as the "Project." The four activities include:

1. providing staff support to the Committee;
2. evaluating land use and other policies affecting groundwater quality and quantity;
3. obtaining additional hydrogeologic data for the Management Area; and
4. conducting community education and outreach activities aimed at promoting groundwater awareness and protection and facilitating an annual groundwater education forum.

II. Project Management

A. Project oversight will be conducted by a Project Management Team (hereinafter "PMT") consisting of one representative each from King County, Redmond, Woodinville, Sammamish, Woodinville Water, Northeast Sammamish and Union Hill. Each Party will designate its respective PMT representative.

B. The PMT will meet at least three times per year and will conduct additional meetings as needed to review Project progress, solicit and consider input on the Project from the Committee, and review Project expenditures per the Project budget, and consider possible changes to the Project Scope of Work.

C. The PMT may make needed changes to the Scope of Work to reflect emerging Project results and findings and to better meet Project objectives. Such changes

shall not cause total annual Project costs as provided for in Exhibit One to be exceeded.

D. King County will perform day-to-day project management and direction and communicate with other PMT members as needed to conduct Project activities.

E. King County will schedule, facilitate, and provide summaries of all PMT meetings during implementation of the Project.

F. The PMT will reach its decisions by consensus, considering input from the Committee where appropriate. Issues that cannot be resolved by the PMT will be referred to the Division Director of the King County Water and Land Resources Division, the appropriate City Managers, and the District Manager for final resolution.

III. Responsibilities

Each of the Parties shall:

A. Designate one representative to serve on the PMT and participate in PMT meetings.

B. Maintain its appointed representation on the Committee.

C. Provide for use in the Project any groundwater-related data it has that would be appropriate to share and would facilitate accomplishment of the Project goals.

D. Participate in the Groundwater Education Forum as outlined in the Scope of Work.

E. Consider revising its groundwater protection policies and regulations to increase groundwater protection when and where it deems appropriate as recommended by the Committee.

F. Where appropriate, utilize public outreach tools developed as part of the Project to increase public awareness of groundwater issues.

G. Pay for its share of Project costs as provided for below and in Exhibit One.

King County shall have the following additional responsibilities:

A. Provide day-to-day Project management.

B. Perform Project tasks as provided for in Exhibit One, including providing for subcontracted services where needed.

IV. Costs

A. The Parties agree to share costs incurred by King County to conduct Project activities as described in Exhibit One. Total estimated Project costs are $645,231 for the years 2005-2007.

B. Estimated Project costs for each year, by activity, are described in Exhibit One.

C. The Parties agree to pay for Project costs according to the percentages specified in Exhibit One on page ten. Project cost shares will not exceed amounts indicated without written agreement of the Parties

D. Total Project costs shall include all those costs incurred by King County in completing the Project, including costs for staff persons, overhead, supplies, contractors, and equipment.

V. Billing and Payment

A. King County shall bill each of the other Parties quarterly on itemized invoices for that Party's share of Project costs.

B. The Parties shall review and approve of the invoices and forward payment to King County within 60 days of receipt of invoice.

C. The Parties represent that funds for service provision under this Agreement have been appropriated and made available. To the extent that such service provision requires future appropriations beyond current appropriation authority, the Parties' obligations are contingent upon the appropriation of sufficient funds to complete the activities described herein. If no such appropriation is made, this Agreement will terminate.

VI. Duration, Termination, and Amendment

A. This Agreement is effective upon signature by the Parties and remains in effect until June 30, 2008.

B. A Party may end its participation in the Project and withdraw from this Agreement upon 90 days' written notice to the other Parties, and paying its share of costs for the Project to the end of the quarter in which termination occurs.

C. This Agreement may be amended, altered, clarified, or extended only by the written agreement of the Parties hereto.

D. This Agreement is not assignable by any Party, either in whole or in part.

E. This Agreement is a complete expression of the terms hereto and any oral or written representations or understandings not incorporated herein are excluded. The Parties recognize that time is of the essence in the performance of the provisions of this Agreement. Waiver of any default shall not be deemed to be a waiver of any subsequent default. Waiver of breach of any provision of this Agreement shall not be deemed to be a waiver of any other or subsequent breach and shall not be construed to be a modification of the terms of the Agreement unless stated to be such through written approval by the Parties which shall be attached to the original Agreement.

