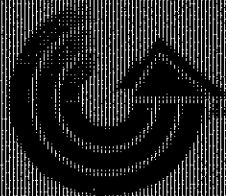


East King County Ground Water Management Plan

Management Strategies



Submitted for adoption, 1992, by
East King County
Ground Water Advisory Committee



**East King County
Ground Water Management Plan
Management Strategies**

**December 1998
Final**

Data and information contained in this document are current as of the period of project performance: 1989 - 1995.

Submitted by:

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(Published Separately)

Executive Summary

**East King County
Ground Water Management Plan**

December 1998

Executive Summary

Overview

The East King County Ground Water Management Area, shown on the following page, encompasses approximately 225 square miles in the north central portion of King County. It is bounded on the north by the Snohomish county line, on the west by the Sammamish and Union Hill Plateaus, on the east by the Cascade mountains and foothills, on the south by Rattlesnake Mountain, and on the southeast, by the topographic divide between the Snoqualmie and Cedar Rivers. The Issaquah Creek and Redmond-Bear Creek Ground Water Management Areas abut the western boundary of the East King County Ground Water Management Area. The higher density residential, commercial and industrial land uses are generally located within the cities of Duvall, Carnation, Snoqualmie and North Bend. The remainder of the management area, outside of the Cities' limits, is predominantly rural, characterized by low-density residential uses, forest, and agricultural lands.

The East King County Ground Water Advisory Committee developed this Plan. They were appointed by the State Department of Ecology and will be submitting the Plan to the state for certification. The Ground Water Advisory Committee met over a six-year period and consists of representatives of many different groups that manage, develop, or rely on ground water in the area.

The East King County Ground Water Management Plan contains an introduction, recommended ground water management strategies, and a recommended implementation and funding process. The recommended management strategies are summarized by implementing agency in Tables 2-1 through 2-4. Supplement I to the plan, the Area Characterization, provides a technical description of the Management Area, and Supplement II contains background material for each issue addressed by the proposed management strategies.

Ground Water Issues

The East King County Ground Water Management Area is unique among the Ground Water Management Areas in King County. It is physically larger than most of the other areas and generally more rural in nature. A larger number of water system purveyors are affected by this ground water planning process. The cities located within the East King County Ground Water Management Area are small, and do not currently support large industrial or commercial complexes. Therefore, the greatest threats to ground water quality are different in nature from those posed in other Ground Water Management Areas. In addition, a large potential regional ground water supply is located within the East King County Ground Water Management Area. Due to these differences, the issues and applicable management strategies proposed in this Plan are somewhat different than those of other smaller and more urban ground water management areas.

With the exception of the areas serviced by Water District 119 and the City of Duvall, nearly all of the water (approximately 90 percent) used for private, municipal, industrial and agricultural purposes in the East King County Ground Water Management Area is provided by ground water sources. Thirteen major Group A water systems, approximately 215 Group B and an unknown number of individual water systems rely on ground water. Analysis of wells in the East King area indicates that alluvium, Vashon recessional, Vashon advance, the upper coarse-grained unit and bedrock are the principal sources of water for existing wells in the East King County Ground Water Management Area. Currently, the alluvial aquifer in the vicinity of the Middle Fork of the Snoqualmie River is being investigated as a potential source of regional ground water supply.

The vulnerability of ground water to contamination is related to the geology, soils, depth to ground water, type of land use activity, and characteristics of the pollutant. In the East King County Ground Water Management Area, the most productive aquifers occur within highly permeable sand and gravel outwash deposits (e.g., coarse alluvial deposits in the upper Snoqualmie Valley). Some of these aquifer systems are susceptible to land use impacts given the high permeability of the overlying soils and the shallow depth to ground water. Furthermore, some private wells in the East King County Ground Water Management Area draw water from relatively shallow depths.

The vulnerability and susceptibility of the ground water in this area is evident from contamination incidences from landfills (Cedar Falls Landfill) and leaking underground storage tanks, consistently high concentrations of total coliforms observed in several wells during data collection, and detection of an herbicide/pesticide in four out of twelve wells sampled near agricultural activities. Land use activities can have a significant impact on ground water quality and use. Land uses in the East King County Ground Water Management Area that can potentially threaten the quality of the ground water supply include: land fills, residential use of septic systems and large lots landscaped in turf, golf courses, underground storage tanks and petroleum pipelines, sand and gravel quarries and mines, and agriculture.

The alluvial aquifer in the vicinity of the Middle Fork of the Snoqualmie River is currently being investigated as a potential source of regional ground water supply. The East King County Regional Water Association, a consortium of water purveyors, has applied to Ecology for water rights in this area. Use of ground water located in the East King County Ground Water Management Area for regional supply further highlights the need for a comprehensive data collection program to track long term trends in ground water quality and quantity.

A water budget performed by the United States Geological Survey (1995) for this Plan indicates that more than half of the precipitation falling on the study area recharges ground water. Of this recharge, only one percent is withdrawn from wells for use, and two percent is discharged at springs (of which one half is put to beneficial use). The ground water used from the study area is therefore a small quantity of the total water present in the system. However, any additional withdrawals from the aquifer

superimposed on a previously stable system must be balanced by an increase in recharge or a decrease in discharge, or result in the loss of storage within the aquifer. Additional withdrawals, therefore, could result in lower ground water levels or a decrease in discharge to springs, rivers, or lakes. Ground water that is discharged to these surface water sources provides for streamflow maintenance, fish propagation, and waste dilution. The magnitude of potential impacts to surface water sources from tapping into ground water sources depends on the decrease in discharge that can be tolerated. Because it can take many years for a new equilibrium to become established, the effects of additional ground water development may not be immediately apparent (United States Geological Survey (USGS), 1995).

Ground Water Management Plan Goals

The underlying goal for the development of this Plan is to protect ground water quality and assure ground water quantity for current and future uses. To achieve this goal, a broad range of strategies is proposed in the plan. Eighteen specific goals intended to provide direction for programs that protect ground water quality and quantity are divided into three categories.

Goals Related to Both Ground Water Quantity and Quality: Four goals are proposed that would protect ground water resources by using local regulations and policies, developing a data collection and management program, infiltrating storm water, and increasing educational efforts for the citizens and local officials of the management area.

Goals Related to Ground Water Quality: Water quality in the East King County Ground Water Management Area is excellent. The emphasis of this proposed plan is to develop strategies and recommended programs to protect the integrity of the existing water quality. Thirteen goals are proposed that address hazardous materials management, infrastructure (e.g., sewer pipes, underground storage tanks and pipelines, and landfills), pesticides, solid waste landfills, golf courses, well construction, and sand and gravel mining. The goals for each of these subject areas simply state that ground water contamination should be prevented.

Goal Related to Ground Water Quantity: An overriding goal of the plan is to manage the quantity of ground water resources of East King County for present and future residents. This goal is addressed through a combination of conservation, education, and long term monitoring and data collection.

Recommendations

The East King County Ground Water Management Plan provides a description of the ground water resources, identifies potential threats to long term water quality and quantity, recommends management strategies for protection, and suggests funding methods for implementation. Management strategies that have been prioritized as 'high' address the susceptibility of the aquifer systems in the management area and the

importance of these systems in supplying the majority of potable water in the area and as a potential regional supply in the future.

A major focus of the recommendations in the East King Ground Water Management Plan is data collection. Because the area is so large, and the available ground water data relatively sparse, it is difficult to characterize the hydrogeology on a scale similar to those of other ground water management plans. In addition, the hydrogeology is quite different in the valley areas and the plateau areas, both of which are included in the East King County Ground Water Management Area. Therefore, data collection activities for this area have been emphasized in order to gain a better understanding of the hydrogeology and water availability.

Other management strategies proposed in this Plan include:

- Adopting policies for location and design of underground petroleum pipelines in city and county land use and comprehensive plans
- Incorporating an assessment of water quality impacts from specific land uses in a "Guide for Environmental Reviewers," especially in areas that are determined to be highly susceptible to ground water contamination, or in high recharge areas.
- Assessing impacts of right-of-way maintenance by chemicals, and suggesting or requiring other methods if right-of-way maintenance methods could impact ground water.
- Development of basic strategies that King County could implement to assist purveyors in their wellhead protection efforts.
- Utilizing the Conservation District's services to help small farmers prepare and implement Farm Plans for ground water and other resource protection.
- Use of best management practices in new sand and gravel mines and a cooperative effort among all agencies involved in permitting or environmental review of sand and gravel mines in order to protect ground water quality.
- Use of best management practices on new golf courses and setting limits on ground water utilization by golf courses;
- Providing education for citizens and local governments by adding to existing educational efforts, and developing needed new education.
- Assessing development's potential impact to recharge areas or infiltration. This would add to the current environmental threshold determination review (which currently only addresses withdrawal or direct contamination).
- Adoption of general aquifer protection policies to provide the policy framework for implementation of specific requirements.
- Providing information to decision makers to aid them in land and water use decisions.
- Mapping physically susceptible and recharge areas to provide a visual tool for decision makers and the public when discussing groundwater concerns.

Implementation

The East King County Ground Water Management Plan is intended to provide a framework to assist cooperation between affected agencies (including purveyors) through implementation of the adopted management strategies. The plan recommends forming a management committee for ground water protection activities in the planning area. The Representation on the East King County Management Committee would consist of a core committee of 5 - 7 members, including a representative from the Ground Water Advisory Committee, the King County Department of Natural Resources, cities in the planning area, a tribal nation in the planning area, a ground water purveyor, and an individual water system owner.

The key task for implementing agencies is to develop programs, projects, budgets, and regulations consistent with this plan. Implementing agencies with the most responsibility include: King County Department of Natural Resources; Seattle-King County Health Department; water purveyors; the Cities of North Bend, Snoqualmie, Duvall, and Carnation; and the State Department of Ecology.

Funding

Long term funding is needed to implement the Ground Water Management Plan. The Ground Water Advisory Committee recommended approach is based on the principle that users of ground water resources that benefit from programs in the Plan should support their implementation. Users of the ground water resource are city water utilities, water districts, water associations, small water systems, individual water systems, industries, and irrigators. Funding for the programs and participation by water purveyors, the cities, and King County would be on a voluntary basis, and is subject to budgetary approval by their governing boards.

If all of the programs identified in this Plan were implemented, there would be a substantial public cost. The Ground Water Advisory Committee prioritized the programs into high, medium and low categories in part because of anticipated funding limitations. Based on preliminary estimates for the County strategies outlined in this Plan, County implementation of the high priority projects would cost approximately \$762,000. Medium and low priority projects would cost approximately \$170,000 and \$150,000, respectively. Cities and purveyors of ground water have not estimated costs associated with their portions of this Plan.

Acknowledgments

**East King County
Ground Water Management Plan**

December 1998

Acknowledgments

The development of the Ground Water Management Plan was extensive and complex. This Plan has been produced jointly by the East King County Ground Water Advisory Committee, in conjunction with: the Seattle-King County Health Department; the King County Department of Natural Resources, Water and Land Resources Division; and the Department of Ecology. The King County Department of Development and Environmental Services, King County Council Staff, and the King Conservation District also contributed information or staff. The Committee and County staff would like to thank the numerous other organizations and citizens who contributed to the development of this Plan.

The Ground Water Advisory Committee was formed in 1990 and met monthly throughout the planning process. The Committee's role was to develop the plan according to the state regulations, and to provide their represented agency's perspective during the development. Input from the Ground Water Advisory Committee provided the foundation for the plan.

Several members of the Ground Water Advisory Committee consistently attended the meetings and provided lively and thoughtful discussion on the various issues. These members included: Robin Boynton, Walt Canter, Mike Fischer, Lyle Fitch, Dr. Kenneth Hahn, Vera Heavens, Bill Jennings, Dick Jones (Committee Chairman), Renny Lillejord, Harold Morgan, Helen Nilon, Christi Norman, Terry Olson, Philip Price, Gerald Prior, Susan Schmoll, and Stephanie Warden.

Technical assistance was provided by the United States Geological Survey. The USGS provided initial background information for the area characterization; including sections on hydrogeology, and water quality and quantity. The consulting team of Golder & Associates also helped prepare the technical information contained in the Area Characterization

The Seattle-King County Health Department's Environmental Health Division initiated the ground water planning process. Under direction and support from Charles Kleeburg, then Chief of the Division, William J. Lasby committed to undertaking this complex and lengthy task. Mr. Lasby directed the development of the Plan from 1987 through 1995, and is recognized for his dedication and leadership. Also, the professional and volunteer staff of the Seattle-King County Health Department ground water program are recognized for their perseverance through the many unanticipated setbacks and demands of ground water program development.

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Chapter One

Introduction

**East King County
Ground Water Management Plan**

December 1998

Introduction

The East King County Ground Water Management Plan has been developed because:

- (1) the ground water of East King County is a limited resource, vital to the future of King County, the well being of local residents, and the vitality of our living natural resources;
- (2) ground water provides nearly 90 percent of the water used for private, municipal, industrial, and agricultural needs in the Management Area;
- (3) ground water is not a separate body of water nor is it a separate environmental resource;
- (4) ground water needs to be protected and managed as a part of the entire hydrologic system, ecosystem, and economic system; and
- (5) the citizens and officials of King County are the stewards of the ground water resource, both for present and future generations.

The East King County Ground Water Management Area is a 225 square mile area generally located in the Snoqualmie Valley. The management area is bounded by the Union Hill and Sammamish Plateaus on the west, Snohomish County on the north, the Cascade Mountain foothills on the east, Rattlesnake Ridge on the south, and the topographic divide between the Snoqualmie and Cedar Rivers on the southeast. Four small cities, the unincorporated communities of Fall City and Preston, low-density rural areas; forestry and agriculture comprise most land use in the Management Area. The King County Comprehensive Plan designates the unincorporated areas of the Management Area as rural, and directs most of the future residential and commercial development into the rural cities of Snoqualmie, North Bend, Carnation, and Duvall. These cities are projected to grow by approximately 6,600 dwelling units over the next 20 years. Future development is projected by the King County Comprehensive Plan to be relatively modest, when compared to the urban portions of the County west of the adopted Urban Growth Boundary. The Management Area is anticipated to grow by approximately four percent of the County's total 20-year growth target.

The East King County Ground Water Management Area is unique among the ground water management areas in King County. It is unique because of geography, the types of activities that pose a threat to ground water, and the potential for one of the area's aquifers to be a source for meeting regional water needs. The Management Area covers the rural Snoqualmie River Valley (from south of I-90 to the Snohomish-King County line), resulting in a plan that affects a large number of water purveyors. The water purveyors of East King County have varying degrees of interest and support for this Plan. Ground water resources are generally not threatened by increasing urbanization, since the four cities located within the management area cover only a small percentage of the entire Ground Water Management Area. Also, they do not have large amounts of impervious surfaces that limit ground water recharge, as compared to cities in other management areas. Thus, the ground water quality issues are related more to land management

practices for recreation, resource extraction, and agricultural uses. Finally, a large potential regional ground water supply, known as the North Bend Aquifer, has been identified in the management area. Due to these differences, the management strategies applicable to the East King County Ground Water Management Area are somewhat different than those for the urban ground water management areas.

Land use activities in the East King County Ground Water Management Area that could potentially affect the quality of the ground water supply include land fills, use of septic systems and underground storage tanks, pesticide and fertilizer use on golf courses and agricultural crops, quarries and proposed petroleum pipelines. Data collection undertaken for development of this plan identified contamination from previously operating landfills and storage tanks, high concentrations of total coliforms, and detection of herbicides or pesticides in several wells near agricultural activities. The proposed management strategies found in this plan are intended to help mitigate the affects of these land use activities on the ground water resource.

1.1 Ground Water Management Program Purpose and Scope

The purpose of the Washington State Department of Ecology's Ground Water Management Program is to foster the development and implementation of local ground water management plans. These plans represent a consensus on the most practical ground water protection measures to safeguard quality and ensure continued availability of this vital resource. The East King County Management Plan directs local and state agencies and water purveyors in developing regulations and/or programs to protect ground water.

The purpose of the East King County Ground Water Management Plan is to provide a framework for cooperation between various agencies through implementation of the recommended ground water protection measures. It is also intended to serve as a guide to further focused research on the aquifers, thereby addressing data, and regulatory protection gaps.

1.2. Ground Water Management Program History

In response to growing concern in Washington State regarding ground water resources, the state legislature passed Substitute House Bill 232 in 1985 (Chapter 90.44.400 RCW *Regulation of Public Ground Waters*). This legislation directed the Department of Ecology to:

- Identify specific locations in need of ground water management programs,
- Establish a program to provide financial assistance to these locations, and
- Develop guidelines for the implementation of local ground water management strategies.

Ecology responded by adopting regulations defining a ground water management area as an area that encloses one or more aquifers, and which exhibits a justifiable concern for

the quality and/or quantity of the ground water (*Ground Water Management Areas and Programs* Chapter 173-100 WAC).

Ecology's ground water program establishes protocols and guidelines for developing a local ground water management plan. A ground water management plan is designed to protect ground water quality and assure ground water quantity for current and future uses. The guidelines establish a process that allows for ground water issues, concerns, and opportunities from all interested groups and agencies to be incorporated into the planning process. The process is designed so that a ground water management plan can be initiated and developed on the local level while being supported by state legislation and regulations. The ground water management program process also provides local government with a method to achieve comprehensive ground water protection goals.

On April 27, 1987, the East King County Regional Water Association asked Ecology to designate the East King County Ground Water Management Area as a ground water management area. The petition document, and subsequent grant application, outlined a number of ground water protection problems facing the area:

- the majority of the water purveyors in the area rely on ground water;
- potential contamination sources threaten groundwater quality, or ground water is susceptible to contamination;
- major aquifers have the potential for over use based on projected future demands;
- the need to assess and document the potential for groundwater development in time for appropriate planning and zoning to be accomplished; and,
- need to address the relationship between shallow ground water and stream flow to help guide planning efforts.

Ecology designated the East King County Ground Water Management Area on April 27, 1989. Ecology approved the membership of the East King Ground Water Advisory Committee, consisting of a broad cross section of interests with representatives from many groups. The Ground Water Advisory Committee was charged with overseeing the development of the Ground Water Management Program and assuring that the program is technically and functionally sound and consistent with the Chapter 173-100 WAC.

Ecology selected the Seattle-King County Health Department to be the lead agency because it has jurisdiction throughout the Ground Water Management Area and has a regulatory role in water systems, on-site sewage systems, and other environmental health concerns. On January 1, 1996, the Metropolitan King County Council assigned responsibility for the ground water program to the Department of Natural Resources, Surface Water Management Division. Subsequently, the division was renamed Water and Land Resources Division.

1.3 Management Plan Process Goals & Objectives

The first step in developing a ground water management plan is to establish goals and objectives. The Ground Water Advisory Committee and the Seattle-King County Health Department developed the following goal and objectives to help guide the process for development of the plans.

Goal To preserve the purity and assure the quantity and quality of existing and future ground water supplies within the management area.

Objectives

- Designate the East King County Ground Water Management Area as a ground water management area, making it eligible for state grants designated for development of ground water management programs and plans.
- Develop a Ground Water Management Plan. This plan must:
 1. Be consistent with federal regulations, state ground water management laws, and local ordinances.
 2. Include the public and local agency participation in drafting, reviewing and modifying the plan.
 3. Include elements as described in *Ground Water Management Areas and Programs* (Chapter WAC 173-100). These include:
 - a) A public involvement plan to educate and inform the public about ground water and the Ground Water Management Plan process. The public will be informed of the need to protect the ground water resource from contamination and overuse and will provide support to the public and private actions required to protect the resource.
 - b) An area characterization section that includes mapping jurisdictional boundaries showing land and water use management authorities boundaries and goals; a description of the locale; the hydrogeology; the ground water quality; and the current ground water use and future needs.
 - c) Identification and description of threats to ground water; stating goals and objectives related to these threats; and recommending strategies that solve or reduce these threats. Technical understanding of the ground water resource will be developed to assist decision-makers in formulating public policy.
 - d) An implementation process for the plan, which includes: a work plan for each affected agency and jurisdiction, an effectiveness monitoring system, and a process for periodic review and revision.
- Obtain local approval and state certification of the plan, which will ensure implementation of the recommended ground water protection measures. Public agencies will work cooperatively to fulfill their responsibilities to protect the ground

water resource. Local, state and regional land-use and water-use plans, policies and regulations will be effective in protecting the ground water resource.

1.4 Ground Water Management Plan Contents

The proposed East King County Ground Water Management Plan contains management strategies and an implementation and funding process. Supplement I of the Plan contains the Area Characterization and Supplement II contains background information pertaining to the development of the management strategies. Each of these sections are briefly described below.

The "Recommended Ground Water Management Strategies" address the potential threats to ground water quality and quantity. The recommended management strategies are prefaced by adopted goals and a summary statement of the issues explored by the Ground Water Advisory Committee. This Chapter also contains tables showing the management strategies for each implementing agency.

The "Recommended Implementation and Funding Process for the Ground Water Management Program" describes the preferred methods for funding and implementing the plan. This Chapter also addresses the participants in the ground water planning process.

Supplement I to this plan contains the Area Characterization. The Area Characterization describes the ground water management area and how its boundaries were chosen. It lists the governments and agencies that manage land and water use and describes their responsibilities. This Supplement characterizes historical land use activities that impact ground water quality and quantity; it also describes the area's hydrogeology and characterizes past and present ground water quality. In addition, the section provides estimates of historical and current rates of ground water use and makes projections of future ground water supply needs.

Supplement II contains the background material and discussion for each recommended ground water management strategy. The complete issue papers the Ground Water Advisory Committee used to make the recommendations, with unabridged background information, are available upon request from the Ground Water Program in the Water and Land Resources Division of the Department of Natural Resources.

1.5 Ground Water Management Plan Team & Responsibilities

Development of this plan was a coordinated effort between local and state government and citizen representatives on the Ground Water Advisory Committee. The following provides a brief explanation of the responsibilities of each group in developing the Ground Water Management Plan.

Ground Water Advisory Committee. The Committee plays a critical role in developing a sound ground water management plan. The Ground Water Advisory Committee consists of a broad spectrum of ground water interest groups, including local, state and federal government agencies, large and small businesses, environmental organizations and citizens. The Committee is responsible for assuring that the Ground Water Management Plan is both technically and functionally sound, and will give final approval to the plan before it is submitted to Ecology for certification. The committee's specific duties include:

- Oversee the development of the Plan;
- Review the work plan, schedule and budget developed by the lead agency;
- Assure that the plan is functional, and will not cause environmental or economic adversity;
- Verify that the plan is consistent with the state's regulations on ground water protection; and
- Formulate and implement a public involvement plan.

Department of Ecology: Ecology appointed the Ground Water Advisory Committee in cooperation with local governments. Ecology is also a participant on the advisory committee. Ecology reviews and approves interim plan products, such as the Public Involvement Plan, the Data Collection and Analysis Plan, the Quality Assurance/Quality Control Plan, and the Data Management Plan. Ecology certifies the Final Ground Water Management Plan; after all affected agencies have concurred.

United States Geological Survey (USGS): The USGS prepared the *Geohydrology and Quality of Ground Water of East King County (1995)*. This report described the ground water system using available data; described the general water chemistry of the major hydrogeologic units and any regional patterns of contamination; evaluated the general potential for ground water development using aquifer characteristics, ground water interaction with surface water, and ground water recharge, and; determined what additional data would be needed to further quantify ground water availability. The USGS provided funding for half of the costs of this part of the ground water management plan.

Seattle-King County Health Department. The Seattle-King County Health Department was responsible for coordinating the activities necessary to develop this proposed Ground Water Management Plan. As lead agency, this included the preparation of a work plan, coordinating data collection, scheduling advisory committee meetings, developing the issue papers, drafting the plan based on committee direction, and obtaining concurrence from the affected agencies.

King County Department of Natural Resources. The Metropolitan King County Council transferred the Ground Water Management Program from the Seattle-King County Health Department to the Surface Water Management Division as part of the County's reorganization plan. Transfer of the program occurred on January 1, 1996, which coincides with the Surface Water Management Division being placed in the new

Department of Natural Resources. Subsequently, the division was renamed the Water and Land Resources Division and is now the lead agency for the Ground Water Management Program.

1.6 Public Review, Certification, & Implementation

Public Review

Upon completion of a draft plan Ecology held a public hearing for comment and review of the plan. This public hearing was held at the Tolt Middle School on December 13, 1995. Public comments from that hearing are included as Appendix A of this document. Ecology extended the comment period by six weeks at the request of the City of Carnation. The lead agency collected public and agency comments during the four and half month period between December and April 1996. Comments received during this period were analyzed by the Ground Water Advisory Committee and, where appropriate, included in the text of this document. The affected agencies that were asked to concur with the Plan are listed in Table 1-1.

TABLE 1-1
CONCURRING AGENCIES

Ames Lake Water Association
City of Carnation
City of Duvall
City of North Bend
City of Snoqualmie
King Conservation District
King County Department of Development and Environmental Services
King County Department of Natural Resources, Water and Land Resources Division
King County Department of Natural Resources, Solid Waste Division
King County Department of Transportation, Roads Services Division
Lake Alice West
Sallal Water Association
Seattle-King County Health Department
Washington State Department of Ecology
Washington State Department of Natural Resources
Water District 119
Water District 123
Seven Class A Water Systems represented by Renny Lillejord, System Consultant: Dawnbreaker Water Association, Riverbend Homeowners Association, Rutherford Estates, Spring Glen Association, Fall City Water District (formerly District 127), Wilderness Rim Association, and the Upper Preston Water Association.

Various drafts of this plan have been prepared, leading up to the present finalization. A Draft was published in November 1995 for concurrence review and comment by various affected agencies. Comments collected during the comment period (through April 1996) were discussed with the affected agencies and governments and necessary changes incorporated into a final draft published in July 1996. This draft was submitted to the

Metropolitan King County Council, and was assigned to the Law, Justice, and Human Services Committee, and hearings were held in July - October 1996 and August - September 1997. However, the plan was not passed, either for concurrence or non-concurrence, in either 1996 or 1997.

In 1998, there was a new effort to move the plan along. This time the plan was referred to two committees, the Utilities and Natural Resources Committee and the Growth Management Committee. Hearings were held in May and June of 1998, and the plan was approved, with conditions, for passage by the Council. On July 6, 1998, the County Council passed Motion 10494 that basically concurred with the plan, although with conditions. The motion, and a sample letter that was attached by Council to the motion, are included in Appendix B.

The Department of Natural Resources (DNR) sent these concurrence materials to the Ground Water Advisory Committee (GWAC) on September 3rd with a cover letter. The GWAC met on November 19th to discuss the changes required by Council, and subsequently drafted a letter (dated December 11, 1998, to Ken Johnson of DNR) clarifying their understanding and acceptance of the changes. All of these items are also included in Appendix B.

Certification

The plan was revised according to Council's motion and submitted to Ecology in December 1998. Following Ecology's review of the plan and determination that it is consistent with the intent of Chapter 173-100 WAC ("Ground Water Management Areas and Programs", see Appendix D) the Plan will be certified and its implementation can begin.

Implementation

Affected agencies and jurisdictions are responsible for implementing the plan following certification by Ecology. Implementation of the plan by water purveyors, cities, and the County is voluntary. The plan may be modified under the supervision of the East King County Ground Water Management Committee. This committee will advise implementing agencies, oversee ground water management activities, review new issues, and consider new programs that emerge after the plan is certified. It is the responsibility of the Management Committee to develop a process for how to incorporate new issues and programs.

Chapter Two
Management Strategies

East King County
Ground Water Management Plan

December 1998

Recommended Ground Water Management Strategies

2.1 Introduction

Ground water management plans specify management strategies to address the potential threats to ground water quality and quantity in the planning area. The ground water advisory committee identified primary issues relating to ground water in the East King County Ground Water Management Area and developed management strategies to address these issues. The East King County Ground Water Advisory Committee considered the following topics: county and city policies to enhance ground water protection, stormwater management, hazardous materials management, golf courses, underground storage tanks and pipelines, on-site sewage disposal system use, pesticides and fertilizers, well construction and decommissioning, sewer pipes, solid waste landfills, burial of human remains, sand and gravel mining, biosolids and effluent, and ground water quantity. The ground water management strategies developed for the East King County Ground Water Management Area are presented and discussed in this chapter. Tables 2 - 1 through 2 - 4, located at the end of this chapter, summarize the strategies by implementing agency.

In developing the management strategies, the East King County Ground Water Advisory Committee made maximum use of existing governmental programs and regulatory structures. The East King County Ground Water Advisory Committee was determined to build on existing efforts rather than developing new and potentially duplicative programs. Also, the East King County Ground Water Advisory Committee realized that the adopted strategies could not totally prevent contamination or depletion of the ground water in East King County, but that implementation of the management strategies should greatly limit the frequency and severity of such problems. The East King County Ground Water Management Plan is intended to provide a framework to facilitate cooperation between various regulatory agencies and water purveyors through implementation of the adopted ground water protection measures. It is also intended to guide further research, focus data collection efforts and address data, and regulatory protection gaps.

