

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:

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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: _____

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**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
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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
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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
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Water Resources Evaluation Total Estimated Cost, 2005-2007:	\$305,000
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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
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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
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Total Estimated Annual Cost – Management and Policy Analysis:	\$70,083
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Policy and Plan Implementation Total Estimated Cost, 2005-2007:	\$210,249
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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
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Education and Outreach Total Estimated Cost, 2005-2007:	\$49,695
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**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.

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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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Groundwater monitoring report • 3-D database of geologic information • Updated geology and susceptibility maps • Geologic cross-sections
2007	<ul style="list-style-type: none"> • 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	
Water Resources Evaluation				FTE	
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	<i>Variable</i> .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
<i>Add \$ to be allocated</i>		<i>\$6,648</i>	<i>-</i>	<i>(\$352)</i>	<i>-</i>	<i>\$2,648</i>	<i>\$8,944</i>
Grand Total		\$196,648		\$175,648		\$192,648	\$564,944