VII. Counterparts

This Agreement may be executed in counterparts.

VIII. Indemnification and Hold Harmless

The Parties agree to the following:

Each Party shall protect, defend, indemnify, and save harmless the other Parties, their officers, officials, employees, and agents, while acting within the scope of their employment as such, from any and all costs, claims, judgments, and/or awards of damages, arising out of, or in any way resulting from, that Party's own negligent acts or omissions. Each Party agrees that its obligations under this subparagraph extend to any claim, demand, and/or cause of action brought by, or on behalf of, any of its employees or agents. For this purpose, each Party, by mutual negotiation, hereby waives, with respect to the other Parties only, any immunity that would otherwise be available against such claims under the Industrial Insurance provisions of Title 51 RCW. In the event that any Party incurs any judgment, award, and/or cost arising therefrom, including attorneys' fees, to enforce the provisions of this Article, all such fees, expenses, and costs shall be recoverable from the responsible Party to the extent of that Party's culpability.

IN WITNESS WHEREOF, the Parties hereto have executed this amendment on the _____ day of _____, 2004____.

Approved as to Form

By: _____

Title: Deputy Prosecuting Attorney

King County:

By: _____

Title: King County Executive

Approved as to Form

By: _____

Title: _____

City of Redmond:

By: _____

Title: _____

Approved as to Form

By: _____

Title: _____

City of Sammamish:

By:

Title: _____

Approved as to Form

By: _____

Title: _____

City of Woodinville:

By: _____

Title: _____

Approved as to Form

Northeast Sammamish Sewer and Water District:

15081

By: _____

Title: _____

Approved as to Form

By: _____

Title: _____

By: _____

Title: _____

Woodinville Water District:

By: _____

Title: _____

Approved as to Form

By: _____

Title: _____

By: _____

Title: _____

Union Hill Water District:

By: _____

Title: _____

By: _____

Title: _____

15081

REDMOND-BEAR CREEK VALLEY GROUNDWATER MANAGEMENT AREA

PROPOSED SCOPE OF WORK FOR GROUNDWATER PROTECTION SERVICES, 2005-2007

SUMMARY OF SERVICES AND ESTIMATED COSTS

I. WATER RESOURCES EVALUATION

SURFACE WATER/GROUNDWATER INTERACTION STUDY (2005-2006)

Geographic scope is entire GWMA

- Review previous studies by USGS, RH2, DNRP, and Ecology.
- Develop a work plan and present it to the Redmond-Bear Creek Groundwater Protection Committee.
- Install temperature probes and mini-piezometers, and utilize other monitoring methods.
- Observe water levels and temperature fluctuations.
- Calculate interaction factors between surface water and groundwater.

Estimated Cost – Interaction Study:	$138,000

STREAM FLOW AND PRECIPITATION GAGING (2005-2007)

Geographic scope is a number of subareas across the GWMA

- Continue stream flow and precipitation monitoring.
- Install new gages as possible.
- Provide data via DNRP hydrology Web pages.

Estimated Cost – Gaging:	$210,000

GEOLOGIC AND SUSCEPTIBILITY MAPPING (2007)

Geographic scope is subareas within the GWMA

- The mapping area, will be a sub-portion of the Redmond-Bear Creek Valley Groundwater Management Area (likely to include Cold Creek and Upper Bear Creek areas). The PMT to approve final mapping area.
- Collect subsurface geologic data (such as borehole or well logs) for mapping study area from current sources.
- Provide a database that includes both groundwater data and a list of boring logs in the mapping area.
- Perform geologic field mapping in the mapping area.
- Develop and verify geologic units for interpretation of maps and cross-sections of the mapping area.
- Update previous geologic mapping (to a 1:24,000 scale) and create geologic cross-sections for mapping area.
- Provide a table that indicates a high, medium or low susceptibility to groundwater contamination for each reinterpreted geologic unit in the mapping area.