After the draft plan was provided to the implementing agencies for review, King County Department of Natural Resources staff and East King County Ground Water Advisory Committee members contacted and/or met with staff from implementing agencies numerous times, to facilitate the concurrence process. This was an iterative process, as first the staff of each agency had to review and comment, then the legislative authority also had to review and comment. As a result of this review, the implementing agencies found that some proposed management strategies needed to be modified or eliminated. The implementing agencies' concurrence comments (if provided) were consolidated by the King County Department of Natural Resources, and revised wording was presented to the East King County Ground Water Advisory Committee for each step in the iterative review process. The East King County Ground Water Advisory Committee then adopted

the revised wording to resolve the issues of non-concurrence. The revised wording is shown in this draft of the Plan.

The East King County Ground Water Advisory Committee prioritized management strategies based on relative impact to ground water and the method used to address the problem (such as regulation or education). The East King County Ground Water Advisory Committee prioritized the management strategies because they recognized that not all management strategies could be implemented at the same time, and that some agencies might not concur with all of the recommended management strategies. Prioritization allows the East King County Ground Water Advisory Committee to indicate the relative importance of each recommended management strategy. These are grouped into high (1 - 4), medium (5 - 8), and low (9 - 14).

The management strategies proposed by the East King County Ground Water Advisory Committee are summarized in tables following Chapter 2. Each table lists the strategies and associated priority for an implementing agency. City strategies are listed in Table 2 - 1, King County strategies in Table 2 - 2, water system purveyor strategies in Table 2 - 3, and Ecology strategies in Table 2 - 4.

The next section summarizes the technical issues pertaining to the Ground Water Management Area, and relates those issues to the proposed management strategies. The following sections then discuss the issues and goals that drove development of each management strategy in the East King County Ground Water Management Plan. First, issues that are associated with both ground water quality and quantity are addressed, followed by issues associated with ground water quality only, and finally those strategies that affect ground water quantity. The strategies and associated tasks that will be involved in the implementation of each strategy are presented by issue. The implementing agency or agencies are identified with an estimate of the time required to implement the strategy, and the priority (high, medium or low) as assigned by the East King County Ground Water Management Committee, for the strategies that need to be implemented. The East King County Ground Water Advisory Committee differentiated between those management strategies that need to be implemented, and those that are of a support or request nature. The management strategies that are requests or supportive of an action do not include associated implementation information. Tables 2 - 1 through 2 - 4 differentiate between those strategies that need to be implemented and those that are requests or support statements.

2.2 Summary of Technical Findings and Recommendations

The following discussion illustrates the relationship between the technical information found in the Area Characterization Supplement and the recommended management strategies in the Plan. The recommended management strategies can be classified as pertaining to either ground water quality or ground water quantity.

The East King County Ground Water Management Area is unique among the Ground Water Management Areas in the county. It is physically larger than most of the other areas and generally more rural in nature. A larger number of water system purveyors are affected by this ground water planning process. The cities located within the East King County Ground Water Management Area are small, and do not currently support large industrial or commercial complexes. Therefore, the greatest threats to ground water quality are different in nature from those posed in other Ground Water Management Areas. In addition, a large potential regional ground water supply is located within the East King County Ground Water Management Area. Due to these differences, the management strategies applicable to the East King County Ground Water Management Area are somewhat different than those of other smaller and more urban Ground Water Management Areas.

A major focus of the East King Ground Water Management Plan is data collection. Because the area is so large, and the available ground water data relatively sparse, it is difficult to characterize the hydrogeology on a scale similar to those of other Ground Water Management Plans. In addition, the hydrogeology is quite different in the valley areas and the plateau areas, both of which are included in the East King County Ground Water Management Area. Therefore, data collection activities for this area have been emphasized in order to gain a better understanding of the hydrogeology and water availability. Regional water suppliers are looking to this area as a potential source of water to augment regional supply to meet future demand projections for King County.

With the exception of the areas serviced by Water District 119 and the City of Duvall, nearly all of the water (approximately 90 percent) used for private, municipal, industrial and agricultural purposes in the East King County Ground Water Management Area is provided by ground water sources. Thirteen major Group A water systems, approximately 215 Group B and an unknown number of individual water systems rely on ground water. Analysis of wells in the East King area indicates that alluvium, Vashon recessional, Vashon advance, the upper coarse-grained unit and bedrock are the principal sources of water for existing wells in the East King County Ground Water Management Area. Currently, the alluvial aquifer in the vicinity of the Middle Fork of the Snoqualmie River is being investigated as a potential source of regional ground water supply.

Water Quality Issues

Ground water quality data presented in the Area Characterization Supplement were collected to provide background information to assess the impacts of changing land use and land use activities on ground water quality. Several management strategies direct further data collection efforts in an attempt to identify long-term water quality trends.

The vulnerability of ground water to contamination is related to the hydrogeologic environment, as well as the type of land use activity and contaminant characteristics. In the East King County Ground Water Management Area, the most productive aquifers

occur within highly permeable sand and gravel outwash deposits (e.g., coarse alluvial deposits in the upper Snoqualmie Valley). Some of these aquifer systems are susceptible to land use impacts given the high permeability of the overlying soils and the shallow depth to ground water. Furthermore, some private wells in the East King County Ground Water Management Area are completed at relatively shallow depths.

The vulnerability and susceptibility of the ground water in this area is evident from contamination incidences from landfills (Cedar Falls Landfill) and leaking underground storage tanks, consistently high concentrations of total coliforms observed in several wells during data collection, and detection of an herbicide/pesticide in four out of twelve wells sampled near agricultural activities. Land use activities can have a significant impact on ground water quality and use. Land uses in the East King County Ground Water Management Area that can potentially threaten the quality of the ground water supply include: land fills, residential use of septic systems and large lots landscaped in turf, golf courses, underground storage tanks and petroleum pipelines, sand and gravel quarries and mines, and agriculture.

Extensive mapping of physically susceptible and recharge areas has been performed as part of this ground water planning process. The areas ranked as highly susceptible to ground water contamination indicate areas where the potential for contamination resulting from specific land management practices is high due to the permeability of the overlying soil and surficial geologic materials and a shallow depth of ground water. Much of the area in and around the cities of North Bend, Snoqualmie, and Carnation is ranked as being of high physical susceptibility to ground water contamination. Some management strategies identified in this Plan, as well as resource protection and land use policies in the King County Comprehensive Plan, are applicable in these highly susceptible areas.

Based on adopted growth targets, the East King County Ground Water Management Area will experience a 60 percent increase in population (from 15,100 to 24,160 households) between 1992 and 2012. The rural cities within the East King County Ground Water Management Area will experience substantially greater growth, based on growth targets and expansion area boundaries designated by the King County Comprehensive Plan. Along with the increased population, employment opportunities in the East King County Ground Water Management Area will expand as well in the cities. These two factors will have an impact on land uses in the area. These impacts will include an increase in residential housing densities and some growth of commercial and industrial activities.

Management strategies that have been prioritized as 'high' address the susceptibility of the aquifer systems in the management area and the importance of these systems in supplying the majority of potable water in the area and as a potential regional supply in the future. These strategies include:

- Adopting policies for location and design of underground petroleum pipelines in city and county land use and comprehensive plans

- Incorporating an assessment of water quality impacts from specific land uses in a "Guide for Environmental Reviewers," especially in areas that are determined to be highly susceptible to ground water contamination, or in high recharge areas.
- Assessing impacts of right-of-way maintenance by chemicals, and suggesting or requiring other methods if right-of-way maintenance methods could impact ground water.
- Development of basic strategies that King County could implement to assist purveyors in their wellhead protection efforts.
- Utilizing the Conservation District's services to help small farmers prepare and implement Farm Plans for ground water and other resource protection.
- Use of best management practices in new sand and gravel mines and a cooperative effort among all agencies involved in permitting or environmental review of sand and gravel mines to protect ground water quality.
- Use of best management practices on new golf courses and setting limits on ground water utilization by golf courses;
- Providing education for citizens and local governments by adding to existing educational efforts, and developing needed new education.

Water Quantity Issues

As the regional population grows, the consumptive use of ground water will increase, particularly if alternative sources are not sufficient to meet demands. Ground water reserves can also be reduced when development decreases the effective area of ground water recharge. For this reason, some management strategies prescribed in the Plan are applicable only to areas defined as highly susceptible to ground water contamination. These areas are mapped on a countywide basis and indicate areas of high potential recharge.

Currently, the alluvial aquifer in the vicinity of the Middle Fork of the Snoqualmie River is being investigated as a potential source of regional ground water supply. The East King County Regional Water Association, a consortium of water purveyors, has applied to Ecology for water rights in this area. Use of ground water located in the East King County Ground Water Management Area for regional supply further highlights the need for a comprehensive data collection program to assure that ground water levels can be maintained.

The USGS states that any additional withdrawals from the aquifer superimposed on a previously stable system must be balanced by an increase in recharge, a decrease in discharge, a loss of storage within the aquifer (reflected by lower water levels), or by a combination of these factors. The magnitude of potential ground water development, therefore, depends on the decrease in discharge that can be tolerated. Because it can take many years for a new equilibrium to become established, the effects of additional ground water development may not be immediately apparent (USGS, 1995).

The deepest aquifers in the study area are believed to be the lower coarse-grained unit and the deepest unconsolidated and undifferentiated deposits. Also, geophysical evidence indicates buried valleys from the ancient Snoqualmie River's path. Recharge to the deep aquifers is very slow in relation to the ability to draw water from them. The age of the water that is extracted is probably as old as the sediment when deposited. If the deep aquifers were pumped for water supply purposes, the time lag would be great between when ground water is removed and when surface aquifers that recharge them are impacted. Similarly, once the deep aquifers are impacted from pumping, the rate at which they will recover will be equally as slow, or slower, if they recharge at all. This fact should be considered before use of the deeper aquifers for water supply purposes is contemplated (USGS, 1995). Exploratory drilling performed to assess the potential of the aquifers near the middle fork of the Snoqualmie River to provide a source of regional supply has occurred in both shallow and deep aquifers of that area.

The East King County Ground Water Advisory Committee recommends management strategies to assist in maintaining ground water levels in the Ground Water Management Area. The highest priority strategies that address water quantity include:

- Assessing development's potential impact to recharge areas or infiltration. This would add to the current environmental threshold determination review (which currently only addresses withdrawal or direct contamination).
- Adoption of general aquifer protection policies to provide the policy framework for implementation of specific requirements.
- Providing information to decision makers to aid them in land and water use decisions.
- Providing education for citizens and local governments by adding to existing educational efforts, and developing needed new education.
- Mapping physically susceptible and recharge areas to provide a visual tool for decision makers and the public when discussing groundwater concerns.

2.3 Program Elements Related to Both Ground Water Quality and Quantity

The East King County Ground Water Advisory Committee identified four topics that affect ground water quantity and quality: general county and city policies; data collection and management; stormwater management; and education. The goals that guided development of the recommended management strategies for each are:

County and City Policies for Ground Water Protection: To use local regulations and policies to enhance ground water protection efforts in the East King County Ground Water Management Area.

Data Collection and Management Program: To protect ground water quantity and quality by developing and implementing a long-term data collection and management program.

Stormwater Management: To promote stormwater practices that provide the greatest amount of recharge while protecting ground water quality.

Education Program: To increase individual participation in protecting the ground water resource by educating citizens concerning the Ground Water Management Plan, the threats to ground water quantity and quality, and means by which those threats can be reduced.

2.3.1. County and City Policies for Ground Water Protection

During the planning process, two significant legislative acts influenced the East King County Ground Water Advisory Committee's recommendations. The first is the Growth Management Act, passed by the Washington legislature in 1990. This act requires local government to identify and protect areas that are critical for aquifer recharge. The East King County Ground Water Advisory Committee responded by recommending that maps of the ground water concern areas be produced to identify the areas, that additional general ground water protection policies be adopted, and that environmental review be standardized. This is in keeping with the directive of the Growth Management Act that local governments cooperatively protect aquifer resources on a county or regional basis.

The second is the State Department of Health Wellhead Protection Program. The program requires public water system purveyors to delineate wellhead protection areas for each public water system and develop programs to protect ground water in those areas. The East King County Ground Water Advisory Committee recognized the need for King County to be able to respond to land use recommendations and other ground water protection strategies specified in well head protection plans.

The Growth Management Act

The Growth Management Act of 1990 requires all counties and cities in Washington to plan in order to manage growth. Counties and cities must adopt comprehensive plans and regulations to protect designated critical areas "including areas with a critical recharging effect on aquifers used for potable water." The Growth Management Act also requires that the comprehensive plans contain land use controls to protect the quality and quantity of ground water used for public water supplies (Chapter 36.70A.070(1) RCW).

Mapping known critical areas is encouraged as the best way to communicate to developers and regulators the location of the protected lands. It is recognized, however, that mapping aquifer recharge areas can be difficult and imprecise. The Growth Management Act guidelines recommend that changes in designated areas be allowed as new information is available and errors are found.

King County adopted the King County Comprehensive Plan, which contains several policies related to ground water protection to meet Growth Management Act requirements. These policies provide the basis for incorporating ground water into overall natural resource management by King County. These policies include:

- NE - 332 In unincorporated King County, areas identified as sole source aquifers or as areas with high susceptibility for ground water contamination where aquifers are used for potable water are designated as Critical Aquifer Recharge Areas as shown on the map, entitled Areas Highly Susceptible to Ground Water Contamination. Since this map focuses primarily on water quality issues, the County shall work in conjunction with cities and ground water purveyors as new information from ground water and wellhead protection studies adopted by the County or state agencies becomes available.
- NE-333 King County should protect the quality and quantity of ground water countywide by:
- a. Placing a priority on implementation of adopted Ground Water Management Plans;
 - b. Developing a process by which King County will review, and implement, as appropriate, adopted Wellhead Protection Programs in conjunction with cities and ground water purveyors; and
 - c. Developing, with affected jurisdictions, Best Management Practices for new development and for forestry, agriculture, and mining operations recommended in adopted Ground Water Management Plans and Wellhead Protection Programs as appropriate. The goals of these practices should be to promote aquifer recharge quality and to strive for no net reduction of recharge to ground water quantity.
 - d. Refining regulations as appropriate to protect critical aquifer recharge areas when information is evaluated and adopted by King County.
- NE-335 In making future zoning and land use decisions, which are subject to environmental review, King County shall evaluate and monitor ground water policies, their implementation costs, and the impacts upon the quantity and quality of ground water. The depletion or degradation of aquifers needed for potable water supplies should be avoided or mitigated, and the need to plan and develop feasible and equivalent replacement sources to compensate for the potential loss of water supplies should be considered.
- NE-336 King County should protect groundwater in the Rural Area by:

- a. preferring land uses that retain a high ratio of permeable to impermeable surface area and that maintain or augment the infiltration capacity of the natural soils, and
- b. Requiring standards for maximum vegetation clearing limits, impervious surface limits, and where appropriate, infiltration of surface water. These standards should be designed to provide appropriate exceptions consistent with Policy R-216.

These policies lay a foundation for ground water protection and management by King County. The East King County Ground Water Advisory Committee built on this foundation by specifying a method for developing and producing maps showing ground water concern areas. Also, the East King County Ground Water Advisory Committee provided for consistent environmental review by King County and cities by recommending that King County Department of Natural Resources develop a guide for environmental reviewers. Environmental reviewers may not be familiar with the information needed to fully assess a development's impact on ground water quality and quantity.

The Wellhead Protection Program

The 1986 amendments to the Safe Drinking Water Act established a Wellhead Protection Program intended to safeguard ground waters used by public water supply wells. A Well Head Protection Area is defined in the Safe Drinking Water Act as "the surface and subsurface area around a well or wellfield supplying a public water system through which contaminants are reasonably likely to move toward and reach such water well or wellfield" (42 U.S.C.A. 300h-7(e)). Due to the nature of wellhead protection, much of the actual implementation efforts will be done by public water systems, local governments and by those agencies with source-specific jurisdictional responsibilities. Public water system purveyors are responsible for delineating a Well Head Protection Area and inventorying sources of contamination within the Well Head Protection Area. The effectiveness of these programs was largely predicated on the ability of the municipal well owner to directly regulate land use in all or a large portion of the zone of contribution. However, where public water system(s) do not control surrounding land use, the success of the Well Head Protection Program will depend on the willingness of other city and county governments to impose necessary land use or other restrictions.

Considering the large number of public water systems in King County, responding to requests for and implementing individualized land use controls for each would be unworkable for King County. However, it should be possible to develop strategies under which King County could help implement Well Head Protection Programs. Development of these strategies would benefit water systems required to prepare Well Head Protection Programs. This approach agrees with the state Wellhead Protection Program, which recommends a countywide approach to wellhead protection. It also follows adopted policy in the King County Comprehensive Plan (NE-333).

Issue 1 General protection of aquifers. Effective aquifer protection requires cooperation between land use jurisdictions because aquifers do not coincide with jurisdictional boundaries. General policies that provide guidance for land use decisions could be adopted by King County and cities to provide a basic level of protection for aquifers. Environmental review needs to be standardized to include thorough consideration of a proposed development's impact on ground water. Ground water concern areas need to be defined and mapped.

AP - 1A Adoption of general aquifer protection policies. King County and cities would adopt the following policies in the next comprehensive plan update, or retain existing policies for the East King County Ground Water Management Area:

- While protection and sustainable use of ground water based drinking supplies in the East King County Ground Water Management Area is preferred over importing or exporting water outside of the Ground Water Management Area, exporting water will not be prohibited, provided local water needs are met first.
- Wellhead protection programs will provide direction for focusing intense aquifer protection efforts in those areas, usually urban, where the existing built environment presents very significant risks to public drinking water systems.

AP - 1B Adoption of general aquifer protection policies. Cities would adopt the following policies in their next comprehensive plan update, or retain existing policies for the East King County Ground Water Management Area:

- Ground water based public water supplies should be protected by preventing land uses that may adversely affect ground water quality or quantity to the extent that the supply of high quality drinking water to present and future populations might be jeopardized.
- Higher intensity (commercial, industrial) land uses in rural cities that may have significant impacts upon ground water quality and quantity should be avoided when possible in the most physically susceptible areas.

Who: King County: Office of Strategic Planning, Metropolitan King County Council; Cities: Planning Department and City Council
Time: King County: Office of Strategic Planning: 0.04 FTE
Priority: High (2.4)

AP - 1C Enhanced environmental review to protect aquifers. King County Department of Natural Resources, in conjunction with the Management Committee, will develop guidance to assist environmental reviewers to:

- Identify proposed development that may significantly impact ground water in the physically susceptible areas;
- Recognize and require adequate information to assess impacts upon ground water; and
- Recognize and propose effective mitigation.

The East King County Ground Water Advisory Committee will provide suggestions to the Management Committee for its consideration in developing the guidance text for environmental reviewers. Related management strategies (SG-1A, GC-2, and WQ-1B) would be included in the guidance.

Who: King County Department of Natural Resources would develop guidance for the approval of the Management Committee. King County Solid Waste Division and cities in the ground water management area may assist in the process. Guidance could be used by city or county environmental review agencies.

Priority: High (2.5)

Time: 0.5 FTE

AP - 1D Ground Water Concern Areas. King County, through an on-going process, will map areas where ground water is physically susceptible to contamination. These areas have been mapped according to the following criteria:

1. Soil permeability - Soil units are defined by the Natural Resources Conservation Service in the Soil Survey of the King County Area (SCS 1973). The units are rated high, moderate, or low permeability according to the description in the Survey. (1/4 weight given to this criteria.)
2. Geologic materials - United States Geological Survey maps provide information on surficial geology. High, moderate, or low permeability has been determined by professional judgment. (Full weight.)
3. Depth to water - Drillers logs and previous investigations are used to determine depth to the uppermost water table. Existing water table elevation maps are used, if available. High (0-25 feet from surface), moderate (25-75 feet from surface), and low (greater than 75 feet from surface) contamination potentials are assigned. (Full weight.)

Areas receive overall ratings by use of an overlay map that incorporates ratings from the three physical parameters. A combined rating score is assigned to each portion of the mapped area. Determination of whether an area has a high, moderate, or low potential for recharge is based on the combined rating.

The ground water susceptibility maps produced for the Ground Water Management Plan and for the King County Comprehensive Plan were based on available information. Both the Ground Water Management Plan and the Comprehensive Plan specify that the maps will be refined as new information becomes available. Identification and protection of areas important to the quantity and quality of ground water is required by the Growth Management Act. King County expects to meet this requirement by starting with the maps currently produced, and adding new information as it becomes available. However, decisions that result in severe changes in the use of property should be deferred until detailed studies of the affected areas can be accomplished. New information may include precipitation data, land coverage and land use, for recharge and vulnerability estimation.

The recommendation in management strategy PF-1A would be included in future mapping efforts.

Who: King County Department of Natural Resources
Priority: High (2.3)
Time: 0.5 FTE

Issue 2 Well Head Protection. Public water system purveyors are required to meet federal and state requirements to delineate and adopt measures to protect wellhead protection areas. Implementation of the East King County Ground Water Management Plan will fulfill some wellhead protection needs. However, specific strategies to provide an increased level of protection to public water systems are required by the Washington Department of Health. In order to accommodate the needs of many water system purveyors, King County needs to develop a way to assist wellhead protection in the unincorporated area.

AP - 2 Well Head Protection Facilitation. The **King County Department of Natural Resources**, in conjunction with the Management Committee, will develop a list of actions that King County would use to help purveyors implement Well Head Protection Programs.

This recommendation is supported by King County Comprehensive Plan policy NE-333 which provides for: "...b. Developing a process by which King County will review, and implement, as appropriate adopted Wellhead Protection Programs in conjunction with cities and ground water purveyors...." King County does not have a process to put in place the recommendations (policies) that the purveyor determines are the best way to protect a well head's zone of contribution. Since many zones of contribution are in King County, and not under a city's jurisdiction, King County may be asked to implement land use controls and other actions for which an individual water purveyor does not have authority. The King County Department of Natural Resources would develop a list of actions that King County could legally and programmatically implement to ensure that the requirement that they be "appropriate" is met. The related management strategies (those listed under UST-1 and OS-1) are examples of actions that the county could take to facilitate wellhead protection. This list would be provided to all of the ground water purveyors in the County that are required to develop a Wellhead Protection program to inform them of the actions the County may take in order to help protect their wellhead. The intent of this strategy is to streamline well head protection program development so that the purveyors and/or administrators of well head protection programs would not waste time requesting that the County take actions, that the County, legally or programmatically, could not accomplish.

Who: King County Department of Natural Resources, Management Committee,
King County agencies.
Priority: High (2.6)

Time: Department of Natural Resources: 0.5 FTE; Department of Development and Environmental Services Code Development: 0.56 FTE. King County Solid Waste Division: To be determined.

2.3.2. Data Collection and Management Program

Ground water resource management requires information on all aspects of ground water hydrology, including surface and ground water levels, precipitation, recharge, use, and potential contamination. Historically, ground water quality and quantity data, in a collated, readily available format, have not been available to ground water resource decision-makers. State and local agencies need those data to:

- determine water resource trends in ground water quality and quantity
- make informed decisions on such issues as land use and water rights
- plan for peak water use and population growth impacts
- conduct water programs such as well construction and decommissioning, operation and maintenance
- develop and refine a water resource model
- respond to data requests from water agencies and other interested parties, and
- respond to incidents such as water level declines.

Further data collection and analysis is needed along with an expanded network of existing and new wells for the development of a conceptual model of ground water hydrology in East King County.

Issue 1 Data Collection, Analysis and Management. Characterization of the ground water hydrology in the East King County Ground Water Management Area needs to be performed. Data collection and analysis is needed to refine characterization of the aquifers and for long term management of the resource.

DCM - 1A Data Collection, Analysis and Management: The King County Department of Natural Resources, in conjunction with the Management Committee, will develop and implement a data collection and management program that:

- Collects data needed according to Data Collection List (see the Supplement: Management Strategies) and the recommendations in management strategy PF-1B.
- Continues data entry into the database, manages the data for quality control and applicability to analysis techniques, standardizes the format, shares the data with other agencies, and ensures data compatibility with other data collection efforts.
- Analyzes the data to:
 1. refine a conceptual understanding of the ground water hydrology for determination of the available resource;
 2. assess impacts of land use on the resource; and
 3. determine if a sophisticated numerical/computerized model is needed or would be useful.

DCM - 1B Data Collection, Analysis and Management: Cities are required to tag existing and new wells per Washington State Department of Ecology regulations.

DCM - 1C Data Collection, Analysis and Management: Purveyors will encourage property owners to tag and report existing and new wells during application for service. Purveyors can also suggest that current customers report existence of wells in a notice in their billing.

Tasks associated with DCM - 1 include:

Task 1: Monitoring of water quality, water level, precipitation and stream discharge parameters. Where water level declines or ground water contamination is observed, appropriate action would be taken. Conduct other activities listed in the Data Collection List, in the Supplement, Chapter 2 Management Strategies.

Task 2: Enter data collected into the King County Department of Natural Resources database. Maintain database and provide this data regularly to Ecology and affected cities and water districts.

Task 3: Develop a numerical or computerized ground water hydrology model.

Who: Tasks 1 - 3: King County Department of Natural Resources
Priority: High (1.1)
Time: King County Department of Natural Resources, 1 FTE.

Task 4: Tag existing and new wells where found.

Who: Ecology, cities (public works departments), utilities, well drillers, Seattle-King County Health Department and volunteers. King County Department of Natural Resources would coordinate the effort.
Priority: High (1.1)
Time: Seattle-King County Health Department: 0.5 FTE.

DCM - 2 Data Collection, Analysis and Management: Ecology will input local ground water management area data into Ecology's ground water database.

Who: Ecology
Priority: High (1.2)
Time: 0.125 FTE

2.3.3. Ground Water Quality and Quantity Issues Associated with Stormwater Management

Past and present stormwater management practices can account for ground water quantity and quality problems. Ground water quality may be impacted if stormwater containing contaminants is recharged intentionally or inadvertently. Also, some precipitation is diverted to surface water when, under natural conditions, it would be recharged to ground water. As a result, the quantity of water recharged to ground water can be decreased.

The East King County Ground Water Advisory Committee adopted the following management strategies to address stormwater management practices, regulations and policies. Educational strategies related to stormwater management are found in the Education Program.

Issue 1 Runoff Versus Recharge. The King County Surface Water Design Manual encourages infiltration as a method of stormwater management. Many cities in the East King County Ground Water Management Area have adopted or use the King County Manual for reference in their stormwater management programs.

ST - 1A Runoff Versus Recharge. King County is in the process of revising the surface water design manual to encourage that runoff be infiltrated when site conditions permit, except where potential ground water contamination cannot be prevented by pollution source controls and stormwater pretreatment, or unless otherwise permitted to directly discharge stormwater into a receiving body. **Cities** should adopt similar provisions. **Cities** should maintain a policy of no net reduction of recharge in new development or redevelopment in the most physically susceptible and recharge areas.

Who: Cities (public works department)
Priority: High (4.1)
Time: To be determined.

Issue 2 Ground Water Quality Concerns. Numerous studies have demonstrated that nonpoint source pollution is a major contributor to ground water degradation. Stormwater quality controls will increasingly be used to reduce the impacts of nonpoint source pollution on both surface and ground water resources. Technology associated with these practices is in early stages and long term effects on ground water quality are unknown. While water quality controls will improve the quality of the water discharged to the ground, the increasing emphasis on infiltration poses risks. Infiltration will be employed most often in areas with glacial and alluvial soils associated that characterize the areas most physically susceptible to ground water contamination. Regardless of how comprehensive new requirements may be, treatment systems will sometimes fail for a variety of reasons and they cannot be expected to function optimally at all times. Additionally, nonpoint source pollution that is not carried by stormwater directly to

surface water, will infiltrate and reach ground water regardless of stormwater management techniques.

ST - 2A Ground Water Quality Concerns - Treatment Requirements. Cities will require more stringent design standards for facilities located in the most physically susceptible areas for new construction. Examples of applicable design standards are in the 1996 draft of the King County Stormwater Design Manual.

ST - 2B Ground Water Quality Concerns - Long Term Impacts. King County Department of Natural Resources, in conjunction with the Management Committee, should sponsor research on the long-term impacts of the infiltration of pretreated stormwater on ground water quality. This research will be supported by monitoring of the discharge from a pretreatment system and other appropriate variables in areas where the facility is installed and operating.

Who: Cities, King County Department of Natural Resources, Management Committee.
Priority: High (4.4)
Time: King County Department of Natural Resources, 0.06 FTE

Issue 3 Coordination Between Surface and Ground Water Planning Efforts. Surface and ground water planning efforts need to be effectively coordinated in order to make the best use of limited resources.

ST - 3A Coordination Between Surface and Ground Water Planning Efforts: Ecology Programs. Ecology will assess surface and ground water quality planning programs to determine how they could be combined or coordinated in a way which is both scientifically justified and which provides for greater efficiency.

Who: Ecology
Priority: High (4.7)
Time: 0.32 FTE

ST - 3B Coordination Between Surface and Ground Water Planning Efforts: King County, cities, appropriate special purpose districts, and other water purveyors will effectively coordinate water resource planning to provide the best possible protection of water resources.

Who: King County Department of Natural Resources. Cities, special purpose districts, other water purveyors.
Priority: High (4.8)
Time: King County Department of Natural Resources: 0.25 FTE

Issue 4 Assessment of Existing Stormwater Facilities. Existing stormwater management facilities (or the lack of facilities) in the most physically susceptible areas and Wellhead Protection Areas may pose a risk to ground water quality and the population served by public water systems. Some facilities were constructed with little concern about ground water quality. Of particular concern are dry wells used in commercial and industrial areas. Also, some areas have only ditches as stormwater facilities. This situation may be found in areas with highly permeable soils that were developed prior to current regulations. Stormwater enters ditches in these areas and rapidly infiltrates without benefit of treatment.

ST - 4 Assessment of Existing Stormwater Facilities. The **East King County Ground Water Advisory Committee** requests that King County and cities assess the adequacy of stormwater facilities in the most physically susceptible and recharge areas and Well Head Protection Areas to protect ground water quality and to give these areas high priority for water quality facility retrofit as warranted.

Issue 5 Roadway Runoff. The State Highway Runoff Program provides for improved water quality and quantity controls for stormwater runoff from new and existing state highways. The King County Surface Water Design Manual requires water quality and quantity controls for new roadways in King County. It is expected that many cities have similar requirements. However, state and local programs may not address ground water quality and quantity problems associated with existing roadways. Existing contamination problems may be identified in Basin Plans developed by Water and Land Resources Division in cooperation with cities and through other processes to identify needed capital improvements. King County and cities would then address the problems identified as funding allows.

ST - 5A Roadway Runoff. The **East King County Ground Water Advisory Committee** requests that the King County Department of Transportation, Road Services Division, and the State Department of Transportation give consideration to physically susceptible and recharge areas in their long term planning of road construction and maintenance projects for correcting water quality problems on new and existing roadways.

Issue 6 Soil Amendment. Clearing vegetation from glacial till soils results in relatively high stormwater runoff volumes, because the vegetative layer (duff) and permeable top layer is often removed. Since the permeable top layer has been partially or completely removed, appropriately used pesticides and nutrients used in landscaping may be carried off site with stormwater runoff, instead of being retained in the soil where they can be utilized or broken down by natural processes. Contaminated runoff can be carried to physically susceptible and recharge areas where it may contribute to ground water contamination. Pesticide use, or releases of other potential contaminants in glacial outwash soils (sand and gravel) may also cause ground water problems. Chemicals may penetrate well beyond the root zone due to poor attenuation capability of the soil,

resulting in contamination of shallow aquifers. Soil amendment is the process of adding materials to the soil to increase moisture and nutrient retention. Amendments that could be used include composted yard waste and commercial topsoil. The benefit to ground water of soil amendment is that nutrients, pesticides, and other pollutants from generalized sources would be less likely to run off of the site or rapidly move through excessively permeable soils to reach shallow, unprotected aquifers typical of the most physically susceptible and recharge areas.

ST - 6 Soil Amendment. King County Department of Natural Resources, in conjunction with the Management Committee, will evaluate the ground water quality and quantity benefits of soil amendment. Soil amendment requirements shall be recommended if the proposed research proves to be a practical method of improving water quality, increasing infiltration, and reducing stormwater runoff.

Who: King County Department of Natural Resources, Management Committee,
Center for Urban Water Resources, University of Washington.
Priority: High (4.9)
Time: To be determined with input from Center for Urban Water Resources
Management. Department of Natural Resources: 0.25 FTE

2.3.4 Education Program

Providing citizens with information on ground water resource management and protection may be a particularly effective method of protecting the resource. Understanding, caring and commitment are needed to protect a resource that is found almost everywhere and is affected by a wide variety of land and water use activities. Although regulations may help, groups of informed citizens actively caring for their own communities might be more effective. Providing technical assistance will not address all concerns but will entice some community members to take individual action.

Currently a number of education programs are focused on individual sources of contamination. However, no existing, comprehensive ground water education program focuses on the following tasks:

- Aid in developing consistent resource protection messages, regardless of the specific educational program;
- Coordinate with other resource protection programs that focus on a specific issue, such as solid waste, hazardous waste, or stormwater management; and
- Develop specific education activities and materials for point and non-point sources of contamination that do not have their own individual educational programs.

A comprehensive program would coordinate existing environmental education programs to develop compatible messages about ground water resources and ground water protection. This component would be accomplished by briefing environmental educators

about King County's ground water system and supporting joint programs. The program would respond to local ground water quality and quantity concerns that are not already addressed by other programs. This program would provide assistance for individual drinking water supplies, local planning efforts, and/or other ground water protection projects.

Issue 1 Existing Education. Considerable effort is underway to educate the public regarding the prevention of non-point pollution, conservation, well construction, and improper disposal of hazardous materials. Agencies or jurisdictions involved include King County Department of Natural Resources, Water Pollution Control and Water and Land Resources Divisions, Seattle-King County Health Department, King County Cooperative Extension, King County Department of Development and Environmental Services, cities, Puget Sound Water Quality Authority, Department of Ecology, King Conservation District, Natural Resources Conservation Service, public and private schools, and others. These agencies have developed a variety of educational materials; however, it has not been determined if these existing educational materials contain ground water resource protection information.

ED - 1A Existing Education: The King County Department of Natural Resources will review existing educational efforts to determine whether the protection of ground water is emphasized, and will report to the Ground Water Management Committee on the adequacy of existing educational programs to address ground water concerns. The King County Department of Natural Resources will seek the cooperation of the parties involved to include ground water information and concerns in the existing educational programs. The specific elements of the educational program are:

- Existing educational program content will be reviewed for agreement with Ground Water Management Plan policies and goals. The King County Department of Natural Resources will review the current educational programs of Natural Resources Conservation Service, Cooperative Extension and other county agencies to ensure that the Ground Water Management Plan goals and policies are reflected;
- The Local Hazardous Waste Management Program in King County will coordinate with the Household Hazardous Waste Education Committee to include information about risks to ground water associated with the disposal of household hazardous wastes to on-site sewage systems as part of their household hazardous waste educational activities;
- King County will work with the local chapter of the Washington State Nursery and Landscape Association, King County Cooperative Extension Service, and the King Conservation District to promote the availability of appropriate seed stocks, plants, and materials to facilitate implementation of xeriscaping (use of low-water use plants);
- The Education Program will support conservation education efforts in the schools and for the general public as described in the *Conservation Planning Requirements*

(Washington Water Utilities Council, Department of Health, Department of Ecology, March 1994);

- Cooperative Extension and the King County Department of Natural Resources will prepare a brochure to educate residents about landscaping practices that promote aquifer recharge;
- The Seattle-King County Health Department will coordinate measures to increase public awareness concerning the potential impacts of discharging household chemical products to an on-site sewage system. Such measures would be an extension of activities scheduled as part of the Local Hazardous Waste Management Plan.
- Educational programs concerning the effect of business and household landscaping practices on aquifer recharge could be coupled with education on the impacts of pesticide and herbicide use on ground water quality. A discussion of proper disposal of household hazardous wastes could be included. Landscaping tips should include a discussion of native vegetation and its role in facilitating infiltration of moisture. Educational efforts would complement and combine with current efforts of the Seattle-King County Health Department, Cooperative Extension, and the Conservation District. This information could be disseminated through the Master Gardener and other programs of Cooperative Extension.
- General public knowledge about the public health significance of the requirements for well construction, operation, maintenance, and decommissioning is lacking. The Ground Water Management Plan Education Program will coordinate with and support the Department of Ecology's well identification, well construction, proper well maintenance, contamination sources, and well decommissioning projects. Informed well owners and other community members are probably more likely to comply with the well construction and decommissioning regulations. Methods of informing well owners might include distributing a questionnaire about wells to homes in the community, developing and distributing an educational brochure for homeowners, and supplementing the brochure with community educational programs. The questionnaire should be designed to ascertain the number of wells on each property, the construction methods used, and the number of wells that require decommissioning. The brochure should include recommended practices and legal requirements for well construction and decommissioning. It should also include the reasons why practices such as sealing the well are both advisable and required by law so that homeowners are knowledgeable before they make plans to construct or decommission a well.

Issue 2 New Educational Elements. Several issues and contaminant sources are not addressed by any existing education program. These have been identified through the East King County Ground Water Advisory Committee's consideration of ground water protection issues. These issues and contaminant sources need to be addressed as part of the educational program.

ED - 2 New Educational Elements: King County Department of Natural Resources will develop specific educational activities and materials for sources of contamination.

The **King County Department of Natural Resources** will report to the Management Committee on the adequacy of existing educational programs to address ground water concerns. This report will include proposed changes as a result of review and discussions carried out in the implementation of ED-1. The King County Department of Natural Resources will then develop a supplemental educational program to address identified deficiencies and present the program to the Management Committee for review and adoption.

New educational programs will be developed and implemented according to the adopted East King County Ground Water Advisory Committee actions below (this is a partial list, more elements are expected to be developed as the program progresses):

- Increase awareness concerning proper on-site sewage system operation and maintenance, including the risks associated with disposal of hazardous wastes in such systems. Amend the existing public information pamphlet concerning on-site sewage system maintenance and operation to provide instructions concerning proper household hazardous waste disposal practices;
- Educate homeowners and other owners of exempt underground storage tanks, including home heating oil tanks, regarding tank abandonment requirements of the Uniform Fire Code. Providing this information may increase the number of home purchasers requesting disclosure of information on tank status.
- Support schools or individual teachers with an interest in ground water protection. Such support could include providing education materials or developing school skits.
- Work with neighborhood groups on neighborhood ground water protection efforts. This could include developing and installing interpretive signs, for example, signs explaining Wellhead Protection Areas.
- Sponsor informational booths at local fairs and displays at local libraries or business lobbies.

Who: King County Department of Natural Resources in conjunction with applicable agencies, under direction of the Management Committee.
Priority: High (2.1)
Time: 0.5 FTE

ED - 3 Education: Cities and other water purveyors will utilize educational program products provided by state and county agencies.

Who: Cities and water purveyors.
Priority: High (2.1)
Time: Varies by agency.

2.4 Programs to Protect Ground Water Quality

The East King County Ground Water Advisory Committee identified eleven topics that affect ground water quality: hazardous materials management, underground storage and transport of petroleum products, on-site sewage treatment and disposal system use, use of pesticide and fertilizer, well construction and decommissioning, sewer pipes, solid waste landfills, burial of human remains, sand and gravel mining, biosolids and sewage effluent, and golf courses. The goals, under which the individual management strategies were developed, are:

Hazardous Materials: Waste Management. To ensure that ground water is not contaminated due to improper management of hazardous wastes.

Hazardous Materials: Contaminated Sites. To assist federal and state cleanup programs in discovering hazardous waste disposal sites in King County and in communicating public health risks associated with ground water pollution at those sites to the public.

Hazardous Materials: Spills. To ensure that the emergency response to spills of hazardous material include methods to avoid ground water contamination.

Underground Storage and Transport of Petroleum Products. To ensure that underground chemical and fuel storage tanks and petroleum product pipelines do not contaminate ground water.

On-Site Sewage Treatment and Disposal System Use. To promote on-site sewage treatment and disposal planning and practices that are effective in protecting ground water resources from possible adverse impacts.

Use of Pesticide and Fertilizer. To prevent ground water contamination from the use of pesticide and fertilizer.

Well Construction and Decommissioning. To protect the quality of ground water in the county by ensuring that proper well construction and decommissioning procedures are followed.

Sewer Pipes. To prevent the degradation of ground water which may be caused by waste water leaking from gravity sewer pipes and side sewers, and to prevent the loss of water through infiltration to gravity sewer pipes and side sewers.

Solid Waste Landfills. To prevent the occurrence of ground water contamination problems associated with the operation of solid waste disposal facilities.

Burial of Human Remains. To prevent the degradation of ground water from embalming fluids, disintegrating metal caskets, decaying human remains and other materials associated with processing bodies for funeral burial or cremation.

Sand and Gravel Mining. To ensure that regulation and enforcement prevent adverse effects upon ground water quality and quantity due to sand, gravel, and rock quarry mining operations, including reclamation.

Sewage Effluent. To provide assurance that ground water will not be contaminated by the reuse of wastewater effluent.

Golf Courses. Golf course development shall not deplete or pollute ground water.

2.4.1. Ground Water Protection Issues Associated with Hazardous Materials Management

Industrial and commercial processes produce and use hazardous materials. The use of hazardous materials is not, however, limited to industries and businesses. These materials are widely available and used by almost everyone. The impact of these substances on our environment, particularly ground water, is often determined by the management practices of the businesses and individuals who use them.

Issue 1 State Hazardous Waste Management Plan: The Washington State Hazardous Waste Management Plan identified many deficiencies in the existing state program to regulate hazardous waste. These problems were identified by an Ecology-sponsored advisory committee made up of business leaders, government agency staff and elected officials, environmentalists, consulting firms, and educators. The 1994 update of the Plan stated that 40 of the 59 recommendations either have been or are being implemented, and that 11 of the 19 not yet implemented were scheduled for implementation during 1994-1998. The program needs support in order for the state to manage hazardous wastes in a manner that will protect ground water.

HM - 1 State Hazardous Waste Plan - Implementation: The East King County Ground Water Advisory Committee supports the findings and recommendations of the Washington State Hazardous Waste Management Plan. The East King County Ground Water Advisory Committee requests that Ecology and the Washington Legislature fund the implementation and carry out the provisions of the Plan with a sense of urgency in recognition of the threat posed to ground water from hazardous wastes.

Issue 2 State Regulations. The Washington State Dangerous Waste Regulations (Chapter 173-303-282 WAC) require a vertical setback from the dangerous waste management unit to the aquifer of beneficial use. However, no setback is required from the unit to the nearest ground water, in general. In effect, the regulations indicate that the

dangerous waste management unit may be located in ground water that is not being put to beneficial use. In addition, the siting regulations do not take into consideration the horizontal setback distances required in the Wellhead Protection Program. Also, specific regulations for the siting of Hazardous Waste Sites in the areas most physically susceptible to ground water contamination are not noted in the current guidance for siting other than what might be required for compliance if the facility is to be sited in a Ground Water Management Area.

HM - 2A State Regulations. The **East King County Ground Water Advisory Committee** requests Ecology to amend the Dangerous Waste Regulations to set a minimum vertical protective distance, based on the permeability of the soils, between the site and ground water.

HM - 2B State Regulations. The **East King County Ground Water Advisory Committee** requests Ecology to prohibit siting of hazardous waste sites in the zone of contribution designated in the Washington State Department of Health adopted Wellhead Protection Programs.

Issue 3 Hazardous Waste Contamination Sites - Site Referral and Public Education. The Washington State Department of Health seeks a cooperative relationship with local health departments for: 1. referral of possible hazardous waste disposal sites, illness clusters, incidence of contaminated drinking water supplies, and related concerns to the Washington State Department of Health Office of Toxic Substances; 2. assistance in gathering data in regard to these referrals; and 3. public education oriented towards health concerns in relation to hazardous waste sites, including those, which may involve contaminated ground water.

HM - 3 Hazardous Waste Contamination Sites - Site Referral and Public Education. The **Seattle-King County Health Department** will provide: assistance to the Washington State Department of Health in site discovery including collection of information regarding hazardous waste contamination site history; and assistance to the Washington State Department of Health in public health information and referral regarding hazardous waste sites.

Who: Seattle-King County Health Department
Priority: Medium (5.8)
Time: 0.1 FTE

Issue 4 Hazardous Material Spills: Implementation of the Uniform Fire Code. Article 80 of the Uniform Fire Code is a valuable tool to prevent hazardous material spills in business, industrial, and institutional settings. Many jurisdictions within the East King County Ground Water Management Area have not fully developed their hazardous materials programs. They lack adequate staff, training, and enforcement tools to implement Article 80. This lack can affect ground water quality, in that these

jurisdictions cannot consider the impacts to ground water in physically susceptible and recharge areas in their response to hazardous material spills in those areas.

HM - 4 Implementation of the Uniform Fire Code. The East King County Ground Water Advisory Committee requests that King County and cities require Hazardous Materials Management Plans and Hazardous Materials Inventory Statements as part of an operating permit in the physically susceptible and recharge areas.

Issue 5 Local Emergency Management Plan. The Local Emergency Management Plan has centralized information and a database on extremely hazardous waste sites and a coordinated planned response to on-site emergency spills. However, it does not contain information on the most physically susceptible, recharge, and well head protection areas, or coordinated response efforts needed for prevention, containment and clean up in these areas, once they occur. Little effort has been initiated to inform the public of the dangers created by spills in these areas.

HM - 5 Local Emergency Management Plan. King County, as lead agency for the Local Emergency Management Plan, and cities will consider ground water protection in the Local Emergency Management Plan by using:

- A hazard analysis that takes into consideration the locations of the most physically susceptible and recharge areas and public water systems utilizing ground water sources (as described in the *Hazardous Materials Emergency Planning Guide*, National Response Team, 1987, or most recent edition);
- Fire-fighting techniques and emergency response techniques that favor ground water protection in the most physically susceptible and recharge areas;
- Out reach activities, which inform the public, who live in aquifer sensitive or well head protection areas, of the dangers created by spills to ground water, and reporting activities necessary to protect the resource. These activities may be in conjunction with the Education Program; and
- Development of a "one-call" response phone number for citizens to report spills.

The King County Department of Natural Resources will:

- Provide maps of the most physically susceptible areas and well locations to the Office of Emergency Management.
- Provide information regarding emergency response techniques necessary to protect aquifers and wells for Local Emergency Planning Committee consideration, and incorporation into the Local Emergency Management Plan; and
- Report on the progress of development and implementation of the Local Emergency Management Plan in relation to East King County Ground Water Advisory Committee concerns.

Who: King County Department of Natural Resources and Office of Emergency Management, and Cities' Emergency Management personnel.

Priority: Medium (5.6)

Time: King County: 0.25 FTE

2.4.2. Ground Water Concerns Associated with Underground Storage and Transport of Petroleum Products

Commercial underground petroleum and chemical storage tanks and pipelines represent perhaps the most significant potential existing threat to ground water quality in King County. Leakage from underground storage tanks and associated piping often occurs without detection and even relatively small amounts of certain compounds can have serious adverse impacts on ground water quality. Once released from an underground storage tank, some volatile organic compounds and petroleum products can rapidly migrate through the soil profile to ground water.

The precise number of underground storage tanks located in King County is not known. However, Ecology estimates that at least 6,550 such tanks are currently in operation, not including home heating oil tanks. Underground storage tanks are regulated by federal, state, and local governments. Private sector pressures from insurance and lending institutions also bring increasing pressure to bear upon owners and operators of underground storage tanks to install and maintain systems in a manner which reduces liability risks by avoiding spills.

Leaking underground home heating oil tanks may present a threat to ground water quality. Both federal and state regulations adopt a less aggressive approach to regulation of heating oil tanks, however, because of differences in the constituency and migration in the soil of fuel oils. Potential problems associated with home heating oil tanks include leakage from operating tanks and releases from improperly abandoned tanks containing residual product. Many of the existing home heating oil tanks within King County are likely to be bare steel tanks without protection from rusting and, as such, a large percentage may be leaking or will leak in the future.

Problems with regulated underground storage tanks are generally documented by Ecology. However, problems with unregulated tanks and home heating oil tanks are usually only found after the tank has been removed. Potential problems can be forecasted based on the age, type of tank and products. Well head protection programs must evaluate the threat to the well's zone of contribution from underground storage tanks. A well head protection program would evaluate this threat on a much smaller scale, and at a greater level of detail than can be accomplished in a ground water management program. This allows water purveyors to determine whether additional controls on underground storage tanks would be appropriate in their well head protection area. If a water purveyor finds that additional controls on underground storage tanks are needed to protect their wellhead, and they do not control land use or other regulatory activities in their area, they can ask King County or a city to assist in implementing controls.

Underground petroleum product pipelines may also threaten ground water. Petroleum product pipelines are used to transport petroleum products across and between states. Washington State currently has two main pipelines, along the I-5 corridor and in eastern Washington (the Yellowstone). Recently, the Olympic Pipeline Company proposed a new pipeline to connect the I-5 pipeline to the Pasco area. The proposed location would be across the lower western foothills of the Cascades. This new pipeline would be located near existing production wells or springs for Carnation, Snoqualmie and North Bend.

Washington State reviews pipeline applications under the Energy Facility Siting Council. This Council's recommendation supersedes any local permits. However, the Council's initial review of the application is to assure that it is in compliance with comprehensive plans. The Council's recommendation does not supersede federal requirements. The United States Department of Transportation, Office of Pipeline Safety has federal requirements about pipeline construction and location.

The East King County Ground Water Advisory Committee adopted the following management strategies to address underground storage tank and petroleum pipeline management practices, regulations and policies. Educational strategies related to underground storage tank and petroleum pipeline management are found in the Education Program.

Issue 1 - Well Head Protection and Underground Storage Tanks: As part of their Well Head Protection Plans, purveyors are to identify potential threats to their wells, including underground storage tanks. The King County Comprehensive Plan policy NE-333 states that "King County should protect the quality and quantity of ground water county-wide by developing a process by which King County will review and implement, as appropriate, adopted Wellhead Protection Programs in conjunction with cities and ground water purveyors." Recommended Management Strategy AP - 2 states that the Management Committee will develop strategies that King County could adopt to help implement Wellhead Protection Programs. These strategies should include ways to address underground storage tanks. Ecology is aware of eighteen sites in the East King County Ground Water Management Area that have contaminated ground water. Five of these have completed remediation. Ecology reports show 167 operational underground storage tanks in the East King County Ground Water Management Area. Some of these tank sites, in Carnation, Fall City, Snoqualmie and North Bend, are near water supply wells.

UST - 1 Well Head Protection Strategies for Underground Storage Tanks. King County Department of Natural Resources, in conjunction with the Management Committee, will include the following in the King County list of potential well head protection activities. These well head protection strategies would only be implemented if specifically requested by a water purveyor:

- **1A Designation as an ESA under Chapter 90.76 RCW:** King County Department of Natural Resources would prepare a petition to Ecology to designate a wellhead protection area as an Environmentally Sensitive Area if underground storage tanks are found to exist in the well head protection area under Chapter 90.76 RCW Underground Storage Tanks for the Metropolitan King County Council consideration.
- **1B Augment State Underground Storage Tank Program:** King County Department of Natural Resources would prepare a program and related ordinances to enhance the identification, testing and current inspection of underground storage tank installations and the possible removal (if testing indicates contamination) in Environmentally Sensitive Areas, designated under 1A above. The ordinances should include the relevant requirements of Chapter 173-360 WAC Underground Storage Tank Regulations, for the Metropolitan King County Council and cities' consideration.
- **1C Disclosure and Secondary Containment:** The Department of Natural Resources would prepare an ordinance for the Metropolitan King County Council's consideration regarding underground tanks containing the following provisions:
 1. Disclosure at the time of sale of any real property in King County of the number, location, and legal status of existing underground chemical storage tanks;
 2. Require secondary containment for new underground tanks or have the tanks installed above ground.
- **1D Exempt Tanks:** The Department of Natural Resources would prepare an ordinance for the Metropolitan King County Council's consideration requiring secondary containment for new underground chemical storage tanks as defined by Chapter 173-360-120 WAC and for new heating oil tanks of all sizes and motor fuel tanks of 1,100 gallons or less.
- **1E Exempt Tanks - Integrity Testing:** The Department of Natural Resources would prepare an ordinance for the Metropolitan King County Council's consideration that requires underground chemical storage tanks without secondary containment, that are in use and exempt from the state Underground Storage Tank Regulations, to be tested at regular intervals for integrity.
- **1F Heating Oil Tanks - Abandonment and Maintenance:** Department of Natural Resources would prepare an ordinance for the Metropolitan King County Council's consideration regarding underground home heating oil tanks containing the following provisions:
 1. Proof from the Fire Marshal that the underground heating oil tank was abandoned in accordance with regulations prior to release of any permits associated with energy conversions (gas piping, electrical, etc.);
 2. Require underground heating oil tanks that are abandoned in place to be filled with a material that precludes further storage of any chemical in the tank.
- **1G Heating Oil Tanks - Location:** King County would develop funding and incentives for identification and proper abandonment of underground storage tanks. This will include establishing an "amnesty/incentive" program for identifying and removing existing residential underground chemical storage tanks.

Who: King County Department of Natural Resources, Management Committee,
King County agencies.
Priority: High (2.6)
Time: Included as part of time estimate for AP - 2.

Issue 2 Petroleum Product Pipelines. The East King County Ground Water advisory committee believes that additional regulatory oversight is needed to reduce the risk to the region's ground water from pipeline oil spills or leaks.

The East King County Ground Water Management Area is especially susceptible to the consequences of oil pipeline spills or leaks because:

- Many domestic ground water sources are shallow wells. Because pin-hole sized leaks can go undetected for years, wells adjoining pipeline rights-of-way are at risk of contamination.
- The most economical east-west pipeline route passes through or near the East King County Ground Water Management Area's most susceptible ground water recharge areas.
- The East King County Ground Water Management Area is located in the second most tectonically active region in the United States (USGS). This region is expected to experience a major earthquake within the next thirty years. A major earthquake will result in catastrophic failure of below-ground pipelines.
- The most promising supply of potable water for the rapidly expanding Puget Sound population is believed to underlie the upper Snoqualmie Basin near North Bend. An oil pipeline over this aquifer creates a great risk, given the likelihood of undetected small leaks of long duration of catastrophic failures due to landslides and earthquakes. Also, oil spills or leaks can also contaminate an aquifer by vertical migration within active wells, migration through improperly decommissioned wells, and direct spills within a recharge area.
- Snow cover in the upper Snoqualmie Basin increases the difficulty in locating oil spills, and in emergency response and clean up.

Pipeline application review by the Energy Facility Siting Council includes review of existing policies and zoning codes to determine compliance. The King County Comprehensive Plan does not contain any policies regarding the location or design specification for petroleum product pipelines. Cities' comprehensive plans also do not contain any policies related to petroleum product pipelines. These policies are needed because a petroleum product pipeline location must be in compliance with existing land use plan (comprehensive plan) policies and zoning codes of the jurisdictions it is proposed to pass through, in order to obtain state approval. Existing local policies and codes can help protect ground water from potential contamination from petroleum product pipelines.

UST - 2 Petroleum Product Pipelines. The East King County Ground Water Advisory Committee recommends that underground oil pipelines not be located in the

East King County Ground Water Management Area. However, should a pipeline be considered for construction within the East King County Ground Water Management Area, the following minimum standards must be met. The **King County Department of Natural Resources and the Office of Strategic Planning** will propose an amendment to the King County Comprehensive Plan for the Metropolitan King County Council's consideration to include a policy that these standards be met. **Cities** will consider adopting this policy at the next comprehensive plan update.

Proposed Pipeline Strategies

King County and Cities will adopt the following amendments to their land use, zoning and/or comprehensive plans:

Location and Design

1. No pipeline shall be located within 500 feet of any ground water supply well.
2. In cases where pipelines and water mains are located in the same general area, minimum separation criteria of 24 inches (vertical) and 10 feet (horizontal) will be applied, wherein, the pipeline will be located below the water line.
3. Ground motion and pipe stress sensors are required for pipelines located near areas of high potential mass wasting (i.e., landslides, liquefaction) and fault zones.
4. Rapid leak detection and shutdown systems (such as state-of-the-art Supervisory Control and Data Acquisition (SCADA) systems) with verifiable performance criteria and back-up communication shall be required where pipelines are located over aquifers that provide a source of potable water.
5. Double wall pipe with continuous leak detection is required for any pipeline segment located in, or within, 500 feet of a physically susceptible and recharge area.

Emergency Response Planning

Land use plans shall require contingency planning prior to location and development of pipeline corridors. Contingency Plans will include the following elements:

1. Require automatic, remotely controlled shutoff valves at closely spaced intervals (every four miles or less, based on resources at risk) in areas of high physical susceptibility.
2. Require pipeline operators to notify all private well owners and water purveyors within one mile of the pipeline about the pipeline's location and how to identify and respond to potential hazards
3. Require notification of all private well owners and water purveyors whenever a report of possible damage has been filed.
4. Require site-specific rapid response contingency plans for physically susceptible and recharge areas.
5. Assemble, train, and maintain a HAZMAT team to respond to local emergencies,

6. Require that every leak or spill be report to local officials, regardless of whether the hazardous material reaches a water body or causes property damage.
7. Require operators to provide local jurisdictions, fire departments, and public safety agencies with maps, inventories, descriptions of transported substances, and a copy of operations, maintenance, and emergency manuals. Changes in procedures, maintenance schedules and emergency response capabilities shall be provided within an annual operations report. Results of the previous year's integrity testing shall be included.

Ongoing Maintenance and Monitoring

1. Require independent hydraulic pressure testing for integrity every two or three years.
2. Require independent systematic assessments of pipeline corrosion using "elastic wave smart pigs" on a regular basis
3. Require regular surveillance of the right-of-way by line walking and hydrocarbon gas monitoring
4. Require soil and ground water monitoring in physically susceptible and recharge areas.

Who: King County Department of Natural Resources, King County Office of Strategic Planning, Cities
Priority: High (2.6)
Time: To be determined.