Estimated Cost – Geologic Mapping:	$89,000

REDMOND-BEAR CREEK VALLEY GROUNDWATER DATABASE/WEB PAGES (2005-2007)

Geographic scope is entire GWMA

- Compile existing data.
- Program the Web pages to allow interactive data downloading.
- Update information on an annual basis.

Estimated Cost – Database/Web Pages:	$15,400

Water Resources Evaluation Total Estimated Cost, 2005-2007:	$452,400

II. POLICY AND PLAN IMPLEMENTATION

GROUNDWATER PROTECTION COMMITTEE AND ILA MANAGEMENT (2005-2007)

- Maintain a Redmond-Bear Creek Groundwater Protection Committee membership roster.
- Facilitate appointments for vacant committee seats.
- Handle committee logistics such as scheduling meetings and guest speakers, securing facilities, and posting public notices.
- Staff and support regular meetings of the committee.
- Develop meeting agendas in partnership with committee chairs.
- Produce meeting notes.
- Distribute notes, agendas, and other communications to committee members and interested parties.
- Serve as the liaison between the committee and the groundwater protection service providers.
- Manage and oversee completion of ILA services.
- Convene an ILA management group as needed.
- Coordinate routine status reports of progress on the ILA scope of work.
- Facilitate committee review of work performed under the ILA.

Estimated Cost – Committee and ILA Management ($23,361/year):	$70,083

GROUNDWATER POLICY AND SUBCOMMITTEE WORK (2005-2007)

- Research and analyze groundwater policy issues as identified by the Redmond-Bear Creek Groundwater Protection Committee.
- Develop policy guidance for implementing agencies in topical areas of interest to the committee.
- Provide organizational support to subcommittees as needed.

Estimated Cost – Policy and Subcommittee Work ($7,787/year):	$23,361

Policy and Plan Implementation Total Estimated Cost, 2005-2007 ($31,148/year):	$93,444

III. EDUCATION AND OUTREACH

UPDATE TO EDUCATION WEB PAGES (2005-2007)

- Post geographically relevant survey data on the groundwater education Web pages of the King County Web site.
- Maintain a comprehensive list of groundwater materials available through Redmond-Bear Creek Valley Groundwater Management Area jurisdictions and agencies.
- Link to Snohomish County's groundwater program and to Cross Valley Water District as appropriate.
- Include links to King County, Washington State, and Federal agency materials.
- Request and integrate updates from groundwater education participants.

Estimated Cost – Web Pages ($8,282/yr):	$24,846

EDUCATORS FORUM (2005-2007)

- Work directly with the Redmond-Bear Creek Groundwater Protection Committee.
- Coordinate logistics for the annual forum.
- Create a mailing list.
- Publicize the forum.
- Facilitate the forum.
- Participate in the forum and share King County groundwater education issues.
- Provide water quality survey results via zip-code sorting to track attitudes and behaviors.
- Prepare and present Educators Forum recommendations to the committee for comment and approval.

Estimated Cost – Educators Forum ($16,565/yr):	$49,695

WRITING AND EDITING (2005-2007)

- Submit quarterly articles to community newsletters and other entities for publication. Topics may include the following:
  - things citizens and businesses can do to improve groundwater recharge
  - vulnerability
  - wellhead protection
  - underground storage tank maintenance
  - scientific findings
  - groundwater's role in the hydrologic cycle
  - groundwater as drinking water.

Estimated Cost – Writing and Editing ($8,282/yr):	$24,846

Education and Outreach Total Estimated Cost, 2005-2007 ($33,129/yr):	$99,387

REDMOND-BEAR CREEK VALLEY GROUNDWATER MANAGEMENT AREA

PROPOSED SCOPE OF WORK FOR GROUNDWATER PROTECTION SERVICES, 2005-2007

DETAIL OF SERVICES AND ESTIMATED COSTS

Groundwater is important to the Redmond-Bear Creek Valley Groundwater Management Area (GWMA) in large part for the following two key reasons:

- A large portion of the population of the GWMA relies on groundwater as its source of drinking water supply. Of the Redmond supply, 40 percent comes from groundwater; of the Union Hill Water Association, and the Northeast Sammamish Sewer and Water District supplies, 100 percent come from groundwater. Beyond these large systems, approximately 100 small (Group B) public water systems rely entirely groundwater.
- Groundwater is essential for sustaining habitat in the area's rivers and wetlands.