2.4.3. Ground Water Quality Issues Relating to On-Site Sewage System Use

Ground water contamination associated with domestic on-site sewage system effluent can involve a number of contaminants including nitrate, bacteria, viruses, and trace organic chemical compounds. Nitrate is often considered the most significant contaminant associated with domestic wastewater since it is highly resistant to removal from treatment in the soil. Bacteria and viruses can be attenuated during migration through a few feet of fine to medium textured soils, provided unsaturated flow conditions can be maintained. If on-site sewage systems are improperly designed or constructed, installed in inadequate soils, used at too high of a development density, or used to dispose of non-domestic wastewater, they can adversely impact surface and ground water quality as well as public health.

The East King County Ground Water Advisory Committee adopted the following management strategies to address on-site sewage system management practices, regulations and policies. Additional educational strategies related to on-site sewage system management are found in the Education Program.

Issue 1 Nitrate Concerns. The designs of most on-site sewage treatment and disposal systems installed in Type 1 soils prior to April 1987, the implementation date of King County Board of Health Title 13, did not incorporate enhanced treatment technology. These systems often support development densities that exceed one residential unit, or equivalent, per acre. The poor treatment efficiency of conventional on-site sewage systems installed in coarse textured soils suggests a potential for nitrate contamination of underlying ground water, especially in areas where the density of on-site sewage systems is relatively high. Nitrate concentrations may build up in the zone of contribution to public water systems to unacceptable levels resulting in irreversible loss of drinking water supplies.

OS - 1 Nitrate Concerns - Wellhead Protection Program and Alternative Methods: The King County Department of Natural Resources will include the following in the well head protection strategies in AP-2: 1. King County would consider alternative methods of development and/or revised land use for those tracts less than an acre in size which are undeveloped in areas where nitrogen levels are found in the potable water supply to be unacceptable (more than 5 mg/l); and 2. The Seattle-King County Health Department would work with the Board of Health to require alternate methods of sewage disposal for those tracts less than an acre in size in areas where nitrogen levels associated with on-site sewage systems are found to be unacceptable (more than 5 mg/l).

Who: King County Department of Natural Resources
Priority: Medium (8.1)
Time: To be determined.

Issue 2 Hazardous Materials. Because some types of commercial, industrial, and institutional facilities use or store hazardous materials in their day to day operations or dispose of hazardous wastes, there may be an opportunity for hazardous materials or wastes to be inadvertently or intentionally discharged to on-site sewage treatment and disposal systems serving those types of facilities. (Note: Hazardous materials as addressed here refers to those material and substances which in their use, and/or disposal will have an adverse impact on ground water.)

OS - 2 Hazardous Materials - Inventory, Education, Monitoring at Commercial, Industrial and Institutional Facilities: The Seattle-King County Health Department should: 1. inventory commercial, industrial, and institutional facilities served by on-site sewage treatment and disposal systems which potentially use, store, or dispose of hazardous materials; 2. educate operators regarding hazardous materials management in relation to on-site sewage disposal systems, and; 3. selectively monitor those facilities that appear to represent a significant risk to ground water quality.

Who: Seattle-King County Health Department. Some education of operators is being done through the Local Hazardous Waste Management Program.
Priority: Medium (8.5)

Time: 0.25 FTE

Issue 3 Household Hazardous Wastes. Household hazardous wastes can enter ground water when residues from cleaning and paint products or quantities of unwanted chemical substances are disposed in a sink or toilet connected to an on-site sewage system. While waste from any single residence are not likely to have detectable impacts on underlying ground water, the cumulative effects of many residences may be significant. Many people are unaware that common household products often contain chemical compounds that can represent an environmental or even public health hazard if disposed in an on-site sewage system.

OS - 3A Household Hazardous Wastes - The Local Hazardous Waste Management Program in King County. The Local Hazardous Waste Management Program in King County will coordinate with the Household Hazardous Waste Education Committee to include information about risks to ground water associated with the disposal of household hazardous wastes to on-site sewage systems as part of their household hazardous waste educational activities.

Who: Seattle-King County Health Department
Priority: Medium (8.2)
Time: 0.125 FTE.

Issue 4 Operation and Maintenance. Homeowners and businesses may not be aware of the location and proper operation and maintenance of on-site sewage treatment and disposal systems.

OS - 4A Operation and Maintenance - Require Recording of As-Built Plan. The **Seattle-King County Health Department** will prepare amendments to *Title 13 of the Code of the King County Board of Health*, for King County Board of Health's consideration, to require that the as-built on-site sewage treatment and disposal system plan be recorded with the property deed in order that it be transferred with the title at the time of property purchase. In addition, information concerning the relationship between on-site system maintenance and operation practices and ground water protection should be added to the standard as-built plan form.

Who: Seattle-King County Health Department
Priority: Medium (8.3)
Time: 0.04 FTE

OS - 4B Operation and Maintenance - On-Site Sewage System Management Program: The **Seattle-King County Health Department** will examine the feasibility of a county-wide on-site sewage system management program to determine its effectiveness in protecting ground water.

Who: Seattle-King County Health Department
Priority: Medium (8.4)
Time: 0.5 FTE.

2.4.4 Ground Water Quality Issues Related to the Use of Pesticide and Fertilizer

Pesticides and fertilizers are used for the control of plant and animal pests and promotion of plant growth. Pesticides are a large and varied group of substances specifically designed to kill biological organisms including weeds, insects, and rodents. Fertilizer is used to promote plant growth. Pesticides and fertilizers are used for agriculture, home, forestry, and right-of-way maintenance. Pesticides and fertilizer have the potential to contaminate ground water when they are used improperly. The King County Comprehensive Plan policy NE-502 states that King County should actively encourage the use of environmentally safe methods of vegetation control and that herbicide use should be minimized.

The East King County Ground Water Advisory Committee adopted the following management strategies to address pesticide and fertilizer regulations and policies. Additional educational strategies related to pesticide and fertilizer use are found in the Education Program.

Issue 1 Pesticide and Fertilizer - Past Use. Past use of pesticide and fertilizer may pose a threat to ground water quality.

PF - 1A Pesticide and Fertilizer - Past Use: Future Mapping of Vulnerable Aquifer Areas: Areas that have the potential for past pesticide and fertilizer use should be included in the determination of vulnerable aquifer areas. (See AP-1D.)

PF - 1B Pesticide and Fertilizer - Past Use: Monitoring. The King County Department of Natural Resources will monitor for specific pesticides and fertilizers in the most physically susceptible areas, where they are expected to occur based upon historical and projected land use, in the Data Collection and Management Program.

Who: King County Department of Natural Resources
Priority: Medium (7.3)
Time: no additional cost to include as part of the Data Collection and Management Program. These costs will be included in that program.

Issue 2 Pesticide and Fertilizer Use. Use of pesticide and fertilizer may pose a threat to ground water quality.

PF - 2A1 Pesticide and Fertilizer Use: Farm Plans. King County will support the King Conservation District in development of Farm Plans using best management

practices for any agricultural user of pesticide and fertilizer in the most physically susceptible and recharge areas.

PF - 2A2 Pesticide and Fertilizer Use: Farm Plans. Cities will support the King Conservation District in the District's development of Farm Plans for city residents by considering joining the District if they are not already members, and considering adoption of the County's Livestock Ordinance (No. 10870, 1993) during the next city comprehensive plan update. The livestock ordinance requires farm plans based on livestock densities and setbacks from surface water bodies. The farm plans also address appropriate pesticide and fertilizer use.

Who: King County, cities and the King Conservation District
Priority: Medium (7.4)
Time: King Conservation District estimates \$30,000 for the East King County Ground Water Management Area

PF - 2B Pesticide and Fertilizer Use - Cooperative Extension Pesticide Reduction Program: The King County Department of Natural Resources will evaluate the Cooperative Extension Pesticide Reduction Program for effectiveness in protecting ground water and applicability to the East King County Ground Water Management Area and report to the Management Committee.

Who: King County Department of Natural Resources staff, under Management Committee direction.
Priority: Medium (7.5)
Time: 0.125 FTE

PF - 2C1 Pesticide and Fertilizer Use - Rights-Of-Way Maintenance. King County Department of Natural Resources, in conjunction with the Management Committee, will determine if maintenance practices by others for roads and utility rights-of-way in the East King County Ground Water Management Area need to be restricted to non-chemical methods or chemicals that degrade into non-harmful elements and that are not persistent in the environment.

PF - 2C2 Pesticide and Fertilizer Use - Rights-Of-Way Maintenance. Cities will use non-chemical vegetation maintenance practices or chemicals that degrade into non-harmful elements and that are not persistent in the environment for roads and utility rights-of-way in the East King County Ground Water Management Area. The King County Roads Services Division's Integrated Pest Management Program may provide a model.

Who: King County Department of Natural Resources, cities (public works department), Management Committee
Priority: Medium (7.1)

Time: King County Department of Natural Resources: 0.15 FTE. Department of Development and Environmental Services: 0.5 FTE

Issue 3 Education and Proposed Programs. Existing educational efforts may not address ground water protection issues related to pesticide and fertilizer use.

PF - 3A Education and Proposed Programs. The **East King County Ground Water Advisory Committee** supports the strategies in the Department of Ecology's *Protecting Ground Water: A Strategy for Managing Agricultural Pesticides and Nutrients*, April, 1992 and the *1991 Puget Sound Water Quality Authority Management Plan* (amended in 1994) (Household Hazardous Waste Program: HHW - 2 Information and Education on Less-Toxic Alternatives for Household Products and Non-point Source Pollution Program: NP - 17 Puget Sound Pest Management Information Program) to help insure that small farmers and homeowners receive more information about pesticide and fertilizer use.

2.4.5. Ground Water Quality Issues Related to Well Construction and Decommissioning

Wells provide a link between an aquifer and the earth's surface. Modern wells consist of a well casing that extends downward from the ground surface to the aquifer within a cylindrical bore hole. The Minimum Standards for Construction and Maintenance of Wells (Chapter 173-160 WAC) require that the space between the casing and the wall of the borehole be sealed to prevent vertical movement of water along the outside of the casing. If this space is not adequately sealed, it may serve as a conduit by which contaminated surface or subsurface water may travel into an aquifer. Also under the Minimum Standards, any well that is unusable, whose use has been permanently discontinued, which is in such disrepair that its continued use is impractical, or is an environmental, safety, or public health hazard, must be decommissioned.

The East King County Ground Water Advisory Committee adopted the following management strategies to address well construction practices, regulations and policies. Educational strategies related to well identification, well construction, proper well maintenance, contamination sources and well decommissioning are found in the Education Program.

Issue 1 State Program. Existing regulations for well construction and decommissioning are not adequately enforced. Ecology does not receive enough funding to inspect more than a small percentage of wells during construction or decommissioning. Ecology is able to delegate part of this responsibility to the local health department.

WC - 1A1 State Program. Ecology and King County will support legislation that provides sufficient funding for enforcement of well construction standards and a complete well decommissioning program.

WC - 1A2 State Program. Cities will consider supporting legislation, when proposed, that provides sufficient funding for a complete well construction and decommissioning program.

Who: King County, cities, Ecology
Priority: Low (12.3)
Time: to be determined.

WC - 1B State Program: Seattle-King County Health Department and Ecology will develop a program for implementation of the delegated portion of the well construction and decommissioning program in King County.

Who: Ecology and the Seattle-King County Health Department
Priority: Low (12.5)
Time: Seattle-King County Health Department: 0.5 FTE. Ecology: 0.64 FTE.

Issue 2 Well Identification. Wells need to be identified so that Ecology may implement programs to protect the ground water resource. No agency is systematically identifying wells; well logs from wells that were drilled before 1973 were not required to be submitted to Ecology; and no agency is identifying wells that should be decommissioned.

WC - 2A Well Identification at Sale of Property. King County Department of Natural Resources will investigate potential methods for the County and cities to require disclosure of used or unused wells at the time of sale of real property.

Who: King County Department of Natural Resources
Priority: Low (12.2)
Time: 0.08 FTE.

WC - 2B1 Well Identification During Environmental Review, Rezone and Land Use Permit Applications: The East King County Ground Water Advisory Committee requests that the State Department of Ecology, or other lead agency, through the state environmental review process, require applicants to establish the location and status of wells present on the property in question during environmental review.

WC - 2B2 Well Identification During Environmental Review, Rezone and Land Use Permit Applications: The King County Department of Natural Resources will develop an ordinance for the Metropolitan King County Council's consideration that requires applicants to establish the location and status of wells present on the property in

question during environmental review, rezone and land use permit applications. This information should be provided to Ecology.

Who: King County Department of Natural Resources
Priority: Low (12.1)
Time: 0.08 FTE.

Issue 3 Decommissioning Cost. Improperly decommissioned wells may become a channel for contamination to the aquifer. Decommissioning costs may prevent property owners from disclosing improperly decommissioned wells.

WC - 3A Decommissioning Cost: Funding Source. King County Department of Natural Resources, in conjunction with the Management Committee, will explore the possibility of having a funding source for decommissioning of wells for those property owners who disclose that they have an existing decommissioned well.

Who: King County Department of Natural Resources, Management Committee
Priority: Low (12.4)
Time: 0.125 FTE.

WC - 3B Decommissioning Cost: Alternative Procedures. Ecology, during regulation revision, will consider alternatives to the present requirements for well decommissioning procedures that are cost effective and would protect public health.

Who: Ecology
Priority: Low (12.6)
Time: 0.14 FTE

2.4.6. Ground Water Concerns Associated with Sewer Pipes

Infiltration, exfiltration, and inflow in sewer pipes may affect ground water quality and quantity. Infiltration is ground water entering sewer pipes, and exfiltration is sewage leaking out of pipes. Inflow is the direct flow of stormwater into sewer pipes through hookups such as roof and footing drains. The more recently installed sewer pipes in King County are fabricated from polyvinyl chloride, a strong, durable material that is virtually leak-free. However, in the past, sewer pipes were made from materials such as concrete, brick, clay, and ductile iron. Joints were more susceptible to leaking with the use of these materials. Many of these older pipes are still in use today, and may be creating infiltration and exfiltration problems. Side sewers may have the greatest problem, as these are not maintained by the sewer utilities. To date, data on the extent and magnitude of the potential problem is unavailable.

Issue 1 Infiltration and Exfiltration. Infiltration of ground water into gravity sewer pipes may be causing significant export losses of ground water from the East King

County Ground Water Management Area. Exfiltration of sewage from leaking sewer pipes may be causing contamination of ground water.

SP - 1A Infiltration and Exfiltration Studies: King County Department of Natural Resources will:

- Review and analyze existing studies and programs by local sewer utilities to determine if infiltration and exfiltration are problems in the East King County Ground Water Management Area and,
- Analyze conclusions and determine appropriate follow up action, if any.

Who: King County Department of Natural Resources
Priority: Low (10.3)
Time: 0.125 FTE.

SP - 1B Sewer Maintenance Programs: The East King County Ground Water Advisory Committee supports cities in continuing or adopting regularly scheduled leak detection and repair programs and side sewer maintenance public education programs.

SP - 1C Infiltration and Exfiltration - Leakproof Piping: The East King County Ground Water Advisory Committee requests King County to amend the King County Comprehensive Plan and King County Code 13.24 to require that: new sewer piping installed in the most physically susceptible and recharge areas be leakproof; and existing leaking sewer pipes including side sewers will be replaced with leakproof piping in the most physically susceptible and recharge areas according to a schedule contained in the Sewer Utility's Comprehensive Plans.

Issue 2 Ground Water Depletion. Sewer pipes installed on sloping ground could provide a conduit for ground water, depleting valuable ground water reserves from a specific area.

SP - 2 Ground Water Depletion - Backfill. Ecology should consider amendments to sewer construction specifications, which stops the transmission of ground water along pipe alignments. Such transmissions take place in the required granular backfill used as pipe support. These provisions shall include best management practices for backfill materials and/or the use of impermeable seals at appropriate intervals.

2.4.7. Ground Water Quality Issues Related to Solid Waste Landfills

The ground water impact from landfills is from leachate production. Leachate is water or other liquid that has been contaminated by dissolved or suspended materials due to contact with solid waste or gases from the solid waste. Aquifers that have been contaminated by leachate may affect public health. Ground water that is not currently being used for drinking water also needs to be protected from leachate contamination, as

it may become a drinking water source in the future. Landfills constructed before modern standards may have contaminated ground water. East King County Ground Water Management Area has three closed landfills (Cedar Falls, City of Carnation and Duvall) that are monitored for ground water contamination. The 1985 Abandoned Landfill Study did not recommend any further study of the two known abandoned landfills in the East King County Ground Water Management Area (Fall City and North Bend). All solid waste in the East King County Ground Water Management Area is collected by commercial haulers, or citizens take it to the nearest transfer station (Factoria in Bellevue) or to the Cedar Hill landfill south of Issaquah. Recyclable materials can be left at the Cedar Falls site. No local transfer station, hazardous materials, or other recycling collection facility is available in the East King County Ground Water Management Area. The hazardous materials wastemobile does conduct several collection days in the East King County Ground Water Management Area.

SW - 1 Standards. The State Department of Ecology has adopted Chapter 173-351 WAC, which provides for prevention and detection of ground water impacts by landfills and other solid waste facilities. The **East King County Ground Water Advisory Committee** supports the state's adoption of Chapter 173-351 WAC because it recognizes the potential impact to ground water, and requires separation between the liner and ground water, and because it requires that lateral expansion meet the standards as a new landfill.

Issue 2 Available Waste Facilities. The East King County Ground Water Advisory Committee is concerned about the availability of waste disposal facilities in the rural areas of King County. The lack of current disposal sites will result in illegal and dangerous waste disposal, which can contaminate aquifers.

SW - 2 Available Waste Facilities. The **East King County Ground Water Advisory Committee** requests King County to maintain and expand the current waste disposal program for the disposal of waste not acceptable in the standard transfer station and landfill sites. Additional sites for recycling should be made available as well.

2.4.8 Ground Water Concerns Associated with Burial of Human Remains

Cemeteries are found throughout King County and it is possible that, under certain hydrogeologic conditions, burial practices have affected or are affecting local ground water quality. The threat to ground water from decomposing corpses and caskets includes chemicals, bacteria, viruses and metals. Attempts to gather information pertaining to ground water contamination have produced no useful citations. Considerable information does exist on the transitional and end products of decomposing human bodies, residual body wastes, and chemicals used in the process of embalming bodies. Data are also available on the composition of residues of disintegrating caskets and associated materials. However, little is known about the effects of these products on

ground water. The East King County Ground Water Management Area has nine known cemeteries, with the earliest documented burial in 1859 (Fall City Cemetery). Many of these are near drinking water wells.

Issue 1 Lack of information. Information is insufficient to determine ground water impairments from embalming fluids, decaying human remains and other materials associated with the burial of human remains.

B - 1 Information - Studies. The King County Department of Natural Resources will search for and evaluate existing information on cemeteries to determine if cemeteries could contaminate ground water. Information gathered can be used to establish siting criteria for new and existing cemeteries or to take other appropriate follow-up actions, if required.

Who: King County Department of Natural Resources
Priority: Low (14.1)
Time: 0.04 FTE

2.4.9 Ground Water Quality Issues Related to Sand and Gravel Mining

Sand, gravel, and rock quarry mines are often located over, near or in vulnerable aquifers. Mining activities in these areas can increase ground water vulnerability to contamination from both the extraction process and site reclamation. The King County Comprehensive Plan lists twenty-nine separately permitted sand and gravel mining operation sites in the East King County Ground Water Management Area. It also shows twelve potential surface mining resource sites.

Issue 1 Aquifer Impacts and Regulatory Modification: Sand, gravel, and rock quarry mining can cause changes in the site or include activities, which increase the potential for contamination of important aquifers. Major changes have occurred at the state level regarding general permitting of sand, gravel, and rock quarry mining operations. Ecology is requiring performance standards as part of the general permit for all mines in King County. All discharges from sand, gravel, and rock quarry mines must meet the Ground water Standards (Chapter 173-200 WAC) and the Surface Water Standards (Chapter 173-201A WAC). There may be needed changes as a result of oversight or problems of coordination between the General Permit process and local zoning and or policies found in the King County Comprehensive Plan.

SG - 1A Aquifer Impacts and Regulation: The environmental review guidance document provided for in action AP - 1C should include the following best management practices for sand, gravel and rock quarries:

1. For sites with a planned excavation depth lower than the ground water table, a detailed hydrologic report should be filed. This may be a part of a complete environmental impact statement or be an appendix to an environmental review checklist.
2. When mining activities are to be located in designated wellhead protection areas, special protection areas, sensitive aquifer areas, or principal recharge zones an environmental impact statement should be required.
3. Where possible, mining sites should utilize internal drainage, in order to support continued ground water recharge and minimize off-site discharges.
4. When ground water is exposed during the mining operation and the resulting impoundment is larger than 3 acres, ground water should be monitored for both water level (monthly) and water quality (quarterly to semi-annually) over the life of the operation. Water level and water quality monitoring should also be considered when depth to seasonal high water is reduced to 5 feet or less.
5. Associated activities such as concrete, asphalt or other batch processing plants shall not contaminate ground waters.
6. Truck and equipment wash runoff should be routed to an approved retention and treatment facility, equipped with an oil-water separator prior to its release to retention ponds.
7. Fuel (oils) storage and handling facilities should be located some distance from the main sediment and wash water retention facility. All such facilities should be equipped with approved containment, monitoring and collection systems. Fuel storage should be above-ground. These sites should be lined and bermed with sufficient capacity to accommodate spills and leaks. Runoff from these surfaces should be routed to a retention pond that can be monitored and cleaned in the event of a spill.
8. All sites should maintain a fuels/hazardous waste management plan. This would be maintained by the operator and be available on the site at all times.
9. At closure of the site, after accidental spills, or at the request of the Washington State Department of Natural Resources or Ecology, all contaminated material will be removed and disposed of with approved methods and at approved disposal sites. This material will not be used as fill at the site.
10. In general, impoundments of greater than three acres should not be filled. These sites should be stabilized as lakes and ponds and the surrounding area revegetated to insure stability of the site. Future land use decisions should reflect increased ground water vulnerability at the site. Individual sites may be filled if it can be demonstrated that

sufficient inert material can be obtained to serve as fill. Impoundments of less than three acres should not be filled if there is doubt as to quality or supply of inert fill.

11. Excavation pits should not be used as landfill disposal sites for unclassified or non-inert wastes. In general, municipal landfills are not an appropriate use of gravel sites located over semi-confined and unconfined ground waters.

12. Pits with standing water that are slated to be filled may use only approved inert earth materials (native fill/overburden) to fill the area up to the high water table. The remaining fill should meet the conditions described in 10 & 11.

13. Future land use should reflect the increased vulnerability of ground water at the site and the change in the water balance of the area.

This recommendation follows the King County Comprehensive Plan policy related to sand and gravel mines:

RL-411 Conditions and mitigations for significant adverse environmental impacts associated with mining operations should be required, especially in the following areas: ...b. Environmentally sensitive and critical areas, such as surface and ground water quantity and quality...

Who: King County Department of Natural Resources (for the approval of the Management Committee).

Priority: High (3.6)

Time: 0.125 FTE

SG - 1B State Regulations. King County will review the site reclamation planning format and make recommendations to the Washington State Department of Natural Resources on a process necessary for determining future site reclamation format that will maintain or enhance recharge rates in sand and gravel mining efforts.

Who: King County Department of Development and Environmental Services,
Department of Natural Resources

Priority: High (3.4)

Time: To be determined.

SG - 1C State Regulations: Ecology will develop amendments to the *Protection of Upper Aquifer Zone* (Chapter 173-154 WAC), to include the conditions created by below-aquifer mining activities which are causing the loss of ground waters due to evaporative processes created when the aquifers are exposed to the ambient weather conditions.

Who: Ecology

Priority: High (3.1)
Time: To be determined.

Issue 2 Land Use of Inactive or Reclaimed Mines: Subsequent land use of inactive and/ or reclaimed sand, gravel, and rock quarry mining sites should reflect the increased susceptibility of aquifers to contamination. Currently, special consideration of the potentially increased susceptibility is not formally required.

SG - 2A1 Land Use of Inactive or Reclaimed Mines: Comprehensive Plans. King County Department of Natural Resources and the Office of Strategic Planning will propose an amendment to the King County Comprehensive Plan for the Metropolitan King County Council's consideration to include a policy which provides that land use of inactive and/or reclaimed sand, gravel, and rock quarry mines be carefully evaluated in light of the increased susceptibility of aquifers to contamination due to mining activities.

SG - 2A2 Land Use of Inactive or Reclaimed Mines: Comprehensive Plans. At the time of their Comprehensive Plan update, cities will consider an amendment to their Comprehensive Plan to include a policy which provides that land use of inactive and/or reclaimed sand, gravel, and rock quarry mines be carefully evaluated in light of the increased susceptibility of aquifers to contamination due to mining activities. Cities could consider an amendment similar to one proposed by the King County Department of Natural Resources and the Office of Strategic Planning for the King County Comprehensive Plan, if desired.

Who: King County Office of Strategic Planning, in conjunction with the King County Department of Natural Resources. Cities (Planning Department)
Priority: High (3.8)
Time: King County Department of Natural Resources: 0.15 FTE

SG - 2B1 Land Use of Inactive or Reclaimed Mines: Reclamation Plans. King County will provide comments to the State Department of Natural Resources on mine reclamation plans proposed within the East King County Ground Water Management Area. Additionally, consistent with KCCP Policy NE-333, King County will develop with affected jurisdictions, Best Management Practices for mining operations.

SG - 2B2 Land Use of Inactive or Reclaimed Mines: Reclamation Plans. Cities shall consider requiring that reclamation plans for mineral extraction sites include measures to protect ground water quality and quantity.

Who: King County Department of Natural Resources, King County Department of Development and Environmental Services, cities (Planning Department)
Priority: High (3.9)

Time: Department of Natural Resources: 0.15 FTE, Department of Development and Environmental Services Code Development: 0.05 FTE

Issue 3 Regulatory Coordination. Positive changes have occurred at the state and local levels in the prevention of ground water contamination as a result of sand, gravel, and rock quarry operation. A number of permit processes will be in operation, carried out under a variety of regulations (National Pollution Discharge Elimination System, Water Quality Standards, Zoning Ordinances, as well as policies found in the King County Comprehensive Plan). Coordination and cooperation will be needed for this to occur.

SG - 3 Regulatory Coordination. All agencies involved in the permitting and review of sand, gravel, and rock quarry permits will coordinate their efforts, especially concerning ground water protection. Ecology will be the lead agency, and establish a standing committee. This recommendation is consistent with King County Comprehensive Plan Policy RL-412, which states that "King County should work with the state and federal governments to ensure that proposals for underground mining, oil and gas extraction, and surface coal mining are reviewed with consideration of local land use and environmental requirements."

Who: King County Department of Development and Environmental Services, the King County Department of Natural Resources, Ecology, the Washington State Department of Natural Resources.

Priority: High (3.3)

Time: To be determined.

2.4.10 Ground Water Concerns Associated with Sewage Effluent

Sewage effluent is the liquid part left after sewage has settled, and is a by-product of wastewater treatment. This liquid may be untreated, or it may be further settled, filtered, and disinfected, depending on final use. Reuse of effluent is regulated by the State Water Pollution Control Act (Chapter 90.48 RCW) administered by Ecology, and by the "Guidelines for Land Disposal of Treated Domestic Sewage Effluent in Washington State" February, 1976, prepared jointly by Ecology and the Department of Social and Health Services (now Department of Health). These guidelines are considered to be outdated and have been replaced by the *Wastewater Reclamation and Reuse Interim Standards*.

Biosolids are another by-product of wastewater treatment. The East King County Ground Water Advisory Committee considered biosolids as a potential ground water contaminant, and found that the current regulations and practices were sufficient for ground water protection.

Issue 1 Guideline Revision. Recently, an increased need for conservation of water resources has focused interest in reuse of treated effluent. The effluent guidelines will be revised and will need to comply with the State ground water standards. However, it is not known if special protection for the most physically susceptible areas will be considered.

SE - 1 Guideline Revision. The **East King County Ground Water Advisory Committee** strongly supports the use of reclaimed water. Also, the **East King County Ground Water Advisory Committee** strongly encourages Ecology to include ground water protection in the guidelines for reuse of effluent. The guidelines need to give special attention to reuse of effluent in the most physically susceptible areas.

2.4.11 Ground Water Quality and Quantity Issues Associated with Golf Courses

Development and maintenance of a golf course may impact ground water quality and quantity. Development of a commercially viable golf course usually requires changing the native plants and landscape to large areas devoted to greens, fairways and rough. These plants need irrigation and chemical maintenance to establish and flourish. Some of the specialized turf grasses used are subject to disease that can only be controlled with pesticides. All plants require irrigation to become established after being planted, and non-native species can require more water for maintenance than native species. The amount and source of water needed for irrigation water is a major ground water issue. One golf course estimated that it needed up to 800,000 gallons of water per day (proposal for Snoqualmie Ridge Golf Course).

The East King County Ground Water Management Area, with large tracts of undeveloped land located within easy driving distance of major urban centers, is an ideal area for golf course development. However, the lack of water availability has precluded development of golf courses in the area in the past. The six golf courses currently in the area are Carnation, Tall Chief, Snoqualmie Falls, Cascade, Twin Rivers and Mt. Si. The Snoqualmie Ridge Golf Course is currently under construction.