These crucial groundwater supplies can be precarious. Much of the upper Bear Creek Basin area uses on-site sewage treatment (septic) systems, which discharge directly to groundwater. In densely populated areas, there has been concern about impacts from these systems to groundwater quality.

All the rivers and streams in the GWMA (such as the Sammamish River, Bear Creek, and Evans Creek) are entirely lowland, and therefore are not sustained by snowmelt. The rivers and streams are completely dependent on groundwater storage to continue their flows through the dry summer months. Fish need the cold water from groundwater to migrate and spawn.

The Redmond-Bear Creek Groundwater Protection Committee has been discussing priorities for the King County Groundwater Protection Program in its GWMA. The committee has worked to identify top priorities with the expectation that implementing agencies will use these priority statements to guide their provision of groundwater protection services.

Key implementing agencies are the Cities of Redmond, Sammamish, and Woodinville; local water utilities and districts; the King County Department of Natural Resources and Parks (DNRP); the King County Department of Development and Environmental Services; Public Health - Seattle & King County; water purveyors; and the Washington State Department of Ecology.

Based on direction from the groundwater protection committee, King County proposes a water resources evaluation, policy and plan implementation services, and education and outreach to help protect groundwater in the Redmond-Bear Creek Valley Groundwater Management Area.

I. WATER RESOURCES EVALUATION

PRIORITIES AND OBJECTIVES

The Redmond-Bear Creek Groundwater Protection Committee identified the following as the most important groundwater data issues:

- Identify areas of surface water and groundwater interaction. Much of the shallow groundwater appears to be in direct communication with Bear Creek, Evans Creek, Cottage Lake Creek, or other streams, all of which contain significant salmonid migration or spawning habitat. Overuse of these shallow resources could put threatened salmon in jeopardy.

- Identify trends in water quantity and water quality. As development has occurred in the GWMA, runoff has been diverted to surface water and could be reducing groundwater recharge. In addition, groundwater withdrawals have been increasing for this same development. Together, these factors could be reducing groundwater quantity. Groundwater quality is also threatened by many land uses in the area.
- Identify groundwater sensitive areas. Inappropriate land uses could contaminate the recharge areas of the GWMA's significant shallow groundwater resources. Both the City of Redmond and King County have recently proposed aquifer protection ordinances, but both ordinances require mapping of surficial geology to determine priority areas of high susceptibility.
- Collect, manage, and distribute groundwater data relevant to the GWMA. To be useful, groundwater data that is obtained by any agency should be combined with all other data. This can be accomplished through a central "clearinghouse," but the public, particularly the consulting community, can also combine the data.

EXISTING SOURCES OF GROUNDWATER DATA

There are a number of existing sources of groundwater data for the GWMA, including the following:

- The Area Characterization work for the Redmond-Bear Creek Valley Groundwater Management Plan provides the overall basis of the hydrogeology of the GWMA, although the data for variable conditions (water levels and water quality) are not current.
- Ambient groundwater monitoring by DNRP has updated the water quality and water level data for many of the wells covered by the management plan, but there are many other wells that could not be included in this update.
- DNRP has been conducting a study of groundwater in the Sammamish River Valley under Wastewater Treatment Division funding. This ongoing study includes installing monitoring wells, pumping tests, and modeling.
- A limited number of hydrogeologic studies have been conducted in the GWMA, mainly for purveyors. Several studies, which included groundwater flow modeling, were conducted for the City of Redmond. The Union Hill Water Association developed hydrogeologic wellhead protection plans. The wellhead protection areas for the Northeast Sammamish Sewer and Water District appear to be based on the Calculated Fixed Radius method however, new hydrogeologic-based data may soon be available. A temperature-based study of surface water/groundwater interactions has been conducted for the Union Hill Water Association, and the Northeast Sammamish Sewer and Water District, but the report is not available at the time of this plan.
- The Redmond Ridge development has a number of monitoring wells to assure that groundwater impacts are minimized. They have also researched the hydrostratigraphy in some detail.
- The Washington State Department of Ecology has made its well log data available via the Internet.
- USGS and King County DNRP, have maintained stream gages and obtained data over an extended period of time that can provide baseline data for flows in the Sammamish River, Lake Sammamish, Bear Creek, Evans Creek, and many of their tributaries.
- USGS has performed studies in many areas around the US, to develop method for estimating surface water – groundwater interactions.
- Seattle District, Corps of Engineers, has responsibility for the Sammamish River, and to assure that it can carry flood flows. As such, they have models to predict flows and water levels in the river. The Corps was also involved in development of the Sammamish River Corridor Action Plan. USGS stream gage data.

These data are not comprehensive or completely up to date. In order to address the priorities listed above and meet the stated objectives, it will be necessary to collect new data as well as to compile the existing data sets.

PROPOSED SERVICES

To address the priorities discussed by the Redmond-Bear Creek Groundwater Protection Committee, King County proposes that the committee invest in a three-year program to obtain additional hydrogeologic data for the GWMA ("Study Area"). In general, the work will not focus on making management recommendations, and the efforts involved with the water resources evaluation will not duplicate existing work, particularly in the Evans Creek area. This program would consist of the following work items, broken out by year:

- 2005 – Review previous surface water/groundwater interaction studies, develop a work plan, and initiate studies; continue stream flow and precipitation gaging; initiate database and Web page development.
- 2006 – Complete the surface water/groundwater interaction study; continue stream flow and precipitation gaging; maintain the database and Web pages; begin geologic and susceptibility mapping.
- 2007 – Complete geologic and susceptibility mapping; continue stream flow and precipitation gaging; maintain the database and Web pages.

This water resources evaluation would provide data that can be used to inform decision-makers about the impact of land-use changes, water withdrawals, and climate change on groundwater supplies within the study area. This data set could be used to help develop a long-term monitoring strategy for groundwater in the area and identify future needs, if any, for more detailed modeling.

SURFACE WATER/GROUNDWATER INTERACTION STUDY

DNRP is proposing a pilot project to help quantify groundwater movement near streams. This proposal is based on a number of studies, in the Study Area and elsewhere, including the following:

- temperature-based studies by the USGS across the country
- a temperature-based study by RH2 Associates for the Union Hill Water Association, and the Northeast Sammamish Sewer and Water District
- the results of several studies under the Sammamish River Valley Groundwater Study, including "mini-piezometer" work by Ecology, and clusters of monitoring wells with water level and temperature logging.

With the understanding that Evans Creek and the Sammamish River have already been extensively studied in this regard, the proposed study would be used initially to assess Cold Creek and upper Bear Creek. Some details for this proposed study will be developed when the final reports for the previously mentioned studies are complete.

The five main tasks required to complete the interaction study are described below.

Task 1: Review Previous Studies

Review previous studies by USGS, RH2, DNRP, and Ecology.

Task 2: Develop Work Plan

Develop a work plan and present it to the Redmond-Bear Creek Groundwater Protection Committee.

Task 3: Develop Monitoring Methods

Install temperature probes and mini-piezometers, and utilize other monitoring methods.

Task 4: Make Observations

Observe water levels and temperature fluctuations.

Task 5: Make Calculations

Calculate interaction factors between surface water and groundwater.

STREAM FLOW AND PRECIPITATION GAGING

As of 2004, DNRP monitors six sites for stream flow within the Bear Creek Valley (three on Big Bear Creek, one on Evans Creek, one on Cottage Lake, and one on Cold Creek). King County also has a full-service weather station and two additional precipitation gages within this area. These current levels of surface water monitoring are based on Surface Water Management (SWM) funding, with some telemeter costs being supported by the Northeast Sammamish Sewer and Water District. This body of work also includes a basin-wide assessment of all measurable

streams over a short time period (two to three days). Finally, new gages may be installed if the proposed level of funding is made available.

The three main tasks required to complete the gaging are described below.

Task 1: Continue Monitoring

Continue stream flow and precipitation monitoring.

Task 2: Install Gages

Install new gages as possible.

Task 3: Provide Data

Provide data via DNRP hydrology Web pages.