King County produced the *Best Management Practices for Golf Course Development and Operation* (BMP Manual) in January 1993. The BMP Manual was developed by the King County Environmental Division and a steering committee of public and private sector representatives. The BMP Manual was prepared to provide technical information to those involved or interested in golf course development and management. The manual's objective was to review, compile, select, and summarize existing technical data relating to golf course development and management. The manual recognizes that while the recommended approaches are not likely to solve all environmental problems associated with golf courses, they can help identify thresholds of concern for particular issues, provide guidance on how to deal with specific situations, and provide direction on how to plan for and mitigate specific impacts.

Issue 1 Ground Water Quantity and Quality. King County anticipates that more golf courses will be proposed for development. These golf courses should be designed to protect ground water quantity and quality. Implementation of the *King County Best Management Practices for Golf Courses Manual* will ensure that they do.

GC - 1A Ground Water Quantity and Quality. King County shall utilize the best management practices available at the current time as a guideline to design golf courses, and apply the most current best management practices on a continual basis for operation of golf courses. For example, those contained in the *King County Best Management Practices for Golf Courses Manual*, except that buffer averaging will not be allowed.

GC - 1B Ground Water Quantity and Quality. Cities shall utilize the best management practices available at the current time as a guideline to design golf courses, and apply the most current best management practices on a continual basis for operation of golf courses. For example, those contained in the *King County Best Management Practices for Golf Courses*, except that buffer averaging will not be allowed.

Who: King County Department of Development and Environmental Services.
Cities (Planning or Building Department).

Priority: High (3.1)

Time: Costs will vary with each application.

Issue 2 Total Water Consumption by Golf Courses. Water resources are limited and precious. Available water quantity for competing water use is a concern for portions of the East King County Ground Water Management Area. Golf courses in this area use ground water for irrigation. Use of ground water for irrigation may exceed the amount of ground water that the zoned (allowed) land use (such as residential development) would use.

GC - 2 Total Water Consumption by Golf Courses. Limitations on water use shall be placed on golf course development to ensure equitable use of ground water resources consistent with zoning. **King County Department of Natural Resources** will propose amendments to the King County Development Regulations to require that all golf course development shall, through a variety of conservation measures such as use of reclaimed water, maximized use of drought tolerant landscaping, and minimized green areas, limit the ground water use to that of the equivalent residential development allowed by zoning for Metropolitan King County Council's consideration. (For ground water calculation purposes, single family residential use is 400 gallons per house per day.) Until the Development Regulations are changed, the guidance for environmental review (AP - 1C) will include this analysis.

Task 1: Propose amendments to the Zoning Code

Who: King County Department of Natural Resources
Priority: High (3.2)
Time: Cost estimate to be developed.

Task 2: Include equivalent water use analysis (by allowed zoning) in the environmental review guidance.

Who: King County Department of Natural Resources as part of AP - 1C
Priority: High (3.2)
Time: Part of AP - 1C action, no additional costs over those estimated for that action.

2.5. Program Elements Addressing Ground Water Quantity

The East King County Ground Water Advisory Committee adopted the following goal to guide the development of the recommended management strategies: Protect the ground water resource in East King County to optimize the current and long term benefits.

Ground water quantity is important because ground water is used for drinking water, irrigation, industrial processes, and provides flow to streams, which support fish and other wildlife. A promising supply of potable water for the rapidly expanding Puget Sound population is believed to underlie the upper Snoqualmie Basin near North Bend. The alluvial aquifer in the vicinity of the Middle Fork of the Snoqualmie River is currently being investigated as a potential source of regional ground water supply. The East King County Regional Water Association, a consortium of water purveyors, has applied to Ecology for water rights in this area. Early estimates of aquifer capacity indicate that this aquifer system has the potential to become a regional water source. Aquifers, and related surface water levels, are maintained by preserving recharge and limiting excessive withdrawals. The two main causes of ground water depletion are reducing recharge by increasing permeable surfaces and overuse. Recharge occurs only through relatively undisturbed, permeable soils. Population growth, with its related building of homes, roads and businesses, causes an increase in impermeable surfaces and increases the demand for ground water.

The state of Washington has attempted to balance the needs of its citizens with maintaining the water resource. Ecology administers laws dealing with water appropriations and allocations. Allocations to new users must not conflict with existing use; however, the information needed to make allocation decisions is lacking. Some areas have experienced the effects of unwise use of aquifers, such as water level decline and seawater intrusion. Parties involved in water use are developing and using innovative techniques, such as conservation and artificial recharge, to decrease water use and increase water availability. Recent interest in maintaining surface water resources has

spotlighted the interaction of ground water and surface water. Future ground water resource management must consider this interaction.

The *Ground Water Areas Management and Programs* (Chapter 173-100 WAC) contains guidelines on program content which were to be adapted to the particular needs of a ground water management plan. Included in the program content is a section on alternatives, which outlines various land and water use management strategies that address each of the ground water problems discussed in the problem definition section. These guidelines state that alternative management strategies could address water conservation, conflicts with existing water rights and minimum instream flow requirements, programs to resolve such conflicts, and long-term policies and construction practices necessary to protect existing water rights and subsequent facilities installed in accordance with the Ground Water Management Plan program and/or other water right procedures. This issue section does not address these topics directly, except for conservation. Several new state programs, initiated since the WAC was written, provide programs to resolve conflicts with existing water rights and minimum instream flow requirements, and long-term policies and construction practices necessary to protect existing water rights and subsequent facilities (generally, under the Water Resources Forum from the Chelan Agreement). The East King County Ground Water Advisory Committee found that the best way to address these issues and to support the new programs is to develop and implement a long-term monitoring and data collection program to provide the decision makers with the necessary information to make better decisions.

The East King County Ground Water Advisory Committee adopted the following management strategies to address ground water quantity regulations and policies. Educational strategies related to landscaping and water use to help preserve water quantity are found in the Education Program.

2.5.1. Aquifer Recharge

Issue 1 Aquifer Recharge Preservation. Other watersheds in King County have experienced increased flooding and decrease in ground water levels after urbanization. East King County has been designated Rural in the King County Comprehensive Plan, but has several “pockets” of urbanization. It is unknown if these areas have or will affect ground water levels. One way to ensure continued recharge is through environmental review on individual developments. However, the current checklist for environmental review does not require a description of impacts to ground water recharge.

WQ - 1A Aquifer Recharge Preservation. King County should evaluate the impact of land clearing and development on aquifer recharge in the East King County Ground Water Management Area to determine if additional requirements are needed to preserve existing aquifer recharge. In particular, such a study should examine the loss of recharge resulting from clearing on glacial till soils and recommend percent clearing limits for new

development. Also, the areas where additional requirements would be implemented would be determined. The **East King County Ground Water Advisory Committee** requests that cities use this information to formulate policy.

Who: Ecology, King County Department of Natural Resources, WA Department of Natural Resources.
Priority: Medium (6.3)
Time: 0.125 FTE

WQ - 1B Aquifer Recharge Preservation: The **East King County Ground Water Advisory Committee** requests Ecology to amend the State Environmental Policy Act checklist to include impacts on the quantity of aquifer recharge. **Cities and King County** will consider impacts on the quantity of aquifer recharge during environmental checklist review.

Who: Cities, King County
Priority: Medium (6.2)
Time: King County: 0.125 FTE

2.5.2 Data Collection and Management

Issue 2 Data Needs. A complete characterization of the aquifer resource includes the following data and analysis: water rights application analysis, surface water/ground water interaction determination, possible ground water reservation, and other resource management concerns. To date, this has not been completed.

WQ - 2 Data Needs: **King County Department of Natural Resources** will design and implement a ground water data collection and management program which would enable Ecology and other land and water use decision makers (such as purveyors, land use planners and public officials) to make water resource decisions based on more complete information.

Who: King County Department of Natural Resources
Priority: Medium (6.2)
Time: (See Data Collection and Management section.)

2.5.3 Conservation

Issue 3 Conservation. Conservation has been shown to have a positive impact on ground water resources. Some conservation methods could be implemented to enhance current programs, including landscaping methods. King County Board of Health regulations for small and individual water systems does not include conservation elements.

WQ - 3A Conservation - Landscaping: Cities should consider adopting landscaping ordinances to encourage conservation for new development. Landscaping plans should incorporate native growth areas, use of plant species, which are drought tolerant, water efficient irrigation technologies, soil amendments, and limitations on the amount of turf.

Who: Cities (Planning Department).
Priority: Medium (6.6)
Time: To be determined

WQ - 3B Conservation - Small Public Water Systems. The Seattle-King County Health Department will propose a revision to regulations for new or expanded Group B Small Public Water Systems to cover water conservation goals and measures for King County Board of Health's consideration. This would include water source meters and other items listed under the *Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology and Conservation Programs*. Existing Group B Small Public Water Systems would be encouraged to add meters (source and individual) to their system. New and expanding Group B systems would have to comply with requirements upon creation, or completion of expansion.

WQ - 3C Conservation - Individual Water Systems. The Seattle-King County Health Department will propose regulations for new individual wells in physically susceptible and recharge areas to incorporate conservation measures for the King County Board of Health's consideration.

Who: Seattle-King County Health Department.
Priority: Medium (6.6)
Time: 0.08 FTE

2.5.4 Artificial Recharge

Issue 4 Artificial Recharge: Artificial recharge is a new technique that is being tried in this area. However, not enough is known about the possibility for long-term artificial recharge.

WQ - 4 Artificial Recharge: Cities and other purveyors with ground water supplies should investigate artificial recharge.

Who: Public ground water systems, Cities (Public Works Department)
Priority: Medium (6.8)
Time: To be determined.

2.5.5 Ground Water Level Declines

Issue 5 Decline Limits. Water level decline limits are set by Ecology and can be an effective tool for managing the resource. Ecology needs long-term information in order to set decline limits.

WQ - 5 Decline Limits: The **East King County Ground Water Advisory Committee** requests that Ecology review the information collected through the Data Collection and Management Program and recommend appropriate legislation and administrative rules to prevent further declines or restore predecline levels and to maintain safe sustainable yields to all jurisdictions affecting the Ground Water Management Area.

Table 2 - 1
City Management Strategies

Recommended Management Strategies for Cities	Priority
<p>AP - 1A & B Adoption of general aquifer protection policies. Cities would adopt the following policies in their next comprehensive plan update, or retain existing policies for the East King County Ground Water Management Area:</p> <ul style="list-style-type: none"> • Ground water based public water supplies should be protected by preventing land uses that may adversely affect ground water quality or quantity to the extent that the supply of high quality drinking water to present and future populations might be jeopardized. • Protection and sustainable use of ground-water based drinking water supplies in the East King County Ground Water Management Area is preferred over importing or exporting water outside of the Ground Water Management Area. • Higher intensity land uses (commercial, industrial) in rural cities that may have significant impacts upon the quality or quantity of a significant ground water resource should be avoided in the most physically susceptible areas when possible. • Wellhead protection programs will provide direction for focusing intense aquifer protection efforts in those areas, usually urban, where the existing built environment presents very significant risks to public drinking water systems. 	High (2.4)
<p>DCM - 1B Data Collection, Analysis and Management: Cities are required to tag existing and new wells per Washington State Department of Ecology regulations.</p>	High (1.1)
<p>ST - 1A Runoff Versus Recharge. King County is in the process of revising the surface water design manual to encourage that runoff be infiltrated when site conditions permit except where potential ground water contamination cannot be prevented by pollution source controls and stormwater pretreatment, or unless otherwise permitted to directly discharge stormwater into a receiving body. Cities should adopt similar provisions. Cities should maintain a policy of no net reduction of recharge in new development or redevelopment in the most physically susceptible and recharge areas.</p>	High (4.1)
<p>ST - 2A Ground Water Quality Concerns - Treatment Requirements. Cities will require more stringent design standards for facilities located in the most physically susceptible areas for new construction. Examples of applicable design standards are in the 1996 draft of the King County Stormwater Design Manual.</p>	High (4.4)
<p>ST - 3B Coordination Between Surface and Ground Water Planning Efforts: King County, cities and appropriate special purpose districts and other water purveyors will effectively coordinate water resource planning to provide the best possible protection of water resources.</p>	High (4.8)
<p>ED - 3 Existing Education: Cities and other water purveyors will utilize educational program products provided by state and county agencies.</p>	High (2.1)
<p>HM - 5 Local Emergency Management Plan. King County, as lead agency for the Local Emergency Management Plan, and cities will consider ground water protection in the Local Emergency Management Plan by using:</p> <ul style="list-style-type: none"> • A hazard analysis that takes into consideration the locations of the most physically susceptible and recharge areas and public water systems utilizing ground water sources (as described in the <i>Hazardous Materials Emergency Planning Guide</i>, National Response Team, 1987); • Fire-fighting techniques and emergency response techniques that favor ground water protection in the most physically susceptible and recharge areas; • Outreach activities which inform the public of the dangers created by spills to ground water, and reporting activities necessary to protect the resource. These activities may be in conjunction with the Education Program; and • Coordinate with King County to develop a county-wide "one-call" response phone number for citizens to report spills. 	Medium (5.6)

Table 2 - 1
City Management Strategies

<p>UST - 2 Petroleum Product Pipeline. The East King County Ground Water Advisory Committee recommends that underground oil pipelines not be located in the East King County Ground Water Management Area. However, should a pipeline be considered for construction within the East King County Ground Water Management Area, the following minimum standards must be met. Also, the King County Department of Natural Resources and the Office of Strategic Planning will propose an amendment to the King County Comprehensive Plan for the Metropolitan King County Council's consideration to include a policy that these standards be met. Cities will consider adopting this policy at the next comprehensive plan update.</p> <p>Location and Design</p> <ol style="list-style-type: none"> 1. No pipeline shall be located within 500 feet of any ground water supply well. 2. In cases where pipelines and water mains are located in the same general area, minimum separation criteria of 24 inches (vertical) and 10 feet (horizontal) will be applied, wherein, the pipeline will be located below the water line. 3. Ground motion and pipe stress sensors are required for pipelines located near areas of high potential mass wasting (i.e., landslides) and fault zones. 4. Rapid leak detection and shutdown systems (such as state-of-the-art Supervisory Control and Data Acquisition (SCADA) systems) with verifiable performance criteria and back-up communication. 5. Double wall pipe with continuous leak detection is required for any pipeline segment located in, or within, 500 feet of a physically susceptible and recharge area. <p>Emergency Response Planning</p> <p>Land use plans shall require contingency planning prior to location and development of pipeline corridors. Contingency Plans will include the following elements:</p> <ol style="list-style-type: none"> 1. Require automatic, remotely-controlled shutoff valves at closely spaced intervals (every four miles or less, based on resources at risk) in areas of high physical susceptibility. 2. Require pipeline operators to notify all private well owners and water purveyors within one mile of the pipeline about the pipeline's location and how to identify and respond to potential hazards 3. Require notification of all private well owners and water purveyors whenever a report of possible damage has been filed. 4. Require site-specific rapid response contingency plans for physically susceptible and recharge areas. 5. Assemble, train, and maintain a HAZMAT team to respond to local emergencies, 6. Require that every leak or spill be report to local officials, regardless of whether the hazardous material reaches a water body or causes property damage. 7. Require operators to provide local jurisdictions, fire departments, and public safety agencies with maps, inventories, descriptions of transported substances, and a copy of operations, maintenance, and emergency manuals. Changes in procedures, maintenance schedules and emergency response capabilities shall be provided within an annual operations report. Results of the previous year's integrity testing shall be included. <p>Ongoing Maintenance and Monitoring</p> <ol style="list-style-type: none"> 1. Require independent integrity (hydrostatic) testing every two or three years. 2. Require independent systematic assessments of pipeline corrosion using "elastic wave smart pigs" on a regular basis 	<p>High (2.6)</p>
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Table 2 - 1
City Management Strategies

3. Require regular surveillance of the right-of-way by line walking and hydrocarbon gas monitoring	
4. Require soil and ground water monitoring in physically susceptible and recharge areas.	
PF - 2A2: Pesticide and Fertilizer Use: Farm Plans. Cities will support the King Conservation District in the District's development of Farm Plans for City residents by considering joining the District if they are not already members, and considering adoption of the County's Livestock Ordinance (Ord. 10870, 1993) during the next City Comprehensive Plan update. The livestock ordinance requires farm plans based on livestock densities and setbacks from surface water bodies. The farm plans also address appropriate pesticide and fertilizer use.	Medium (7.4)
PF - 2C2 Pesticide and Fertilizer Use - Rights-Of-Way Maintenance. Cities will use non-chemical vegetation maintenance practices or chemicals that degrade into non-harmful elements and that are not persistent in the environment for roads and utility rights-of-way in the East King County Ground Water Management Area. The King County Roads Services Division's Integrated Pest Management Program may provide a model.	Medium (7.1)
SG - 2A2 Land Use of Inactive or Reclaimed Mines: Comprehensive Plans. At the time of their Comprehensive Plan update, Cities will consider an amendment to their Comprehensive Plan to include a policy which provides that land use of inactive and/or reclaimed sand, gravel, and rock quarry mines be carefully evaluated in light of the increased susceptibility of aquifers to contamination due to mining activities. Cities could consider an amendment similar to one proposed by the King County Dept. of Natural Resources and the Office of Strategic Planning for the King County Comprehensive Plan, if desired.	High (3.8)
SG - 2B2 Land Use of Inactive or Reclaimed Mines: Reclamation Plans. Cities shall consider requiring that reclamation plans for mineral extraction sites include measures to protect ground water quality and quantity.	High (3.9)
GC - 1B Ground Water Quantity and Quality. Cities shall utilize the best management practices available at the current time as a guideline to design golf courses, and apply the most current best management practices on a continual basis for operation of golf courses. For example, those contained in the <i>King County Best Management Practices for Golf Courses</i> , except that buffer averaging will not be allowed.	High (3.1)
WQ - 3A Conservation - Landscaping: Cities should consider adopting landscaping ordinances to encourage conservation for new development. Landscaping plans should incorporate native growth areas, use of plant species which are drought tolerant, water efficient irrigation technologies, soil amendments, and limitations on the amount of turf.	Medium (6.6)
WQ - 4 Artificial Recharge: Cities with ground water supplies should investigate artificial recharge.	Medium (6.8)

Table 2 - 1
City Management Strategies

REQUEST/SUPPORT SECTION

ST - 4 Assessment of Existing Stormwater Facilities. The East King County Ground Water Advisory Committee requests that cities assess the adequacy of stormwater facilities in the most physically susceptible and recharge areas and Well Head Protection Areas to protect ground water quality and to give these areas high priority for water quality facility retrofit as warranted.	
HM - 4 Implementation of the Uniform Fire Code. The East King County Ground Water Advisory Committee requests that cities within the East King County Ground Water Management Area require Hazardous Materials Management Plans and Hazardous Materials Inventory Statements as part of an operating permit in the physically susceptible and recharge areas.	Medium (5.6)
WC - 1A2 State Program. Cities will consider supporting legislation, when proposed, that provides sufficient funding for a complete well construction and decommissioning program.	Low (12.3)
WC - 2B1 Well Identification During Environmental Review, Rezone and Land Use Permit Applications: The East King County Ground Water Advisory Committee requests that the State Department of Ecology, or other lead agency, through the state SEPA process, require applicants to establish the location and status of wells present on the property in question during environmental review.	Low (12.1)
SP - 1B Sewer Maintenance Programs: The East King County Ground Water Advisory Committee supports cities in continuing or adopting regularly scheduled leak detection and repair programs and side sewer maintenance public education programs.	
WQ - 1A Policies and Ordinances King County should evaluate the impact of land clearing and development on aquifer recharge in the East King County Ground Water Management Area to determine if additional requirements are needed to preserve existing aquifer recharge. In particular, such a study should examine the loss of recharge resulting from clearing on glacial till soils and recommend percent clearing limits for new development. Also, the areas where additional requirements would be implemented would be determined. The East King County Ground Water Advisory Committee requests that cities use this information to formulate policy.	Medium (6.3)
WQ - 1B Policies and Ordinances: The East King County Ground Water Advisory Committee requests that Ecology include impacts on the quantity of aquifer recharge in the standard environmental checklist review process via an amendment to the State Environmental Policy Act checklist. Cities will consider impacts on the quantity of aquifer recharge during environmental checklist review.	Medium (6.2)

Table 2-2
County Management Strategies

Recommended Management Strategies for King County	Priority
<p>AP - 1A Adoption of general aquifer protection policies. King County would adopt the following policies in the next comprehensive plan update, or retain existing policies for the East King County Ground Water Management Area:</p> <ul style="list-style-type: none"> • Protection and sustainable use of ground-water based drinking water supplies in the East King County Ground Water Management Area is preferred over importing or exporting water outside of the Ground Water Management Area. • Wellhead protection programs will provide direction for focusing intense aquifer protection efforts in those areas, usually urban, where the existing built environment presents very significant risks to public drinking water systems. 	High (2.4)
<p>AP - 1C Enhanced environmental review to protect aquifers. King County Department of Natural Resources, in conjunction with the Management Committee, will develop guidance to assist environmental reviewers to:</p> <ul style="list-style-type: none"> • Identify proposed development that may significantly impact ground water in the physically susceptible areas. • Recognize and require adequate information to assess impacts upon ground water; and • Recognize and propose effective mitigation. 	High (2.5)
<p>AP - 1D Ground Water Concern Areas. King County, through an on-going process, will map areas where ground water is physically susceptible to contamination. These areas are defined as follows:</p> <ul style="list-style-type: none"> • Areas of physical susceptibility have been mapped according to the following criteria: <ul style="list-style-type: none"> • Soil permeability - Soil units are defined by the Natural Resources Conservation Service in the Soil Survey of the King County Area (SCS 1973). The units are rated high, moderate, or low permeability according to the description in the Survey. (1/4 weight given to this criteria.) • Geologic materials - United States Geological Survey maps provide information on surficial geology. High, moderate, or low permeability has been determined by professional judgment. (Full weight.) • Depth to water - Drillers logs and previous investigations are used to determine depth to the uppermost water table. Existing water table elevation maps are used, if available. High (0-25 feet from surface), moderate (25-75 feet from surface), and low (greater than 75 feet from surface) contamination potentials are assigned. (Full weight.) 	High (2.3)
<p>AP - 2 Well Head Protection Facilitation. The King County Department of Natural Resources, in conjunction with the Management Committee, will develop a list of actions that King County would use to help purveyors implement Well Head Protection Programs.</p>	High (2.6)
<p>DCM - 1A Data Collection, Analysis and Management: The King County Department of Natural Resources, in conjunction with the Management Committee, will develop and implement a data collection and management program that:</p> <ul style="list-style-type: none"> • Collects data needed according to Data Collection List (see the Supplement: Management Strategies) and the recommendations in management strategy PF-1B. • Continues data entry into the database, manages the data for quality control and applicability to analysis techniques, standardizes the format, shares the data with other agencies, and ensures data compatibility with other data collection efforts. • Analyzes the data to: <ul style="list-style-type: none"> • refine a conceptual understanding of the ground water hydrology for 	High (1.1)

Table 2-2
County Management Strategies

Recommended Management Strategies for King County	Priority
<p>determination of the available resource;</p> <ul style="list-style-type: none"> • assess impacts of land use on the resource; and • determine if a sophisticated numerical/computerized model is needed or would be useful. 	
<p>ST - 2B Ground Water Quality Concerns - Long Term Impacts. King County Department of Natural Resources, in conjunction with the Management Committee, should sponsor research on the long term impacts of the infiltration of pretreated stormwater on ground water quality. This research will be supported by monitoring of the discharge from a pretreatment system and other appropriate variables in areas where the facility is installed and operating.</p>	High (4.4)
<p>ST - 3B Coordination Between Surface and Ground Water Planning Efforts: King County. King County, cities, appropriate special purpose districts, and other water purveyors will effectively coordinate water resource planning to provide the best possible protection of water resources.</p>	High (4.8)
<p>ST - 6 Soil Amendment. King County Department of Natural Resources, in conjunction with the Management Committee, will evaluate the ground water quality and quantity benefits of soil amendment. Soil amendment requirements shall be recommended if the proposed research proves to be a practical method of improving water quality, increasing infiltration, and reducing stormwater runoff.</p>	High (4.9)
<p>ED - 1A Existing Education: The King County Department of Natural Resources will review existing educational efforts to determine whether the protection of ground water is emphasized, and will report to the Ground Water Management Committee on the adequacy of existing educational programs to address ground water concerns. The King County Department of Natural Resources will seek the cooperation of the parties involved to include ground water information and concerns in the existing educational programs. The specific elements of the educational program are:</p> <ul style="list-style-type: none"> • Existing educational program content will be reviewed for agreement with Ground Water Management Plan policies and goals. The King County Department of Natural Resources will review the current educational programs of Natural Resources Conservation Service, Cooperative Extension and other county agencies to ensure that the Ground Water Management Plan goals and policies are reflected; • The Local Hazardous Waste Management Program in King County will coordinate with the Household Hazardous Waste Education Committee to include information about risks to ground water associated with the disposal of household hazardous wastes to on-site sewage systems as part of their household hazardous waste educational activities; • King County will work with the local chapter of the Washington State Nursery and Landscape Association, King County Cooperative Extension Service, and the King Conservation District to promote the availability of appropriate seed stocks, plants, and materials to facilitate implementation of xeriscaping (use of low-water use plants); • The Education Program will support conservation education efforts in the schools and for the general public as described in the <i>Conservation Planning Requirements</i> (Washington Water Utilities Council, Department of Health, Department of Ecology, March 1994); • Cooperative Extension and the King County Department of Natural Resources will prepare a brochure to educate residents about landscaping practices that promote aquifer recharge; • The Seattle-King County Health Department will coordinate measures to increase public awareness concerning the potential impacts of discharging household 	High (2.1)

Table 2-2
County Management Strategies

Recommended Management Strategies for King County	Priority
<p>chemical products to an on-site sewage system. Such measures would be an extension of activities scheduled as part of the Local Hazardous Waste Management Plan.</p> <ul style="list-style-type: none"> • Educational programs concerning the effect of landscaping practices on aquifer recharge could be coupled with education on the impacts of pesticide and herbicide use on ground water quality. A discussion of proper disposal of household hazardous wastes could be included. Landscaping tips should include a discussion of native vegetation and its role in facilitating infiltration of moisture. Educational efforts would complement and combine with current efforts of the Seattle-King County Health Department, Cooperative Extension, and the Conservation District. This information could be disseminated through the Master Gardener and other programs of Cooperative Extension. • General public knowledge about the public health significance of the requirements for well construction, operation, maintenance, and decommissioning is lacking. The Ground Water Management Plan Education Program will coordinate with and support the Department of Ecology's well identification, well construction, proper well maintenance, contamination sources, and well decommissioning projects. Informed well owners and other community members are probably more likely to comply with the well construction and decommissioning regulations. Methods of informing well owners may include distributing a questionnaire about wells to homes in the community, developing and distributing an educational brochure for homeowners, and supplementing the brochure with community educational programs. The questionnaire should be designed to ascertain the number of wells on each property, the construction methods used, and the number of wells that require decommissioning. The brochure should include recommended practices and legal requirements for well construction and decommissioning. It should also include the reasons why practices such as sealing the well are both advisable and required by law so that homeowners are knowledgeable before they make plans to construct or decommission a well. 	
<p>ED - 2 New Educational Elements: King County Department of Natural Resources will develop specific educational activities and materials for sources of contamination. The King County Department of Natural Resources will report to the Management Committee on the adequacy of existing educational programs to address ground water concerns. This report will include proposed changes as a result of review and discussions carried out in the implementation of ED-1. The King County Department of Natural Resources will then develop a supplemental educational program to address identified deficiencies and present the program to the Management Committee for review and adoption. New educational programs will be developed and implemented according to the adopted East King County Ground Water Advisory Committee actions below (this is a partial list, more elements are expected to be developed as the program progresses):</p> <ul style="list-style-type: none"> • Increase awareness concerning proper on-site sewage system operation and maintenance, including the risks associated with disposal of hazardous wastes in such systems. Amend the existing public information pamphlet concerning on-site sewage system maintenance and operation to provide instructions concerning proper household hazardous waste disposal practices; • Educate homeowners and other owners of exempt underground storage tanks regarding tank abandonment requirements of the Uniform Fire Code; • Include information about the relationship between solid waste disposal and the 	High (2.1)