GEOLOGIC AND SUSCEPTIBILITY MAPPING

DNRP is proposing to contract with the University of Washington's GeoMapNW (formerly the Seattle-Area Geologic Mapping Project) to perform geologic mapping of a portion of the GWMA. Benefits of this mapping effort would include defining groundwater recharge areas with new susceptibility and maps.

The five main tasks required to complete the mapping are described below.

Task 1: Define Study Area

Only a portion of the Redmond-Bear Creek Valley Groundwater Management Area will be mapped. A current priority area is the Cottage Lake and Cold Creek area. Some aspects of this mapping have already been accomplished in the Sammamish River Valley and in the Lower Bear and Evans Creek areas. We propose to complete these areas (mainly the surficial geologic mapping and input of hydrologic parameters) and to extend the study to the Upper Bear Creek basin. The selection of actual mapping areas will be approved by the PMT.

Task 2: Collect Subsurface Geologic Data

Collect subsurface geologic data (such as borehole or well logs) for the mapping area from sources at King County, with cities and purveyors, in state agency offices in Olympia, and elsewhere.

Task 3: Provide Database

Provide a database that includes both groundwater information and a list of boring logs in the mapping area.

Task 4: Perform Geologic Field Mapping and Updates

Perform geologic field mapping in the mapping area to aid in the development and verification of geologic units for interpretation of maps and cross-sections; use these data to update previous geologic mapping (to a 1:24,000 scale) and create geologic cross-sections of the mapping area.

Task 5: Create Susceptibility Table

Provide a table that indicates a high, medium, or low susceptibility to groundwater contamination for each reinterpreted geologic unit in the study area to allow for future revision of mapping of "areas of susceptibility to groundwater contamination."

REDMOND-BEAR CREEK VALLEY GROUNDWATER DATABASE/WEB PAGE

DNRP currently has software (EQuIS) that allows compilation of groundwater data. DNRP staff is trying to obtain the most up-to-date groundwater data from a variety of sources within the Redmond-Bear Creek Valley

Groundwater Management Area as well as the rest of King County. With the completion of this project, the groundwater data will be available to the public via interactive Web pages.

The three main tasks required to complete the groundwater database/Web pages are described below.

Task 1: Compile Existing Data

Compile available GWMA-specific groundwater data.

Task 2: Program Web Page

Program the Web pages to allow interactive data downloading.

Task 3: Update Information

Update the information on an annual basis.

WATER RESOURCES EVALUATION DELIVERABLES

Table 1. Proposed Water Resources Evaluation Deliverables by Year

Year	Deliverables
2005	• Work plan for surface water/groundwater interaction study; mid-project progress report • Provide stream flow and precipitation gaging data via DNRP hydrology Web pages • GWMA-specific groundwater database programmed; Web pages available to the public
2006	• Surface water/groundwater interaction study completion report • Provide stream flow and precipitation gaging data via DNRP hydrology Web pages • GWMA-specific groundwater database/Web pages maintained
2007	• Complete geologic and susceptibility mapping, produce new map • Provide stream flow and precipitation gaging data via DNRP hydrology Web pages • GWMA-specific groundwater database/Web pages maintained

WATER RESOURCES EVALUATION ESTIMATED COSTS

The total estimated cost for the water resources evaluation is $452,400 over three years. Of this total, DNRP will contribute $210,000 from the SWM fund to continue and extend stream and precipitation gaging. Thus, new (non-SWM) costs for this effort will be $242,400.

Table 2. Water Resources Evaluation Estimated Costs by Work Item

Work Item	Year	Labor (FTE)*	Material, Lab, or Consultant Costs	Total Cost
Surface Water/Groundwater Interaction Study	2005-2006	0.70	$40,000	$138,000
Stream Flow and Precipitation Gaging	2005-2007	1.50 SWM fund	----------	$210,000
Geologic and Susceptibility Mapping	2006-2007	0.10	$75,000	$89,000
GWMA-specific Groundwater Database/Web Pages	2005-2007	0.11	----------	$15,400
TOTAL		**2.41**	**$115,000**	**$452,400**

*Labor costs vary, but are based on $140,000 per FTE per year.