Table 2-2
County Management Strategies

Recommended Management Strategies for King County	Priority
<p>resultant potential threat to ground water quality in the education program.</p> <ul style="list-style-type: none"> • Inform homeowners of their responsibilities for home heating oil tank abandonment under the Uniform Fire Code. Providing this information may increase the number of home purchasers requesting disclosure of information on tank status. <p>Other new program elements may be developed under direction from the Management Committee. Some possible tasks are:</p> <ul style="list-style-type: none"> • Support schools or individual teachers with an interest in ground water protection. Such support could include providing education materials or developing school skits. • Work with neighborhood groups on neighborhood ground water protection efforts. This could include developing and installing interpretive signs, for example, signs explaining Wellhead Protection Areas. • Sponsor informational booths at local fairs and displays at local libraries or business lobbies. 	
<p>HM - 3 Hazardous Waste Contamination Sites - Site Referral and Public Education. The Seattle-King County Health Department will provide:</p> <ul style="list-style-type: none"> • assistance to the Washington State Department of Health in site discovery including collection of information regarding hazardous waste contamination site history; and • assistance to the Washington State Department of Health in public health information and referral regarding hazardous waste sites. 	Medium (5.8)
<p>HM - 5 Local Emergency Management Plan King County, as lead agency for the Local Emergency Management Plan, will consider ground water protection in the Local Emergency Management Plan by using:</p> <ul style="list-style-type: none"> • A hazard analysis that takes into consideration the locations of the most physically susceptible and recharge areas and public water systems utilizing ground water sources (as described in the <i>Hazardous Materials Emergency Planning Guide</i>, National Response Team, 1987, or most recent edition); • Fire-fighting techniques and emergency response techniques that favor ground water protection in the most physically susceptible and recharge areas; • Out reach activities which inform the public, who live in aquifer sensitive or well head protection areas, of the dangers created by spills to ground water, and reporting activities necessary to protect the resource. These activities may be in conjunction with the Education Program; and • Development of a "one-call" response phone number for citizens to report spills. <p>The King County Department of Natural Resources will:</p> <ul style="list-style-type: none"> • Provide maps of the most physically susceptible areas and well locations to the Office of Emergency Management. • Provide information regarding emergency response techniques necessary to protect aquifers and wells for Local Emergency Planning Committee consideration, and incorporation into the Local Emergency Management Plan; and • Report on the progress of development and implementation of the Local Emergency Management Plan in relation to Ground Water Advisory Committee concerns. 	Medium (5.6)

Table 2-2
County Management Strategies

Recommended Management Strategies for King County	Priority
<p>UST - 1 Well Head Protection Strategies for Underground Storage Tanks. King County Department of Natural Resources, in conjunction with the Management Committee, will include the following in the King County list of potential well head protection activities. These well head protection strategies would only be implemented if requested by a water purveyor:</p>	Low (13.1)
<ul style="list-style-type: none"> • 1A Designation as an ESA under Chapter 90.76 RCW: King County Department of Natural Resources would prepare a petition to Ecology to designate a wellhead protection area as an Environmentally Sensitive Area if underground storage tanks are found to exist in the well head protection area under Chapter 90.76 RCW Underground Storage Tanks for the Metropolitan King County Council consideration. 	
<ul style="list-style-type: none"> • 1B Augment State Underground Storage Tank Program: King County Department of Natural Resources would prepare a program and related ordinances to enhance the identification, testing and current inspection of underground storage tank installations and the possible removal (if testing indicates contamination) in Environmentally Sensitive Areas, designated under 1A above. The ordinances should include the relevant requirements of Chapter 173-360 WAC Underground Storage Tank Regulations, for the Metropolitan King County Council and cities' consideration. 	Low (13.1)
<ul style="list-style-type: none"> • 1C Disclosure and Secondary Containment: The Department of Natural Resources would prepare an ordinance for the Metropolitan King County Council's consideration regarding underground tanks containing the following provisions: <ol style="list-style-type: none"> 1. Disclosure at the time of sale of any real property in King County of the number, location, and legal status of existing underground chemical storage tanks; 2. Require secondary containment for new underground tanks or have the tanks installed above ground. 	Low (13.3)
<ul style="list-style-type: none"> • 1D Exempt Tanks: The Department of Natural Resources would prepare an ordinance for the Metropolitan King County Council's consideration requiring secondary containment for new underground chemical storage tanks as defined by Chapter 173-360-120 WAC and for new heating oil tanks of all sizes and motor fuel tanks of 1,100 gallons or less. 	Low (13.3)
<ul style="list-style-type: none"> • 1E Exempt Tanks - Integrity Testing: The Department of Natural Resources would prepare an ordinance for the Metropolitan King County Council's consideration that requires underground chemical storage tanks without secondary containment, that are in use and exempt from the state Underground Storage Tank Regulations, to be tested at regular intervals for integrity. 	Low (13.4)
<ul style="list-style-type: none"> • 1F Heating Oil Tanks - Abandonment and Maintenance: Department of Natural Resources would prepare an ordinance for the Metropolitan King County Council's consideration regarding underground home heating oil tanks containing the following provisions: <ol style="list-style-type: none"> 1. Proof from the Fire Marshal that the underground heating oil tank was abandoned in accordance with regulations prior to release of any permits associated with energy conversions (gas piping, electrical, etc.); 	Low (13.6)

Table 2-2
County Management Strategies

Recommended Management Strategies for King County	Priority
<p>2. Require underground heating oil tanks that are abandoned in place to be filled with a material that precludes further storage of any chemical in the tank.</p> <ul style="list-style-type: none"> • 1G Heating Oil Tanks - Location: King County would develop funding and incentives for identification and proper abandonment of underground storage tanks. This will include establishing an "amnesty/incentive" program for identifying and removing existing residential underground chemical storage tanks. 	Low (13.8)
<p>UST - 2 Petroleum Product Pipeline. The East King County Ground Water Advisory Committee recommends that underground oil pipelines not be located in the East King County Ground Water Management Area. However, should a pipeline be considered for construction within the East King County Ground Water Management Area, the following minimum standards must be met. Also, the King County Department of Natural Resources and the Office of Strategic Planning will propose an amendment to the King County Comprehensive Plan for the Metropolitan King County Council's consideration to include a policy that these standards be met. Cities will consider adopting this policy at the next comprehensive plan update.</p> <p>Location and Design</p> <ol style="list-style-type: none"> 1. No pipeline shall be located within 500 feet of any ground water supply well. 2. In cases where pipelines and water mains are located in the same general area, minimum separation criteria of 24 inches (vertical) and 10 feet (horizontal) will be applied, wherein, the pipeline will be located below the water line. 3. Ground motion and pipe stress sensors are required for pipelines located near areas of high potential mass wasting (i.e., landslides) and fault zones. 4. Rapid leak detection and shutdown systems (such as state-of-the-art Supervisory Control and Data Acquisition (SCADA) systems) with verifiable performance criteria and back-up communication. 5. Double wall pipe with continuous leak detection is required for any pipeline segment located in, or within, 500 feet of a physically susceptible and recharge area. <p>Emergency Response Planning</p> <p>Land use plans shall require contingency planning prior to location and development of pipeline corridors. Contingency Plans will include the following elements:</p> <ol style="list-style-type: none"> 1. Require automatic, remotely-controlled shutoff valves at closely spaced intervals (every four miles or less, based on resources at risk) in areas of high physical susceptibility. 2. Require pipeline operators to notify all private well owners and water purveyors within one mile of the pipeline about the pipeline's location and how to identify and respond to potential hazards 3. Require notification of all private well owners and water purveyors whenever a report of possible damage has been filed. 4. Require site-specific rapid response contingency plans for physically susceptible and recharge areas. 5. Assemble, train, and maintain a HAZMAT team to respond to local emergencies, 6. Require that every leak or spill be report to local officials, regardless of whether the hazardous material reaches a water body or causes property damage. 7. Require operators to provide local jurisdictions, fire departments, and public safety agencies with maps, inventories, descriptions of transported substances, and a copy of operations, maintenance, and emergency manuals. Changes in procedures, 	High (2.6)

Table 2-2
County Management Strategies

Recommended Management Strategies for King County	Priority
<p>maintenance schedules and emergency response capabilities shall be provided within an annual operations report. Results of the previous year's integrity testing shall be included.</p> <p>Ongoing Maintenance and Monitoring</p> <ol style="list-style-type: none"> 1. Require independent integrity (hydrostatic) testing every two or three years. 2. Require independent systematic assessments of pipeline corrosion using "elastic wave smart pigs" on a regular basis 3. Require regular surveillance of the right-of-way by line walking and hydrocarbon gas monitoring 4. Require soil and ground water monitoring in physically susceptible and recharge areas. 	
<p>OS - 1 Nitrate Concerns - Wellhead Protection Program and Alternative Methods: The King County Department of Natural Resources will include the following in the well head protection strategies in AP - 2: 1. King County would consider alternative methods of development and/or revised land use for those tracts less than an acre in size which are undeveloped in areas where nitrogen levels in the potable water supply are found to be unacceptable (more than 5 mg/l); and 2. The Seattle-King County Health Department would work with the Board of Health to require alternate methods of sewage disposal for those tracts less than an acre in size in areas where nitrogen levels associated with on-site sewage systems are found to be unacceptable (more than 5 mg/l).</p>	Medium (8.1)
<p>OS - 2 Hazardous Materials - Inventory, Education, Monitoring at Commercial, Industrial and Institutional Facilities: The Seattle-King County Health Department should: 1. inventory commercial, industrial, and institutional facilities served by on-site sewage treatment and disposal systems which potentially use, store, or dispose of hazardous materials; 2. educate operators regarding hazardous materials management in relation to on-site sewage disposal systems, and; 3. selectively monitor those facilities that appear to represent a significant risk to ground water quality.</p>	Medium (8.5)
<p>OS - 3A Household Hazardous Wastes - The Local Hazardous Waste Management Program in King County. The Local Hazardous Waste Management Program in King County will coordinate with the Household Hazardous Waste Education Committee to include information about risks to ground water associated with the disposal of household hazardous wastes to on-site sewage systems as part of their household hazardous waste educational activities.</p>	Medium (8.2)
<p>OS - 4A Operation and Maintenance - Require Recording of As-Built Plan. The Seattle-King County Health Department will prepare amendments to <i>Title 13 of the Code of the King County Board of Health</i>, for King County Board of Health's consideration, to require that the as-built on-site sewage treatment and disposal system plan be recorded with the property deed in order that it be transferred with the title at the time of property purchase. In addition, information concerning the relationship between on-site system maintenance and operation practices and ground water protection should be added to the standard as-built plan form.</p>	Medium (8.3)
<p>OS - 4B Operation and Maintenance - On-Site Sewage System Management Program: The Seattle-King County Health Department will examine the feasibility of a county-wide on-site sewage system management program to determine its effectiveness in protecting ground water.</p>	Medium (8.4)
<p>PF - 1A Pesticide and Fertilizer - Past Use: Future Mapping of Vulnerable Aquifer Areas. Areas that have the potential for past pesticide and fertilizer use should be included in the determination of vulnerable aquifer areas. (See AP-1D.)</p>	Medium (7.3)

Table 2-2
County Management Strategies

Recommended Management Strategies for King County	Priority
PF - 1B: Pesticide and Fertilizer - Past Use: Monitoring. The King County Department of Natural Resources will monitor for specific pesticides and fertilizers in the most physically susceptible areas, where they are expected to occur based upon historical and projected land use, in the Data Collection and Management Program.	Medium (7.3)
PF - 2A1: Pesticide and Fertilizer Use: Farm Plans. King County will support the King Conservation District in development of Farm Plans using best management practices for any agricultural user of pesticide and fertilizer in the most physically susceptible and recharge areas.	Medium (7.4)
PF - 2B: Pesticide and Fertilizer Use - Cooperative Extension Pesticide Reduction Program: The King County Department of Natural Resources will evaluate the Cooperative Extension Pesticide Reduction Program for effectiveness in protecting ground water and applicability to the East King County Ground Water Management Area and report to the Management Committee.	Medium (7.5)
PF - 2C1 Pesticide and Fertilizer Use - Rights-Of-Way Maintenance. King County Department of Natural Resources, in conjunction with the Management Committee, will determine if maintenance practices by others for roads and utility rights-of-way in the East King County Ground Water Management Area need to be restricted to non-chemical methods or chemicals as described above.	Medium (7.1)
WC - 1A1 State Program. Ecology and King County will support legislation that provides sufficient funding for enforcement of well construction standards and a complete well decommissioning program.	Low (12.3)
WC - 1B State Program: Seattle-King County Health Department and Ecology will develop a program for implementation of the delegated portion of the well construction and decommissioning program in King County.	Low (12.5)
WC - 2A Well Identification at Sale of Property. King County Department of Natural Resources will investigate potential methods for the County and cities to require disclosure of used or unused wells at the time of sale of real property.	Low (12.2)
WC - 2B2 Well Identification During Environmental Review, Rezone and Land Use Permit Applications: King County Department of Natural Resources will develop an ordinance for Metropolitan King County Council consideration that requires applicants to establish the location and status of wells present on the property in question during environmental review, rezone and land use permit applications. The applicant shall disclose all pump tests on any wells on the property. This information would be provided to Ecology.	Low (12.1)
WC - 3A Decommissioning Cost: Funding Source. King County Department of Natural Resources, in conjunction with the Management Committee, will explore the possibility of having a funding source for decommissioning of wells for those property owners who disclose that they have an existing decommissioned well.	Low (12.4)
SP - 1A Infiltration and Exfiltration Studies: King County will: <ul style="list-style-type: none"> • Review and analyze existing studies and programs by local sewer utilities to determine if infiltration and exfiltration are problems in the East King County Ground Water Management Area and, • Analyze conclusions and determine appropriate follow up action, if any. 	Low (10.3)
B - 1 Information - Studies. The King County Department of Natural Resources will search for and evaluate existing information on cemeteries to determine if cemeteries could contaminate ground water. Information gathered can be used to establish siting criteria for new cemeteries or to develop other appropriate follow-up actions, if required.	Low (14.1)

Table 2-2
County Management Strategies

Recommended Management Strategies for King County	Priority
<p>SG - 1A Aquifer Impacts and Regulation: The environmental review guidance document provided for in action AP - 1C should include the following best management practices for sand, gravel and rock quarries:</p> <ol style="list-style-type: none"> 1. For sites with a planned excavation depth lower than the ground water table a detailed hydrologic report should be filed. This may be a part of a complete environmental impact statement or be an appendix to a environmental check list. 2. When mining activities are to be located in designated wellhead protection areas, special protection areas, sensitive aquifer areas, or principal recharge zones an environmental impact statement should be required. 3. Where possible, mining sites should utilize internal drainage, in order to support continued ground water recharge and minimize off-site discharges. 4. When ground water is exposed during the mining operation and the resulting impoundment is larger than 3 acres, ground water should be monitored for both water level (monthly) and water quality (quarterly to semi-annually) over the life of the operation. Water level and water quality monitoring should also be considered when depth to seasonal high water is reduced to 5 feet or less. 5. Associated activities such as concrete, asphalt or other batch processing plants shall not contaminate ground waters. 6. Truck and equipment wash runoff should be routed to an approved retention and treatment facility, equipped with an oil-water separator prior to its release to retention ponds. 7. Fuel (oils) storage and handling facilities should be located some distance from the main sediment and wash water retention facility. All such facilities should be equipped with approved containment, monitoring and collection systems. Fuel storage should be above-ground. These sites should be lined and bermed with sufficient capacity to accommodate spills and leaks. Runoff from these surfaces should be routed to a retention pond that can be monitored and cleaned in the event of a spill. 8. All sites should maintain a fuels/hazardous waste management plan. This would be maintained by the operator and be available on the site at all times. 9. At closure of the site, after accidental spills, or at the request of the Washington State Department of Natural Resources or Ecology, all contaminated material will be removed and disposed of with approved methods and at approved disposal sites. This material will not be used as fill at the site. 10. In general, impoundments of greater than three acres should not be filled. These sites should be stabilized as lakes and ponds and the surrounding area revegetated to insure stability of the site. Future land use decisions should reflect increased ground water vulnerability at the site. Individual sites may be filled if it can be demonstrated that sufficient inert material can be obtained to serve as fill. Impoundments of less than three acres should not be filled if there is doubt as to quality or supply of inert fill. 11. Excavation pits should not be used as landfill disposal sites for unclassified or non-inert wastes. In general municipal landfills are not an appropriate use of gravel sites located over semi-confined and unconfined ground waters. 12. Pits with standing water that are slated to be filled may use only approved inert earth materials (native fill/overburden) to fill the area up to the high water table. The remaining fill should meet the conditions described in 10 & 11. 13. Future land-use should reflect the increased vulnerability of ground water at the site and the change in the water balance of the area. 	High (3.6)
<p>SG - 1B State Regulations. King County will review the site reclamation planning format and make recommendations to the Washington State Department of Natural</p>	High (3.4)

Table 2-2
County Management Strategies

Recommended Management Strategies for King County	Priority
Resources on a process necessary for determining future site reclamation format that will maintain or enhance recharge rates in sand and gravel mining efforts.	
SG - 2A1 Land Use of Inactive or Reclaimed Mines: Comprehensive Plans. King County Department of Natural Resources and the Office of Strategic Planning will propose an amendment to the King County Comprehensive Plan for the Metropolitan King County Council's consideration to include a policy which provides that land use of inactive and/or reclaimed sand, gravel, and rock quarry mines be carefully evaluated in light of the increased susceptibility of aquifers to contamination due to mining activities.	High (3.8)
SG - 2B1 Land Use of Inactive or Reclaimed Mines: Reclamation Plans. King County Department of Natural Resources will prepare amendments to the zoning code to require that reclamation plans for mineral extraction sites include measures to protect ground water quality and quantity for Metropolitan King County Council's consideration.	High (3.9)
SG - 3 Regulatory Coordination. All agencies involved in the permitting and review of sand, gravel, and rock quarry permits will coordinate their efforts, especially concerning ground water protection. Ecology will be the lead agency, and establish a standing committee. This recommendation is consistent with King County Comprehensive Plan Policy RL-412, which states that "King County should work with the state and federal governments to ensure that proposals for underground mining, oil and gas extraction, and surface coal mining are reviewed with consideration of local land use and environmental requirements.	High (3.3)
GC - 1A Ground Water Quantity and Quality. King County shall utilize the best management practices available at the current time as a guideline to design golf courses, and apply the most current best management practices on a continual basis for operation of golf course. For example, those contained in the <i>King County Best Management Practices for Golf Courses Manual</i> , except that buffer averaging will not be allowed.	High (3.1)
GC - 2 Total Water Consumption by Golf Courses. Limitations shall be placed on golf course development to ensure equitable use of ground water resources consistent with zoning. King County Department of Natural Resources will propose amendments to the Development Regulations to require that all golf course development shall, through a variety of conservation measures such as use of reclaimed water, maximized use of drought tolerant landscaping, and minimized green areas, limit the ground water use to that of the equivalent residential development allowed by zoning and the appropriate community plan for the land on which the golf course is proposed, for Metropolitan King County Council's consideration. (For ground water calculation purposes, single family residential use is 400 gallons per house per day.) Until the Development Regulations are changed, the guidance for environmental review (AP - 1C) will include this analysis.	High (3.2)
WQ - 1A Policies and Ordinances: King County should evaluate the impact of land clearing and development on aquifer recharge in the physically susceptible and recharge areas in the East King County Ground Water Management Area to determine if additional requirements are needed to preserve existing aquifer recharge. In particular, such a study should examine the loss of recharge resulting from clearing on glacial till soils and recommend percent clearing limits for new development. Also, the areas where additional requirements would be implemented would be determined.	Medium (6.3)
WQ - 1B Aquifer Recharge Preservation: The East King County Ground Water Advisory Committee requests Ecology to amend the State Environmental Policy Act checklist to include impacts on the quantity of aquifer recharge. Cities and King County will consider impacts on the quantity of aquifer recharge during environmental checklist review.	Medium (6.2)
WQ - 2 Data Needs: King County Department of Natural Resources will design and	Medium (6.2)

Table 2-2
County Management Strategies

Recommended Management Strategies for King County	Priority
implement a ground water data collection and management program which would enable Ecology and other land and water use decision makers (such as purveyors, land use planners and public officials) to make water resource decisions based on more complete information (see DCM-1, DCM-2).	
WQ - 3B Conservation - Small Public Water Systems. The Seattle-King County Health Department will propose a revision to regulations for new or expanded Group B Small Public Water Systems to cover water conservation goals and measures for King County Board of Health's consideration. This would include water source meters and other items listed under the <i>Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology and Conservation Programs</i> . Existing Group B Small Public Water Systems would be encouraged to add meters (source and individual) to their system. New and expanding Group B systems would have to comply with requirements upon creation, or completion of expansion.	Medium (6.6)
WQ - 3C Conservation - Individual Water Systems. The Seattle-King County Health Department will propose regulations for new individual wells in the physically susceptible and recharge areas to incorporate conservation measures for the King County Board of Health's consideration.	Medium (6.6)
REQUEST/SUPPORT SECTION	
ST - 4 Assessment of Existing Stormwater Facilities. The East King County Ground Water Advisory Committee requests that King County assess the adequacy of stormwater facilities in the most physically susceptible and recharge areas and Well Head Protection Areas in unincorporated King County to protect ground water quality and to give these areas high priority for water quality facility retrofit as warranted.	
HM - 4 Implementation of the Uniform Fire Code. The East King County Ground Water Advisory Committee requests that King County require Hazardous Materials Management Plans and Hazardous Materials Inventory Statements as part of an operating permit in the physically susceptible and recharge areas.	Medium (5.6)
WC - 1A1 State Program. Ecology and King County will support legislation that provides sufficient funding for well construction standards and a well decommissioning program.	Low (12.3)
SP - 1C Infiltration and Exfiltration - Leakproof Piping: The East King County Ground Water Advisory Committee requests King County to amend the King County Comprehensive Plan and King County Code 13.24 to require that: new sewer piping installed in the most physically susceptible and recharge areas be leakproof; and existing leaking sewer pipes including side sewers will be replaced with leakproof piping in the most physically susceptible and recharge areas according to a schedule contained in the Sewer Utilities' Comprehensive Plans.	
SW - 2 Available Waste Facilities. The Ground Water Advisory Committee requests King County to maintain and expand the current waste disposal program for the disposal of waste not acceptable in the standard transfer station and landfill sites. Additional sites for recycling should be made available as well.	
WQ - 1B Policies and Ordinances: The East King County Ground Water Advisory Committee requests Ecology to amend the State Environmental Policy Act checklist to include impacts on the quantity of aquifer recharge. King County and other reviewing agencies will consider impacts on the quantity of aquifer recharge during environmental checklist review.	Medium (6.2)

Table 2 - 3
Purveyor Management Strategies

Recommended Management Strategies for Purveyors	Priority
DCM - IC Data Collection, Analysis and Management: Purveyors will encourage property owners to tag and report existing and new wells during application for service. Purveyors can also suggest that current customers report existence of wells in a notice in their billing.	High (1.1)
ED - 3 Existing Education: Purveyors will utilize educational program products provided by state and county agencies.	High (2.1)
WQ - 4 Artificial Recharge: Purveyors with ground water supplies should investigate artificial recharge.	Medium (6.8)

Table 2 - 4
Ecology Management Strategies

Recommended Management Strategies for Ecology	Priority
DCM - 2 Data Collection, Analysis and Management: Ecology will input local ground water management area data into Ecology's ground water data base.	High (1.2)
ST - 3A Coordination Between Surface and Ground Water Planning Efforts: Ecology Programs. Ecology will assess surface and ground water quality planning programs to determine how they could be combined or coordinated in a way which is both scientifically justified and which provides for greater efficiency.	High (4.7)
WC - 1B State Program: Seattle-King County Health Department and Ecology will develop a program for implementation of the delegated portion of the well construction and decommissioning program in King County.	Low (12.5)
WC - 3B Decommissioning Cost: Alternative Procedures. Ecology, during regulation revision, will consider alternatives to the present requirements for well decommissioning procedures that are cost effective and would protect public health.	Low (12.6)
SP - 2 Groundwater Depletion - Backfill. Ecology should consider amendments to sewer construction specifications which stops the transmission of ground water along pipe alignments. Such transmissions take place in the required granular backfill used as pipe support. These provisions shall include best management practices for backfill materials and/or the use of impermeable seals at appropriate intervals.	
SG - 1C State Regulations: Ecology will develop amendments to the <i>Protection of Upper Aquifer Zone</i> (Chapter 173-154 WAC), to include the conditions created by below-aquifer mining activities which are causing the loss of ground waters due to evaporative process created when the aquifers are exposed to the ambient weather conditions.	High (3.1)
SG - 3 Regulatory Coordination. All agencies involved in the permitting and review of sand, gravel, and rock quarry permits will coordinate their efforts, especially concerning ground water protection. Ecology will be the lead agency, and establish a standing committee. This recommendation is consistent with King County Comprehensive Plan Policy RL-412, which states that "King County should work with the state and federal governments to ensure that proposals for underground mining, oil and gas extraction, and surface coal mining are reviewed with consideration of local land use and environmental requirements.	High (3.3)

REQUEST/SUPPORT SECTION

HM - 1 State Hazardous Waste Plan - Implementation: The Ground Water Advisory Committee supports the findings and recommendations of the Draft Washington State Hazardous Waste Management Plan. The Ground Water Advisory Committee requests that Ecology and the Washington Legislature fund the implementation of the Plan with a sense of urgency in recognition of the threat posed to ground water from hazardous wastes.	
HM - 2A State Regulations. The East King County Ground Water Advisory Committee requests Ecology to amend the Dangerous Waste Regulations to set a minimum vertical protective distance, based on the permeability of the soils, between the site and groundwater.	
HM - 2B State Regulations. The East King County Ground Water Advisory Committee requests Ecology to prohibit siting of hazardous waste sites in the zone of contribution designated in the Washington State Department of Health adopted Wellhead Protection Programs.	
WC - 1A1 State Program. Ecology and King County will support legislation that provides sufficient funding for well construction standards and a well decommissioning program.	Low (12.3)

Table 2 - 4
Ecology Management Strategies

Recommended Management Strategies for Ecology	Priority
SE - 1 Guideline Revision. The Ground Water Advisory Committee strongly supports the use of reclaimed water. Also, the Ground Water Advisory Committee strongly encourages Ecology to include groundwater protection in the guidelines for reuse of effluent. The guidelines need to give special attention to reuse of effluent in the most physically susceptible areas.	
WQ - 1B Policies and Ordinances: The East King County Ground Water Advisory Committee requests Ecology to amend the State Environmental Policy Act checklist to include impacts on the quantity of aquifer recharge. King County and other reviewing agencies will consider impacts on the quantity of aquifer recharge during environmental checklist review.	Medium (6.2)
WQ - 5 Decline Limits: The East King County Ground Water Advisory Committee requests that Ecology review the information collected through the Data Collection and Management Program and recommend appropriate legislation and administrative rules to prevent further declines or restore predecline levels and to maintain safe sustainable yields to all jurisdictions affecting the Ground Water Management Area.	

Chapter Three
Recommended Implementation and Funding Process

**East King County
Ground Water Management Plan**

December 1998

Recommended Implementation and Funding Process

3.1 Introduction

The ground water management planning process has been funded by Centennial Clean Water Fund grants administered by the Washington State Department of Ecology and contributions from King County and the United States Geology Survey. However, implementation of the Ground Water Management Program depends upon long term funding and appropriate assignment of responsibility. Executive and legislative branches of government and other public and private interests have important roles in the implementation of the Ground Water Management Plan to protect ground water quality and quantity. The recommended implementation process described in this chapter assigns roles and tasks and discusses funding sources. Topics addressed include:

- Legislative authority
- Funding
- Ground Water Management Committee
- Ground Water Advisory Committee
- Lead Agency
- Implementation of the Plan
- Process for Evaluation and Revision of the Ground Water Management Plan

Management Strategy Tables 2-1 through 2-4 (Chapter 2) list recommended actions for Plan implementation by responsible agency.

3.2 Legislative Authority

The land areas affected by this plan lie within the jurisdictions of the Cities of North Bend, Snoqualmie, Carnation and Duvall; King County; Water Districts 119 and 123, and the Fall City Water District; and the Group A water systems of Sallal, Ames Lake, Spring Glen, Wilderness Rim, Dawnbreaker, Riverbend, Lake Alice, Lake Margaret and Echo Glen. These entities are responsible for land use and/or maintaining water supplies to provide sufficient and adequate potable water in their respective jurisdictions. The Department of Ecology has state level responsibility for assuring that the provisions of the Ground Water Management Plan are implemented.

Metropolitan King County Council

The Metropolitan King County Council is the legislative authority of the county. The Council exercises its legislative power by adoption and enactment of ordinances; by levying taxes, appropriating revenue and adopting budgets; and other powers as described in the King County Charter Section 220.20. (King County Charter, Sections 220 - 270) The Council ensures that the policies in the King County Comprehensive Plan are carried out through ordinances implementing the Plan.

Seattle-King County Board of Health

The Seattle-King County Board of Health has powers concerning supervision over all health and sanitary measures for the protection of the public health of the county, including: enacting and enforcing such county rules and regulations as are necessary in order to preserve, promote and improve the public health; and establishing fee schedules for issuing or renewing permits or for such other services as are authorized, provided, that such fees or services shall not exceed that actual cost of providing any such services.

Affected City Councils, Special Purpose Districts and Others

City councils, elected by the citizens within the city boundaries, are the legislative body for the incorporated cities. They have similar powers and authority as the county council: most importantly, they are the land use and policy bodies for the incorporated cities. Other administrative bodies include the board of commissioners for water districts, sewer districts, and water associations. These boards set policies and rates for the provision of water and sewer service within their service areas.

Washington State Department Of Ecology

The certified Ground Water Management Plan is codified in the Washington Administrative Code and administered by Ecology. The Plan is voluntary in nature and it is anticipated to remain voluntary upon codification in the Washington Administrative Code. Ecology will rely on local government cooperation to implement the Plan, but may assist the lead agency, if needed, to gain compliance with provisions of the certified Plan.

Recommendation: The Ground Water Advisory Committee recommends that legislative authority for adoption and implementation of the Ground Water Management Plan be shared between the Metropolitan King County Council, the King County Board of Health, and affected city councils. These legislative bodies are needed to implement the plan because it encompasses actions that are typically under the purview of one but not the others. King County Board of Health authority is particularly important because it allows for the adoption of ordinances that are effective in both the unincorporated areas and in the cities of King County. Roles of each legislative authority are recommended as outlined below:

Metropolitan King County Council

- Review and prepare findings, and state concurrence with the Draft Ground Water Management Plan;
- Authorize budgetary expenditures to implement the Ground Water Management Plan as necessary, after it has been certified by Ecology;

- Appoint members of the Ground Water Management Committee from nominees provided by entities represented (see the Management Committee description below);
- Review and comment on revisions to the Ground Water Management Plan;
- Adopt ordinances necessary for the implementation of the Ground Water Management Plan (generally addressing such matters as land use, zoning, and regulations governing the activities of county agencies).

King County Board of Health

- Adopt ordinances necessary for the implementation of the Ground Water Management Plan (generally addressing activities regulated by the Seattle-King County Health Department, Environmental Health Division, e.g. on-site sewage disposal, small public and private drinking water systems, wellhead protection, and solid waste disposal).

City Councils

- Review and prepare findings, and state concurrence with the Draft Ground Water Management Plan;
- Authorize budgetary expenditures to implement the Ground Water Management Plan as necessary, after it has been certified by Ecology;
- Adopt ordinances as needed to implement the Ground Water Management Plan within city limits;
- Review and comment on revisions to the Ground Water Management Plan;

Special Purpose Districts and Others

- Review and prepare findings, and state concurrence with the Draft Ground Water Management Plan;
- Authorize budgetary expenditures to implement the Ground Water Management Plan as necessary, after it has been certified by Ecology;
- Adopt measures as needed to implement the Ground Water Management Plan within their jurisdiction; and
- Review and comment on revisions to the Ground Water Management Plan.

3.3 Funding

Long term funding is needed to implement the Ground Water Management Plan. Two methods have been found to be potential funding mechanisms for the Plan:

- Allocation of general funds by the County, cities and purveyors for ground water protection activities within their respective jurisdictions, or
- Establishment of an Aquifer Protection Area under Chapter 36.36 RCW.

Plan implementers may also want to explore various grants and loans offered by public and private sources. A partial list of alternative funding sources is included as Appendix C.

Initial estimates of personnel time required to implement the County elements of the Ground Water Management Plan are shown in Chapter 2 under the individual management strategies. In the future, any East King County Ground Water Plan tasks yet to be completed will be evaluated annually, updated and modified by the Management Committee. Any party to the Management Committee can direct their funds to go toward the tasks which they have agreed to complete or contract with another party to complete. They can also decline to fund certain portions of the work at their discretion. All implementation will be at the discretion of the funding agency, that is, implementation will be accomplished as funds are allocated.

Funding Recommendations:

Funding for the program and participation by King County, Cities, ground water purveyors and other plan implementers would be on a voluntary basis and is subject to budgetary approval by their governing bodies.

King County: The Ground Water Advisory Committee recommends that the Metropolitan King County Council provide long term funding for implementation of the Ground Water Management Plan

Other Plan Implementers: The Ground Water Advisory Committee recommends that Plan implementers fund the strategies for which they voluntarily elect to implement in the Plan. Participation by these entities shall be on a voluntary basis.

The funding for tasks and projects voluntarily implemented by a city or a purveyor shall be the responsibility of that city or purveyor. Where two or more participating agencies agree to implement a project together, the funding shall be as they agree. King County shall be responsible for funding projects it undertakes.

Aquifer Protection Area: The Ground Water Advisory Committee recommends that the Management Committee assess the feasibility of an Aquifer Protection Area in the future, to provide a potential source of funding for implementation of the East King County Ground Water Management Plan.

The purpose of an Aquifer Protection Area is to establish a funding base for ground water protection, preservation, and rehabilitation programs. Aquifer Protection Areas are established through an election ballot issue requiring approval from a simple majority of voters within the proposed Aquifer Protection Area. If voters approve the Aquifer Protection Area, the county can collect monthly ground water and septic system user fees. Establishing an Aquifer Protection Area that includes territory located within a city must

include approval of the city's governing body. The Metropolitan King County Council could propose an Aquifer Protection Area jointly with city councils' approval for the entire Ground Water Management Area. This would require an interlocal agreement between the cities and King County on funding and implementation of the Ground Water Management Plan. Alternatively, an aquifer protection area can be proposed for the unincorporated areas by Metropolitan King County Council action only.

The Ground Water Advisory Committee recognizes that the ballot measure must describe specific use of the funds, and any changes in specific uses or the fee would require voter approval. Fee collection is limited, in that the Aquifer Protection Area fees may only be collected from users of water withdrawn from an aquifer as opposed to a surface water source; the fee is not related to the amount of water used; and fees may be assessed only on on-site sewage disposal, and not on other sources of ground water contamination.

3.4 Management Committee

The Ground Water Management Plan will be implemented by various agencies. These agencies and the public should be represented in the oversight of Ground Water Management Plan implementation.

Recommendation: The Ground Water Advisory Committee recommends the formation of a Ground Water Management Committee that will coordinate ground water protection activities in the Ground Water Management Area. The Management Committee will be advised by the Ground Water Advisory Committee at the Ground Water Advisory Committee's discretion.

The Management Committee will be established as a Board by the Metropolitan King County Council. Potential members will be recommended by the Ground Water Advisory Committee and the King County Department of Natural Resources for nomination by the King County Executive. Potential members must have a strong interest and knowledge of ground water issues and the Ground Water Management Plan. The Management Committee will carry out the following tasks:

- Review, amend as necessary, adopt, and recommend to the Metropolitan King County Council, cities, and purveyors that are implementing recommended activities, an annual work plan based upon the certified Ground Water Management Plan;
- Monitor the implementation of the Ground Water Management Plan:
 1. Review annual reports on implementation prepared by the King County Department of Natural Resources;
 2. Determine whether implementation is adequate and whether changes are needed in priorities, monitoring, reporting, etc. during the implementation period.
- Update the Ground Water Management Plan:

1. Act as a forum to consider new or ongoing ground water protection issues of significance to the Ground Water Management Area;
 2. Determine whether revisions are needed to the Ground Water Management Plan; and
 3. Review, amend as necessary, adopt, and recommend for concurrence by the Metropolitan King County Council, King County Board of Health, water purveyors and city councils an updated Ground Water Management Plan five years after certification of the original Ground Water Management Plan by Ecology.
- Perform tasks as assigned in the Ground Water Management Plan (i.e., facilitating wellhead protection in King County; and development of guidance documents to assist environmental reviewers in King County and cities).

The Management Committee should consist of a core committee of 5 - 7 members (and their designated alternate) from the ground water management area, including a representative from the Ground Water Advisory Committee, the King County Department of Natural Resources, cities in the planning area, a tribal nation in the planning area, a ground water purveyor, and an individual water system owner. The Management Committee shall be established by motion by the Metropolitan King County Council with members nominated by the Council, each serving staggered terms of three years. The Committee would meet regularly to provide oversight to the implementation, to ensure that the budget process is performed in a fair and equitable manner, and to address the topics assigned to them in the Ground Water Management Plan. Only the city and groundwater purveyors that are implementing portions of the Plan could be Management Committee members. The Management Committee should work independently on most topics, but may join with other Ground Water Management Committees for county-wide programs. They should solicit information and participation from experts and interested parties as necessary.

Public Involvement: Interested public groups and individuals should be kept informed of the Management Committee work and implementation progress by inclusion on a notification list. Those on the list should receive meeting agendas and minutes and routine updates on the Ground Water Management Plan progress. The Management Committee meetings should be open to the public. Also, if the Management Committee is aware of an agency or individual that has an interest in a topic under discussion, they should be invited to attend. Elected officials should also be included on the notification list. Elected officials may also have the opportunity to have presentations on the Ground Water Management Plan progress.

Dispute Resolution: The Management Committee should develop a process for resolving disputes between those implementing the plan or for other interested agencies and individuals. The Committee should first attempt to resolve any disputes before they are appealed to local legislative bodies.

Administrative Policies: Decisions of the Management Committee will be by consensus whenever possible. Procedures for resolving lack of consensus should be adopted by the committee for inclusion in its administrative policies. The Management Committee administrative policies should include a provision stating that Ground Water Advisory Committee recommendations will be carefully and promptly considered and followed by a written response.

Individual members of the Management Committee will have the responsibility to coordinate internally with the entity represented. For example, a representative of a city needs to communicate and coordinate with their council and public works, planning, and building departments, and other affected departments regarding ground water management issues.

The Management Committee may make use of subcommittees to accomplish some tasks. For example, a subcommittee might address the topic of hazardous materials transport through aquifer protection areas. Federal and State agencies will be asked to serve in a technical capacity, as appropriate, on the subcommittees.

Water purveyors relying on a ground water source are asked to contribute to technical subcommittees formed to advise the Management Committee regardless of whether the system is located in the Ground Water Management Area. The reason is that subcommittees will be deliberating upon issues that will affect all ground water purveyors, not just those in the Ground Water Management Areas. An example of such an issue is wellhead protection strategies for King County. Wellhead protection strategies developed by the Management Committee will add to what is already contained in the Ground Water Management Plan.

3.5 Ground Water Advisory Committee

The Ground Water Advisory Committee was established to develop the Ground Water Management Plan. After the Plan is certified by Ecology, the Ground Water Advisory Committee's duties are completed. However, successful implementation of the Ground Water Management Plan depends upon support by the affected agencies and the community.

Recommendation: The Ground Water Advisory Committee recommends that the Ground Water Advisory Committee will continue to meet at its discretion. The role of the Ground Water Advisory Committee is to monitor implementation of the Ground Water Management Plan and to make recommendations to the Management Committee via its representative. The Ground Water Advisory Committee will also review and comment upon the first Ground Water Management Plan update.

3.6 Lead Agency

Implementation of the Ground Water Management Plan will require staff to perform day-to-day tasks. This staff needs to be familiar with the Ground Water Management Plan, data base management, Ground Water Management Area concerns, budget process, and be technically capable. This staff needs to provide administrative functions to the satisfaction of the Management Committee and the legislative authorities.

Recommendation: The Ground Water Advisory Committee recommends that the King County Department of Natural Resources serve as lead agency for the implementation of the Ground Water Management Plan. In fulfilling its role as lead agency, the King County Department of Natural Resources will:

- Refine cost estimates of the Ground Water Management Plan in consultation with implementing governments and agencies;
- Provide staff support to the Management Committee and the Ground Water Advisory Committees;
- Prepare annual implementation reports for the review of the Management Committee and the Ground Water Advisory Committees;
- Implement elements of the Ground Water Management Plan as assigned;
- Coordinate implementation of multi-jurisdictional program efforts such as data collection and mapping;
- Bring issues to the attention of the Management Committee;
- Coordinate with other King County planning processes and with federal, state, and local agencies regarding ground water protection;
- Coordinate revision of the Ground Water Management Plan:
 1. Prepare draft update of the Ground Water Management Plan for review, amendment as necessary, and approval of the Management Committee;
 2. Submit draft updates of the Ground Water Management Plan to the Metropolitan King County Council and carry out the process of obtaining concurrence from affected governments and agencies.
- Carry out other tasks that are determined to be appropriate.

3.7 Implementation of the Plan

The priorities established by the Ground Water Advisory Committee for implementation of the management strategies recommended in this Plan are listed in Tables 2-1 through 2-4 and under individual management strategies in Chapter 2. The Committee prioritized management strategies because they recognized that not all strategies could be implemented at the same time, and that some agencies might not concur with all of the recommended management strategies. Setting priorities enables the Ground Water Advisory Committee to indicate the relative importance of each recommended management strategy. The priority for each recommendation provides a framework within which all governments and agencies can plan their ground water protection

activities. It is recognized that the time frame for implementation depends on available funding. In particular, King County implementation efforts will be phased in over time and are dependent upon the availability of funding.

Recommendation: The Ground Water Advisory Committee also recommends that the Metropolitan King County Council adopt an ordinance providing for implementation of the Ground Water Management Plan that:

- Establishes the membership and role of the Management Committee;
- Establishes the lead agency and responsibility for staffing implementation of the Plan; and,
- Provides for voluntary interlocal agreements with plan implementers.

3.8 Process for Evaluation and Revision of the Ground Water Management Plan

The *Guidelines for Ground Water Areas and Programs* (Chapter 173-100 WAC) requires that the Ground Water Management Plan include a process for periodic review and revision. This process depends upon the complexity and recommendations in the Plan.

Recommendation: The Ground Water Advisory Committee recommends that a process for periodic evaluation and revision of the Ground Water Management Plan be established in order to ensure that the goals of the Ground Water Management Plan are achieved efficiently under changing conditions.

The Management Committee, the Ground Water Advisory Committee, King County Department of Natural Resources, and governments and agencies affected by the Ground Water Management Plan will be involved in the evaluation and revision(s). The first revision will be considered five years from the date of Ground Water Management Plan certification by Ecology. Subsequent revisions will be considered in five-year intervals unless the Management Committee determines that more frequent updates are needed.

The concurrence process will be initiated by King County Department of Natural Resources following adoption of revisions by the Management Committee. Public hearings will be held as required by law. The draft update will be submitted to the Metropolitan King County Council for review, amendment, and adoption when all affected governments and agencies have concurred, and before it is submitted to Ecology for re-certification.

Ground Water Management Plan updates at time intervals smaller than five years should be avoided due to the lengthy process of review, public hearings, concurrence, and certification. Other mechanisms may be used to implement short term changes either in substance or priority. For example, a grant could be sought to carry out a specific new task that the Management Committee feels is urgent but which is not included in the current Ground Water Management Plan. Alternatively, Ground Water Management

Plan priorities could be changed in order to expedite activity related to an issue that the Management Committee determines is more urgent than others.

King County Department of Natural Resources will assist the Management Committee in its evaluation of the Ground Water Management Plan by preparing annual implementation reports. These reports will cover such topics as:

- Progress in implementing plan elements in comparison with established priorities and schedule;
- Problems encountered in implementation of specific program elements;
- Proposed revisions or priority adjustments to address problems encountered in implementation;
- Changes in federal, state, or local laws impacting the Ground Water Management Plan.

The Management Committee will use the reports as well as its own deliberations and the recommendations of the Ground Water Advisory Committee to determine whether and how the Ground Water Management Plan should be modified when it is updated. The King County Department of Natural Resources will incorporate proposed revisions into the Draft Ground Water Management Plan.

The future ground water program at the County will address resource protection issues for the entire County. The East King County Ground Water Advisory Committee wants to ensure that the unique issues for this area are recognized and addressed as the county-wide program is implemented. The potential for additional ground water sources in this Management Area, and the use of those resources both inside and outside of the Ground Water Management Area boundaries, is of utmost concern. The Ground Water Advisory Committee wants to ensure that the unique aspects of this Ground Water Management Area are recognized, and that the necessary funding mechanisms, protection and maintenance measures are implemented equitably.

Appendices

Appendix A: Public Comment

Appendix B: Letters of Concurrence or Comment

Appendix C: Alternative Funding Sources

**Appendix D: Guidelines for Development of Ground
Water Management Areas and Programs**

Appendix E: Management Strategy References

**East King County
Ground Water Management Plan**

December 1998

Appendix A
Public Comment

East King County
Ground Water Management Plan

December 1998

**EAST KING COUNTY GROUND WATER MANAGEMENT PLAN
PUBLIC HEARING COMMENTS - DECEMBER 13, 1995 - 9:00 P.M.**

The following comments were taped and transcribed by the Washington State Department of Ecology:

1. Renny Lillejord, P.O. Box 691, Fall City, WA 98024 (Ames Lake Water Association)

First of all, I want to comment that there's been a lot of work done on the processes to bring this plan up to date. I've been involved in groundwater for a number of years. I'm the manager of the Ames Lake Water Association. What I do think, and I haven't gotten my written comments yet, but I will submit those to you. I do think, and I concur very, very, very heavily to the area of more research. One of the things that we've heard for a number of years that we don't have any water, which is really not true. We are not running out of water. Water is a renewable resource. And we need to take and do more investigation of that through these processes, and in order to do that kind of work, there's got to be money. The point of the plan that I really have a little bit of difficulty with, is how the money is going to be obtained, and I'll submit some of those comments in there. Other than that, I would not want to take a lot of people's time up because everybody wants to go home. I would like to see the Ground Water Management Program continued under the Health Department jurisdiction. I think the Health Department jurisdiction locally can offer more for the public than any other agency, more so than state agencies. And I've heard that it possibly is going to go under Surface Water Management, which I think is gross. Unfortunately, it really doesn't belong there. It is a health situation and it is not something that should be stuck under something that'll be diverted and not focused. Now it's focused as a health situation, and that's really good because the water is pretty primary to the human needs. I don't think Surface Water Management (they calling it Natural Resources?) I don't think it will do the job that the Health Department has done so far.

2. Ron Little 1510 228th Ave. SE, Issaquah, WA 98029 (Sammamish Plateau Water & Sewer District)

Again, I think that the Ground Water Management Group in the Snoqualmie Valley here should pat themselves on the back a lot. I think they've done a really good job and I think it's really been well received from the other areas of the county too, the stuff that's been done in this area. Our Board of Commissioners, we do have some concerns with this plan. One of the concerns is that we are in three different ground water management areas. We're in the Redmond and the Issaquah, and the East King County plan. We think that's a little much for us to manage. We believe that in fact many of our hydrogeologic characteristics are not similar to the valley's. We also are within the urban area of King County, for the most part, so we believe that we have different threats to the ground water than the valley does. So we would like to see, during the implementation of the plan, we would like to see us actually moved over to the Redmond or the Issaquah

plan for implementation, or at least not made part of this plan during the implementation portion.

3. Helen Nilon 14700 NE 29th Pl., #204, Bellevue, WA 98007 (East Lake Washington League of Women Voters)

Hi, I'm Helen Nilon with the League of Women Voters for East Lake Washington. And mine is really more of a question comment. With this process, I noticed that we have a SEPA checklist, which was made out on November 3rd, and I want to ask or raise this issue on that environmental checklist and review of it against the plan. Is that a 90-day period? And there's no determination recommendation.

(Bill Lasby, Seattle-King Co. Health Dept. answered the question). The determination was non-significance. That's the determination of the SEPA checklist. Helen, I'd have to check on the date in the commentary, but what we have been doing is going through with the plan at the same time as the checklist. I'm not sure if it's 30 days or 90 days. I'll check on that.

Helen - so comments on the checklist had 45 days. So by December 31st. Then we need to have been able to review the plan and look at it for the SEPA checklist although many people here haven't received the plan, I mean the public folks, until today.

Bill - Well, the plan, what most people got today was the USGS technical report. The plan's been available at the library. Anybody requesting copies of the plan can purchase them from our department for the cost that we have in just printing them, not making money on them. But we did put, Bruce put, 5 at the library? (Bruce answers) There's one each at the five local libraries. (Helen) Thank you. Is there also a possibility for those of us who might want to review the plan in more detail, since we do have a long comment period, to be able to know or request comments of testimony that may come in? For me this is a bit unusual to have a public hearing before I've been able to read something. All I know right now is that I have served on the committee. I believe that the committee has worked very hard with the staff to create a document that meets the needs of the community. And yet, I personally have never been able to read it all in one piece. And, as you say, we're being handed the technical data to support the plan tonight, so I know the League is very interested in public process, so as a part of that process, I believe that I can speak for the League in saying that we very much want the process to be effective, so that the end result of all of this is we do have a concrete plan that then we can go forward and do the implementation we need.

(Bill Lasby) What I can do is speak to the work that was done in the Redmond and Issaquah area. When people went through and reviewed the plans, we incorporated comments from citizens from various jurisdictions. For instance, we just recently, a couple of days ago, got Sammamish Plateau's letter of concurrence with the Issaquah plan. The public review process provided a lot of input into the plan and changes to the plan. We welcome people reviewing it, that's why we try to make it available at the

library for people and we've handed them out to each GWAC member for their information, we mailed it out actually, and so welcome any and all comments. We want a good product.

4. Bob George, Sammamish Plateau Water and Sewer District

My name's Bob George, I'm one of the commissioners on the Sammamish Plateau, and I want to second Ron's recommendation of perhaps transferring what portion of the East King County plan over into the Issaquah or perhaps the Redmond. I think it would be a much more efficient operation since we are drawing water basically from the Issaquah valley, which is part of the Issaquah Ground Water Management Committee's GWAC. I think it would be a much more efficient method of having it, particularly in financing. It would be not so many different techniques involving our district. Thank you.

5. Dick Jones, Carnation WA (chair of East King County GWAC)

I have a couple points I want to make. One I also want to endorse the water district, plateau, it makes sense that they be part of Redmond or Issaquah. I'd like to endorse that individually. Also, I would like to, on behalf of a lot of my neighbors in the surrounding area that I've talked to that are individual well owners, voice our concern and endorsement in terms of individual private wells, in terms of our right to have our water, the water that we applied for and the water rights that we have on it. And that it belongs to us, it's our water, we feel real strong about that. And that we are opposed to metering those wells, and that the plan does address that, so we want to endorse that.

End of taped public comments. No written comments were received at Ecology.

Appendix B

Letters of Concurrence or Comment

**East King County
Ground Water Management Plan**

December 1998

APPENDIX B

Letters of Concurrence or Comment

This Appendix contains letters of concurrence or comment letters from:

Washington State Department of Ecology
Seattle-King County Health Department
King Conservation District
Washington State Department of Natural Resources
Water District 119
City of Duvall
City of North Bend
King County Department of Development and Environmental Services
King County Department of Natural Resources, Surface Water Management Division
King County Department of Natural Resources, Solid Waste Division
King County Department of Transportation, Road Services Division
Group A Water Systems represented by Renny Lillejord, System Consultant¹

Representatives of these other agencies, City of Carnation, City of Snoqualmie, and Water District 123, reviewed the East King Ground Water Management Plan, and provided written comments on the Plan. Subsequently, lead agency staff made presentations to the cities, where city representatives discussed their concerns with staff. The Ground Water Advisory Committee amended the draft Plan to address the agencies' concerns and resolve their issues of non-concurrence.

Lastly, the Metropolitan King County Council reviewed the plan and passed Motion 10494, included in this Appendix with an attached sample letter. The motion was transmitted to the East King County Ground Water Advisory Committee under a cover letter by Ken Johnson of the Department of Natural Resources. The Committee met and responded with a letter accepting and clarifying its understanding of the Council's changes.

¹Group A Water Systems represented by Renny Lillejord include: Ames Lake Water Association, Dawnbreaker Water Association, Riverbend Homeowners Association, Rutherford Estates, Sallal Water Association, Spring Glen Water Association, Fall City Water District (formerly District 127), Wilderness Rim Association, and the Upper Preston Water Association.



STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

P.O. Box 47600 • Olympia, Washington 98504-7600
(360) 407-6000 • TDD Only (Hearing Impaired) (360) 407-6006

May 3, 1996

Mark Isaacson
Ground Water Management Plan Program
Surface Water Management Division
700 Fifth Avenue, Suite 2200
Seattle, Washington 98104

Dear Mr. Isaacson:

Re: Concurrence on the Draft East King County Ground Water
Management Plan

I have reviewed the draft East King County Ground Water Management Plan. The Department of Ecology concurs with the draft plan.

I look forward to working with you to certify and complete the East King County Ground Water Management Plan. I can be reached at 360/407-7255 if you have any questions.

Sincerely,

Laura H. Lowe
Environmental Planner
Shorelands and Water Resources Program

LL:ll

cc: Grant File



City of Seattle
Norman B. Rice, Mayor



King County
Gary Locke, Executive


Seattle-King County Department of Public Health

Alonzo L. Plough, Ph.D., MPH, *Director*

MEMORANDUM

December 22, 1995

To: Laura Lowe, Department of Ecology
Dick Jones, Chair of the East King County Ground Water Advisory Committee
Bill Lasby, Supervisor, Drinking Water and Ground Water Program, SKCHD

From:  Carl Osaki, Chief, Environmental Health Division

Re: Draft East King County Ground Water Management Plan

Thank you for the opportunity to review the draft East King County Ground Water Management Plan. We, as the Seattle-King County Health Department, concur with the plan as written. After the Metropolitan King County Council has reviewed and concurred with the plan, and the funding has been secured, we look forward to implementation of the tasks identified to our agency.

Gwm\east\concrdrf\corresp\osaki.d20



King Conservation District

935 Powell Ave. SW - Renton, WA 98055 - (206) 226-4867 - FAX (206) 764-6677

March 19, 1996

Mark Issacson
Groundwater Project Manager
King County Dept. of Natural Resources
Surface Water Management Division
700-Fifth Ave., 22nd Floor
Seattle, WA 98104-9830

Dear Mr. Isaacson:

In reviewing the draft East King County Groundwater Management Area Plan, we found that the general comments we provided for the Vashon-Maury Island Plan are applicable here.

As far as the plan itself is concerned King Conservation District does concur with goals and objectives of the plan.

Specific actions listed for King Conservation District and by association, SCS or Soil Conservation Service are ED-1, PF-2A, PF-3B:

ED-1, elements 1 and 3. King Conservation District welcomes people and agencies for assistance.

PF-2A, Task 1, 2. King Conservation concurs with these task, but currently does not have sufficient funds from all sources to target areas specifically in this plan. It is estimated (roughly) that identification of farms in the susceptible areas and development of plans in those areas would cost approximately \$30,000 depending on actual numbers of farms in the area. Another note here is that we do have a relatively new program available to us from NRCS that will evaluate the susceptibility of groundwater contamination from pesticides and herbicides in various soil mapping units. The Cooperative Extension programs may be based on the same information. Current funding is primarily from a county special assessment authorized by the King County Council through 1997.

PF3B, We welcome cooperative efforts listed for Soil Conservation Service.

In summary, King Conservation District concurs with the plan goals and objectives and also agrees to do the specific items mentioned subject to the availability of funding. We are willing to discuss and explore new funding sources to be able to carry out specific tasks.

Sincerely,

Jack Davis
District Manager



WASHINGTON STATE DEPARTMENT OF
Natural Resources

RECEIVED

LESLIE M. BELCHER
Commissioner of Public Lands
KALEEN COTTINGHAM
Supervisor

FEB 23 1996
SURFACE WATER MANAGEMENT DIVISION
OFFICE SUPPORT SERVICES

February 20, 1996

Lisa Dally Wilson
King County Surface Water Management Division
Department of Natural Resources
700 5th Avenue, Suite 2200
Seattle, WA 98104

Dear Ms. Dally Wilson:

The Washington State Department of Natural Resources (DNR) has reviewed the November 1995 Draft East King County Ground Water Management Plan. We concur with the overall intent, goals and objectives of the Plan and will do our part in support of Goals SG-1C and SG-3 relating to surface mining operations. However, we identified some aspects of the Plan where we have a concern or believe a modification is needed.

1. Page 2-13, Environmentally Sensitive Area Designation - Goals SA-1A and SA-1B, if implemented, would designate the whole East King County Ground Water Management Area (EKCGWMA) as an environmentally sensitive area so that some of the categorical exemptions currently granted under SEPA WAC 197-11-800 may be eliminated. If the intent is to consider only those exemptions listed on page 2-16, middle paragraph, then we have no concern and fully support both goals. However, if all of the categorical exemptions listed under WAC 197-11-908 concerning sensitive areas are up for review and possible elimination, we strongly feel that certain exemptions must remain as exemptions. Specifically, from WAC 197-11-800, paragraphs (1)(b)(I, v), (2)(c, e, f, h), (3), (5), (6)(a), (14)(c), (24)(a through g) and (25)(d, f, h, I) should not be changed as they have minimal effect on water quality/quantity issues but do affect how we do business as both a regulator and a landowner. The text on pages 2-13 and 2-16 needs to be made clearer on exactly which parts of WAC 197-11-800 will be considered for elimination, and that WAC 197-11-908 also applies to the process. If the broad range of exemptions is up for review, we request, as part of our concurrence, to be on the committee that determines the exact exemptions.

2. Page 2-144, Goal WQ-1A - Any clearing ordinance will have to be carefully written so that the authorities and responsibilities given DNR under the Forest Practices Act (RCW 76.09) are not affected. Currently, the County does have jurisdiction over lands platted after 1960, forest land converting to non-forest use, and non-forest activities on non-forest lands. Any other forest activity on forest land is under the department's jurisdiction and may not be covered by a clearing ordinance. We are very willing to assist the county in developing an ordinance that reflects each agency's roles and responsibilities.



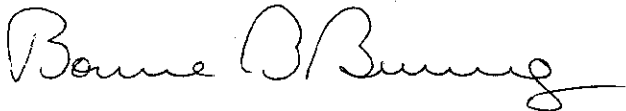
Lisa Dally Wilson
Page 2
February 20, 1996

3. Page 8, Draft East King County Ground Water Management Plan Supplement: Area Characterization - Change the paragraph describing the Washington State Department of Natural Resources to read:

"As a proprietary agency, the Department of Natural Resources manages 5 million acres of state-owned forest, aquatic, agricultural, range and commercial lands. Of the total, 2.1 million acres are forest lands that produce income primarily through the sale of timber and other forest products. DNR also manages 2 million acres of aquatic lands that include tidelands, shore lands, and the beds of all navigable lakes, streams and marine waters. As a regulator, DNR is responsible for site permitting approval and enforcement of reclamation standards on public and private surface mining operations, principally sand and gravel mines and quarries. DNR is also responsible for enforcing the Forest Practices Act governing timber harvest, reforestation and water quality protection for forestry operations on state and private lands."