Table 3. Water Resources Evaluation Estimated Costs by Year

Year	Work Item/Task	Labor (FTE)*	Material, Lab, or Consultant Costs	Total Cost
2005	Surface water/groundwater interaction study	0.25	$40,000	$75,000
2005	Stream flow and precipitation gaging	0.50 SWM fund	----------	$70,000

2005	GWMA-specific groundwater database/Web pages	0.05	----------	$7,000
	2005 Total	**0.8**	**$40,000**	**$152,000**
2006	Surface water/groundwater interaction study	0.45	----------	$63,000
2006	Stream flow and precipitation gaging	0.50 SWM fund	----------	$70,000
2006	Geologic and susceptibility mapping	0	$13,000	$13,000
2006	GWMA-specific groundwater database/Web pages maintenance	0.03	----------	$4,200
	2006 Total	**0.98**	----------	**$150,200**
2007	Geologic and susceptibility mapping	0.10	$62,000	$76,000
2007	Stream flow and precipitation gaging	0.50 SWM fund	----------	$70,000
2007	GWMA-specific groundwater database/Web pages maintenance	0.03	----------	$4,200
	2007 Total	**0.63**	**$75,000**	**$150,200**
TOTAL		**2.41**	**$115,000**	**$452,400**

*Labor costs are based on $140,000 per FTE per year; labor costs may vary.

Total RBC Groundwater Program 3-year financial overview

Detail for RBC Groundwater ILA Services

Budget

	Year:	2005	2006	2007	annual FTE	
Science						
	Stream flow and precipitation gaging	$70,000	$70,000	$70,000	0.50	
	SW/GW Interaction	$75,000	$63,000		0.25	(.45 in '06)
	UW Mapping		$13,000	$76,000	0.10	(in '07) *plus UW staff*
	GW data base & web service	$7,000	$4,200	$4,200	0.05	(.03 in '06, '07)
	science subtotal	**$152,000**	**$150,200**	**$150,200**	**0.90**	
Education						
	Education web site coordination of materials	$8,282	$8,282	$8,282	0.05	
	Annual Educators GW Forum	$16,565	$16,565	$16,565	0.10	
	4 GW Articles	$8,282	$8,282	$8,282	0.05	
	education subtotal	**$33,129**	**$33,129**	**$33,129**	**0.20**	
GWPC						
	GWPC logistics: notes, schedules, agendas	$23,361	$23,361	$23,361	0.15	
	GW Policy and Subcommittee work	$7,787	$7,787	$7,787	0.05	
	GWPC subtotal	**$31,148**	**$31,148**	**$31,148**	**0.20**	
RBC Program		**$216,277**	**$214,477**	**$214,477**	**1.30**	

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Project Cost Shares

Partner	2005 Cost Share Percentage	2005 Estimated Cost ($)	2006 Cost Share Percentage	2006 Estimated Cost ($)	2007 Cost Share Percentage	2007 Estimated Cost ($)	TOTAL ESTIMATED COST ($)
King County	62%	120,000	62%	120,000	62%	120,000	$360,000
City of Redmond	21%	40,000	21%	40,000	21%	40,000	$120,000
City of Woodinville	8%	15,000	8%	15,000	8%	15,000	$45,000
City of Sammamish	2.5%	5,000	2.5%	5,000	2.5%	5,000	$15,000
Northeast Sammamish Sewer and Water District	2.5%	5,000	2.5%	5,000	2.5%	5,000	$15,000
Woodinville Water District	2.5%	5,000	2.5%	5,000	2.5%	5,000	$15,000
Union Hill Water District	1.5%	3,000	1.5%	3,000	1.5%	3,000	$9,000
Totals	100%	$193,000	100%	$193,000	100%	$193,000	$579,000
Prospective Grant Revenues	-	*$23,277*	-	*$21,477*	-	*$21,477*	*$66,231*
Grand Total		***$216,277***		***$214,477***		***$214,477***	***$645,231***

NOTE: Total Project Costs are $645,231. Estimated revenues are $579,000. Partners are seeking additional contributions from other sources to support this project and effectively cover all projected costs.