If you have questions, please call Dave Kiehle at (360)825-1631.

Sincerely,



Bonnie Bunning
Region Manager

bc: Doug McCielland
Dave Kiehle
Ben Cleveland
Eric Huart, RPAM

King County Water District No. 119
11106 318th Place NE
Carnation, WA 98014

April 23, 1996

Ground Water Management Section
King County Surface Water Management Division
700 5th Avenue
Suite 2200
Seattle, WA 98104

Attention: Lisa Wilson

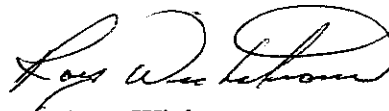
Reference: East King County Ground Water Management Plan

Dear Ms. Wilson:

King County Water District No. 119 generally concurs with the Draft East King County Ground Water Management Plan dated November 1995. The District has a thorough understanding of the limited ground water resources in the area and also appreciates and supports all efforts to protect those resources. Therefore, the District agrees with the goals and objectives of the Plan. We have identified several aspects of the Plan where we believe modifications are necessary to adequately address responsibilities within our jurisdiction. Our comments are summarized on the attachment.

We are willing to discuss these concerns with you. If you have any questions or need additional information do not hesitate to call the District at (206) 788-2885.

Very truly yours,



Roy Wickstrom
Commissioner

Attachment

cc: Engineering Consultants Northwest, Inc.
File

JJD/pv

DRAFT EAST KING COUNTY GROUND WATER MANAGEMENT PLAN

COMMENTS OF KING COUNTY WATER DISTRICT No. 119

APRIL 1996

1. GWAC Priority 1.1. Management Strategy DCM-1. Data Collection, Analysis and Management.

The District recognizes the need and value for developing an informational database of existing wells within a planning area. However, the District has only two full time employees, a clerk and a maintenance person. In addition, the District's planning area encompasses a land area of nearly 22,000 acres. We do not believe we have the resources to tag the existing wells in this relatively large area. We also do not believe we have the authority to contact individuals who may have a well and attempt to obtain information on its construction. We will share any information that we have on existing wells in the area. We will also share information we receive on any new wells.

2. GWAC Priority 5.4. Management Strategy HM-7A. Assessment of Aquifer Contamination Risk.

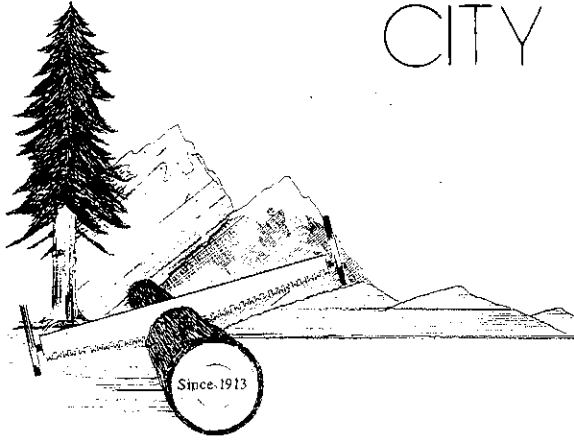
The District does not own any wells; all water provided to our customers is purchased wholesale from the Seattle Water Department. We have investigated the development of our own well sources and have yet to find a local aquifer with sufficient capacity to serve our needs. If we should find a potential ground water source we will assess the risks for contamination in accordance with all wellhead protection strategies.

3. GWAC Priority 12.4. Management Strategy WQ-3A. Water Rights.

The District supports the strategy that utilities update their water right records with the Department of Ecology. The relinquishment of rights does not appear to be feasible unless the right holder cannot demonstrate a legitimate need for the water.

4. GWAC Priority 6.8. Management Strategy WQ-4C1. Artificial Recharge.

The District supports the use of artificial recharge in carefully selected areas where geohydrologic conditions and other local physical characteristics make recharge beneficial.



CITY OF DUVALL

May 20, 1996

Lisa Dally Wilson, P.E.
Ground Water Program Hydrogeologist
King County
Surface Water Management Division
700 - 5th Avenue, Suite 2200
Seattle, WA 98104

RE: Response to the City Management Strategies of the East King County Ground Water Management Plan (EKCGWMP)

Dear Ms. Wilson;

Thank you for the opportunity to review the City Management Strategies of the EKCGWMP with you last week. After reviewing the Strategies, I believe that the City Council would agree with the objectives of the Plan, but can not concur with it for the following reasons:

1. There is no indication as to how the Plan is to be funded or what each City, Purveyor, or King County will have to contribute financially for the Plan.
2. The City of Duvall does not want to have to fund any portion of the County's program for the EKCGWMP.
3. The majority of the strategies of the Plan are already being carried out by the City, do not apply or could be adopted without an additional cost to the citizens of Duvall.

The following are my responses to each strategy that remains for the Cities.

SA - 1C Adoption of general aquifer protection policies. Cities would adopt the following policies in their next comprehensive plan update, or retain existing policies for the East King County Ground Water Management Area:

- **Ground water based public water supplies should be protected by preventing land uses that may adversely affect ground water quality or quantity to the extent that the supply of high quality drinking water to present and future populations might be jeopardized.**

At the present time, the City of Duvall obtains its drinking water from the City of Seattle Tolt Pipeline and reservoir not from wells. Our Water Comprehensive Plan, that was prepared in 1994, indicates that the City of Seattle will provide Duvall with water until the year 2010. The City is also a member of the East King County Coordinated Water System Plan (CWSP) with wells near North Bend. Therefore this does not apply.

- Protection and sustainable use of ground-water based drinking water supplies in the East King County Ground Water Management Area is preferred over importing water from sources outside of the Ground Water Management Area.

The Tolt reservoir and pipeline and the CWSP wells are within the Ground Water Management Area.

- High intensity land uses in urban areas (commercial, industrial) that may have significant impacts upon the quality or quantity of a significant ground water resource should be avoided when possible.

The City's Comprehensive Plan and Sewer Comprehensive Plan already limit the types of commercial and industrial businesses that can occur. The sewer treatment plant is only rated at 0.9 MGD and will not handle treatment for large water users such as a brewery, cheese factory, large chicken farms or other such businesses.

- Wellhead protection programs will provide direction for focusing intense aquifer protection efforts in those areas usually urban, where the existing built environment presents very significant risks to public drinking water systems.

The City does not presently use wells as a source for public water.

DMC - 1 Data collection, analysis and management. Cities are required to tag existing and new wells per Washington State Department of Ecology regulations.

As property is developed in the City of Duvall, any existing wells are required to be capped and the development is required to connect to the City water system.

ST - 1 Runoff versus recharge. King County is in the process of revising the surface water design manual to encourage that runoff be infiltrated when site conditions permit except where potential ground water contamination cannot be prevented by pollution source controls and stormwater pretreatment, or unless otherwise permitted to directly discharge stormwater into a receiving body. Cities should adopt similar provisions. Cities should maintain a policy of no net reduction of recharge in new development or redevelopment in the most physically susceptible and recharge areas.

The majority of soils within the Urban Growth Boundary for the City of Duvall are Agc type soils. This is described as an Alderwood type soil that has a low capacity for water where water moves on top of the substratum in winter. This substratum layer is found 27 to 60 inches below the surface. Per the proposed King County Surface Water Design Manual the requirement for infiltration facilities is a minimum of 3 feet of permeable soil below the bottom of the facility (bottom of pond or excavation for tank) and at least 3 feet between the bottom of the facility and the maximum wet season water table. Therefore it is not likely that much if any runoff could be infiltrated within the City limits. Also the City is within 1/4 mile of the Snoqualmie River which is listed as a receiving body for direct discharge in the King County Surface Water Design Manual.

ST - 2A Ground water quality concerns - treatment requirements. Cities will require more stringent design standards for facilities located in the most physically susceptible areas for new construction. Examples of applicable design standards are in the 1996 draft of the King County Stormwater Design Manual.

The City has adopted the King County Surface Water Design Manual by reference. Therefore once it has been adopted by the County Council it will be automatically adopted by the City.

ST - 4C Coordination between surface and ground water planning efforts. King County, cities and appropriate special purpose districts and other water purveyors will effectively coordinate water resource planning to provide the best possible protection of water resources.

This strategy is rather vague and does not really indicate what will be required or how it will be implemented.

ED - 1 Existing education. City purveyors will utilize educational program products provided by state and county agencies.

The City would be willing to distribute flyers provided by the State or County with the monthly billing to help educate the public.

HM - 5 Local emergency management plan. King County, as lead agency for the local emergency management plan, and Cities will consider ground water protection in the local emergency management plan by using:

- A hazard analysis that takes into consideration the locations of the most physically susceptible and recharge areas and public water systems utilizing ground water sources (as described in the Hazardous Materials Emergency

Planning Guide, National Response Team, 1987);

This does not apply to the City as the only physically susceptible areas in the City's Urban Growth Area are in the floodplain for the Snoqualmie River or are designated as Open Space per the 1994 Comprehensive Plan. Also as stated before, the City does not use wells for public water supply.

- **Fire fighting techniques and emergency response techniques that favor ground water protection in the most physically susceptible and recharge areas;**

This would have to be approved by the Duvall King County Fire District 45, not the City.

- **Out reach activities which inform the public of the dangers created by spills to ground water, and reporting activities necessary to protect the resource. These activities may be in conjunction with the Education Program; and**

This could be included as part of the education program in strategy ED - 1.

- **Coordinate with King County to develop a county-wide "one-call" response phone number for citizens to report spills.**

This strategy is also vague because it does not indicate who will receive the call and who will respond to the spill. The City cannot afford to employ a team to respond to spills. This seems to be something that the Washington Department of Ecology should be responding to.

PF - 2A Pesticide and fertilizer use: Farm plans. Cities will support the King Conservation District in the District's development of farm plans for City residents by considering joining the District if they are not already members, and considering adoption of the County's Livestock Ordinance (Ord. 10870, 1993) during the next City Comprehensive Plan update. The livestock ordinance requires farm plans based on livestock densities and setbacks from surface water bodies. The farm plans also address appropriate pesticide and fertilizer use.

The City is already a member of the King Conservation District.

PF 2C Pesticide and fertilizer use: Rights-of Way maintenance. Cities will use non-chemical vegetation maintenance practices or chemicals that degrade into non-harmful elements and that are not persistent in the environment for roads and utility rights-of-way in the East King County Ground Water Management Area. The King County Roads Services Division's Integrated Pest Management Program may provide a model.

The City presently uses a mower to control vegetation in the right-of-ways and will use chemicals that degrade into non-harmful elements.

WC - 2A Well identification at sale of property. King County Department of Natural Resources will develop an ordinance for Cities' consideration that requires sellers to disclose to buyers the existence of used or unused wells on the property. Cities will consider the ordinance.

This appears to be a strategy that the County should be required to enforce, as property owners do not have to notify the City when property is sold. This is something that King County Assessors office would have knowledge of.

WC - 2B Well identification during environmental review, rezone and land use permit applications. King County Department of Natural Resources will develop an ordinance for Cities' consideration that requires applicants to establish the location and status of wells present on the property in question during environmental review, rezone and land use permit applications. This information should be provided to Ecology. Cities will consider the ordinance.

During the review process for land development in the City applicants are already required to identify and cap all existing wells and connect to the City water system. Any of this information could be passed onto the State Department of Ecology.

SG - 2A Land use of inactive or reclaimed mines: Comprehensive Plans. At the time of their Comprehensive Plan update, Cities will consider an amendment to their Comprehensive Plan to include a policy which provides that land use of inactive and/or reclaimed sand, gravel, and rock quarry mines be carefully evaluated in light of the increased susceptibility of aquifers to contamination due to mining activities. Cities could consider an amendment similar to one proposed by the King County Department of Natural Resources and the Office of Strategic Planning for the King County Comprehensive Plan, if desired.

To my knowledge, the City does not have any existing or former mining operations within the City limits.

SG - 2B Land use of inactive or reclaimed mines: Reclamation plans. King County Department of Natural Resources will prepare amendments to the zoning code to require that reclamation plans for mineral extraction sites include measures to protect ground water quality and quantity. Cities shall consider similar requirements.

This does not apply to the City of Duvall.

City of Duvall
Response to EKCGWMP Strategies
May 20, 1996
Page 6

GC - 1 Ground water quantity and quality. Cities shall utilize the best management practices available at the current time as a guideline to design golf courses, and apply the most current best management practices on a continual basis for operation of golf courses. For example, those contained in the King County Best Management Practices for Golf Courses, except that buffer averaging will not be allowed.

This does not apply to the City of Duvall. There are no golf courses in the City limits nor are any designated in the 1994 Comprehensive Plan.

WQ - 4A1 Conservation: Landscaping. Cities should consider adopting landscaping ordinances to encourage conservation for new development. Landscaping plans should incorporate native growth areas, use of plant species which are drought tolerant, water efficient irrigation technologies, soil amendments, and limitations on the amount of turf.

The City has landscape requirements for all developments per the 1994 Comprehensive Plan.

WQ - 4C1 Artificial recharge. Cities with ground water supplies should investigate artificial recharge.

This does not apply to the City as we do not utilize ground water supplies for the public.

These are the strategies that are to be considered by the Cities in the East King County Ground Water Management Plan and my responses. As stated previously most of them are presently being covered by ordinances already in place or do not apply to the City of Duvall. Therefore it is my belief that this plan should not cost the citizens of Duvall any more than they are already paying through taxes, utility fees, and King Conservation District fees presently in place. Once the issue of funding is resolved, my recommendation to the City Council will be to concur with the plan as long as it does not create an additional cost to the citizens of Duvall.

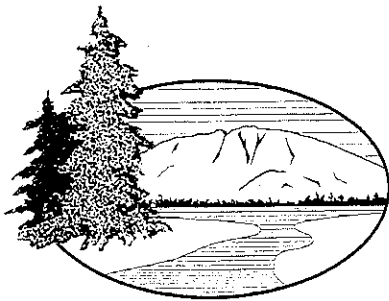
If you have any questions in regard to my responses or would like to discuss the funding of the Plan and it's concurrence, please call me at (206) 788-5959.

Sincerely,



Ken McDowell, P.E.
Public Works Director/City Engineer

cc: City of Duvall Council Members



CITY OF NORTH BEND
"Excellence in Government - Pride in Service"
P.O. Box 896 ☐ North Bend, Washington 98045

TO: Lisa Dally Wilson, King County Ground Water Program
FR: Phil Messina, North Bend City Administrator

RE: East King County Ground Water Management Plan
Date: August 19, 1996

Thank you for the opportunity to review the East King County Ground Water Management Plan as revised on 5/8/96 and reviewed in your presentation before the North Bend City Council on 6/4/96. The Public Works Committee of the North Bend City Council is in general concurrence with the plan with the following comments on the proposed Cities actions section of the plan:

SA-1C General Aquifer Protection Policies - The City of North Bend Comprehensive Plan calls for extensive industrial, commercial and residential land use over areas that may be part of the Upper Snoqualmie Valley aquifer. The City will take the approach of managing these land uses to avoid or control the potential adverse impacts to the aquifer instead of avoiding the high intensity uses.

DCM -1 Data Collection, Analysis and Management - The City does not presently have any funds budgeted to tag existing and new wells per Department of Ecology regulations.

ST-1 Runoff Versus Recharge - The high natural ground water table in North Bend is frequently a significant problem during utility construction and subsequently can produce high infiltration into leaking sewer lines and surface flooding during severe storm events. Under these circumstances it may not be feasible or desirable to encourage aquifer recharge in the developed areas of the City.

ST -2A Ground Water Quality Concerns - Treatment Requirements - The referenced 1996 King County standards have not been reviewed by the City and the City is not prepared to adopt the standards at this time.

PF - 2A The plan should add a new Pesticide and Fertilizer policy addressing appropriate use guidelines on residential property.

Proposed Pipeline Strategies - The plan should reserve the right to comment on pipeline proposals in accordance with the final strategies when adopted as an element of the plan.



King County
Department of Development
and Environmental Services
3600 - 136th Place Southeast
Bellevue, Washington 98006-1400

August 9, 1996

TO: Mark Issacson, Project Manager, Surface Water Management Division

FM: Robert S. Derrick, Director

RE: East King County Groundwater Management Plan

Thank you for including the majority of the revisions we requested to the November draft of the East King County Groundwater Management Plan (GWMP). With resolution acceptable to the Department of the following outstanding issues, the Department of Development and Environmental Services (DDES) will be able to concur with the plan:

1. **Funding.** The tasks assigned to DDES are identified to be funded by "General Agency Funds." As discussed in our previous comments, DDES is a fee-supported agency and needs specific funding to conduct any work that does not generate fees. An acceptable funding source will have to be identified for the agency to complete the assigned tasks or they are unlikely to be completed. We again request that the tasks be funded through the Aquifer Protection Fund or some other specific source.
2. **SEPA Categorical Exemptions.** The plan's recommendation that SEPA categorical exemptions are considered for repeal is in direct conflict with the County's recent efforts to meet the requirements of the state's Regulatory Reform Act. DDES has completed an analytical review of the current categorical thresholds and application of SEPA mitigation to projects. Most of the projects above the thresholds had no additional mitigations identified -- usually because the existing environmental protection measures were already codified. The conclusion was that thresholds be expanded; not exempted as the plan recommends. In light of the mandated 120 day permit time limits, the expectation that even smaller projects be subjected to SEPA review is unrealistic. The plan's focus should be on each jurisdiction's development of adequate regulation that precludes the need for individual SEPA review for many project types. This recommendation should be removed.
3. **Coordination with other GWMPs.** Most of the tasks that are identified for DDES are consistent across all of the GWMPs. DDES concurs with the level of effort and proposed schedule identified in the Redmond Bear Creek GWMP; not with this plan. Since the completion of tasks identified under this one plan will complete the majority of the tasks

Mark Issacson
August 9, 1996
Page 2

identified for DDES in the other plans, the funding of these tasks should be shared across all plans.

It is our understanding that some of these issues will not be resolved until after the King County Council has reviewed and concurred with the plan. We look forward to working with the Management Committee to resolve any outstanding issues and move forward with a successful implementation of the plan. After the Council has reviewed and concurred with the plan, the outstanding issues have been resolved, and the funding has been secured, we look forward to implementation of the tasks identified for our agency.

RSD:js

cc: Dick Jones, Chair, Ground Water Advisory Committee
Doug Rushton, Washington State Department of Ecology
Greg Kipp, Deputy Director, Department of Development and Environmental Services
ATTN: Jerry Balcom, Supervisor, Code Development Section
Mark Carey, Manager, Land Use Services Division
Tom McDonald, Manager, Building Services Division

March 25, 1996

TO: Lisa Dally Wilson, Paul Shallow, Mark Isaacson, Bill Eckel

FR: Lorin Reinelt *L. Reinelt*

RE: East King County Ground Water Management Plan Comments

Here are my draft comments on the East King County Ground Water Management Plan dated November 1995. My comments focus on the Storm Water Management section and those items listed for SWM implementation, but I have also included a number of general and specific comments from my review.

The following recommendations that specifically reference or imply implementation by the SWM Division are followed by a discussion on implementation or concurrence. This can be written up as a formal concurrence letter by the SWM Division, or included as part of a Department of Natural Resources concurrence letter. We should discuss this further to determine the best approach given the recent organizational changes.

ST-1A: Amend/adopt surface water design manual.

The proposed update of the Surface Water Design Manual was recently transmitted to the Council. In the proposed update, dispersion or infiltration systems are required for some cases and allowed for other cases. In rural areas, roof downspout dispersion or infiltration is required for new residential development. In urban areas, roof downspout infiltration is only required for new residential development in those soils that readily infiltrate (coarse sands and cobbles to medium sands). For urban lots in less permeable soils, dispersion is required. For subdivisions and commercial developments, infiltration is not required, but would likely occur on coarse soils in order to meet pre-development flow control requirements. Such infiltration for flow control would occur after water quality pre-treatment. It is important to note that the threshold for drainage review is 5000 square feet of new impervious surfaces, so projects below this level would not be covered by these requirements.

If greater use of infiltration is desired for the East King County Groundwater Management Area, the plan should probably specify additional conditions under which it should be required. Similarly, if greater pre-treatment, beyond that required in the Design Manual, is desired, this should also be specified. It is not certain when future updates or amendments to the Design Manual will occur.

ST-2B: Sponsor study, monitor facilities and report findings.

In general, the SWM Division is supportive of efforts to study the effectiveness of stormwater treatment facilities as related to treatment efficiencies and groundwater protection. However, SWM's BMP/facility monitoring program budget was significantly cut in 1996. Current monitoring efforts are focused on facility maintenance. SWM cannot agree to do the proposed monitoring under its existing budget, since this budget is minimal. The Center for Urban Water Resources Management may be able to coordinate such a study with joint funding from multiple jurisdictions. Subject to future funding decisions, SWM could contribute to such a study.

General Comments

1. The document should be updated to reflect the new organizational structure at King County. References to the Department of Public Works should be removed and replaced by KCDNR or KCDOT.
2. The language for recommendations should be changed to "should" or "shall" instead of "will" throughout the plan.
3. The storm water section refers several times to "the most physically susceptible areas and Well Head Protection Areas" for targeting a recommendation. These sections should reference a map, or define more specifically where these areas are located.
4. Whenever possible, it would be helpful to be specific about what departments or divisions within King County are designated for implementation of a particular recommendation.
5. There are many recommendations in the plan that are countywide in scope, such as updating King County code (title 13 or 10), education programs, or stormwater facility monitoring. It may be helpful to distinguish these recommendations from those that are specific to the East King County GWMA in the text or in the implementation tables. It is also important to note that such countywide programs would probably utilize a countywide funding source or shared funding from all aquifer protection funds.

The specific comments below focus on the Storm Water Management Section (2.2.3)

- p. 2-31, para. 5 - Wet ponds should also be included among the most common methods of water quality control.
- p. 2-33, para. 5 - Local Programs - It should be noted that SWM's Service Area primarily includes the unincorporated western third of King County. The entire Snoqualmie Valley, a good portion of the East King County groundwater management planning area, is outside the SWM Service Area.
- p. 2-34, para. 2 - This should be revised given the new organizational structure and the merging of the groundwater section into SWM.
- p.2-34, para. 6, 7 - Can these studies be referenced, or the language changed? For instance: ~~"Research has shown that a~~Nearly all"
- p. 2-35, para. 1 - *"Infiltration technology is fraught with problems, but given Ecology's emphasis on infiltration, we are about to find out how effective this technology is in the Puget Sound region."* This sentence is quite editorial like. You may want to strike it or justify why we should not emphasize infiltration in East King County.
- p. 2-35 Issue 1 - Change sentence to read: Rather, the Manual requires that there be no increase in peak runoff rates and in other instances no increase in the duration of flows above specific thresholds (e.g., above 50% of the 2-year pre-developed levels).

p. 2-35 (ST-1A Runoff versus Recharge) - This recommendation appears to be more of a "countywide" recommendation. The Design Manual is currently being updated and will soon be transmitted to the Council. Infiltration is required for various types of development and soils. Consideration should be given to modifying the recommendation to be more specific to East King County, that would take effect upon adoption of the East King County Groundwater Management Plan, such as:

New development proposals in the most physically susceptible areas within the East King County Ground Water Management Area shall be required to infiltrate stormwater runoff where ground water contamination can be prevented by pollution source controls and storm water pretreatment.

It may be desirable to be even more specific about what level of pretreatment is required. For instance:

ST-1A: Amend the surface water design manual to add infiltration treatment requirements.

The water quality treatment design standards of the King County Surface Water Design Manual are currently being updated. The Design Manual should require infiltration of stormwater after treatment in order to maintain aquifer recharge, while protecting groundwater quality. New developments in the East King County Groundwater Management Area shall be required to provide treatment of stormwater using one of the following options:

1. If soil infiltration rates are greater than 9 inches per hour, then stormwater shall be treated prior to infiltration using a facility from the proposed basic water quality menu, designed to remove 80 percent of total suspended solids and associated pollutants. Any one of the following facility options can be used to satisfy the basic water quality protection requirement: biofiltration swale, filter strip, wetpond, wetvault, constructed wetland, or sand filter.

2. If soil infiltration rates are less than 9 inches per hour, soil treatment can be used to satisfy the treatment requirements if certain soil characteristics are met.

p. 2-36 Implementation - The surface water design manual is in the final phase of being updated. It is not clear when another update will occur.

The cost of amending the design manual to address this issue would depend on the direction pursued (i.e., whether it is countywide or area specific).

p. 2-37 (ST-2A Treatment Requirements) - This recommendation needs to be more clear and specific (in terms of types of pretreatment requirements or a performance standard). It should also be separated into two recommendations, one covering new development and one focused on retrofitting. Possible language might be:

New development proposals in the most physically susceptible area within the East King County GWMA (see attached map) shall be required to provide pretreatment prior to infiltration of stormwater runoff. Pretreatment requirements shall consist of(for example,

.. lined wetponds designed with a Vb/Vr of 3.0 followed by sand filtration, or removal of 80 percent of the total suspended solids according to the Design Manual basic water quality treatment menu, or some other standard).

If problem areas have been identified where retrofitting of existing facilities is necessary, they should probably be identified in this plan. If not, perhaps the recommendation should be:

King County and the cities should evaluate existing stormwater facilities within the East King County GWMA and make recommendations about the need for water quality retrofitting, where necessary, to protect groundwater quality.

p. 2-37 to 2-39 Discussion - The discussion includes several recommendations for the study. These could be included in ST-2B.

pg. 2-38, para. 3 - It should be noted that infiltration facilities can also fail because of design and construction problems.

p. 2-39 - Task 3 - In general, the SWM Division is supportive of efforts to study the effectiveness of stormwater treatment facilities as related to treatment efficiencies and groundwater protection. However, SWM's BMP/facility monitoring program budget was significantly cut in 1996. Current monitoring efforts are focused on facility maintenance. SWM cannot agree to do the proposed monitoring under its existing budget, since this budget is minimal. The Center for Urban Water Resources Management may be able to coordinate such a study with joint funding from multiple jurisdictions. Subject to future funding decisions, SWM could contribute to such a study. Typical costs of stormwater facility evaluations are approximately \$20-30,000 per facility.

pg. 2-40, para. 2 - Should be the King ~~County~~ Conservation District and ~~Soil~~ Natural Resources Conservation Service as a result of recent name changes.

p. 2-40, ST-3 (Education) - You might consider combining these four recommendations (ST-3A through ST-3D) into a single recommendation. The current focus of this recommendation is countywide. Consideration should be given to an education program that focuses specifically on East King County.

p. 2-41, ST-4A, 4B and 4C - These recommendations are quite general. Did the GWAC specifically recommend that they be included in the East King County plan?

The recommendation on coordination of surface and ground water planning efforts could be more explicit. King County or the GWAC could make a recommendation that Ecology change its funding strategy to allow for integrated water resources management and planning to cover both ground and surface water.

p. 2-43, Task 3 - The specific elements and outcome of this task need to be more explicit. It is not clear what the role of the SWM Division would be for this task and what is covered by the estimated \$27,144 cost.

p. 2-43, ST-5A (Assessment of Existing Storm Water Facilities) - This recommendation should evaluate more than simply petitioning King County, the cities and special purpose districts. If funding is available, the SWM Division could assess the adequacy of stormwater management facilities in the most physically susceptible areas and Wellhead Protection Areas, and make recommendations for retrofitting. It is important to note, however, that most of the East King County GWMA is outside the SWM Service Area, so SWM funds cannot be used to assess and recommend facility retrofits.

p. 2-44, ST-6A (Roadway Runoff) - The Roads Division should respond to this recommendation.

p. 2-45, ST-7 (Soil Amendment) - What department or division will evaluate the ground water quality and quantity benefits of soil amendment? DNR? SWM? The soil amendment findings seem most applicable to urban residential lots (conversion from forest to grass) where the objective is to reduce stormwater volumes and enhance baseflow to streams. Thus, they would be most applicable on the East Lake Sammamish plateau and around the Snoqualmie Valley cities. ST-7A might also include recommendations focused on limiting topsoil removal during clearing and grading so that preservation of existing soil storage and infiltration are maximized.

Comments on other selected sections:

p. 2-125 - SG-1A - The final NPDES General Permit for sand, gravel and rock quarry operations was issued in July, 1994. Prior to issuance, there was an extensive review and comment period. Perhaps SG-1A should be modified to recommend that the lead agency and GWAC review and participate in changes to the general permit during the next update.

p. 2-135 - GC-1 - The basis of the recommendation to not allow buffer averaging is not clear. There should be some reference in the discussion as to why buffer averaging should not be allowed.

p. 2-144 - WQ-1A recommends consideration of a clearing ordinance to limit clearing activities outside of sensitive areas. Experience recently with the Issaquah Creek and Cedar River basin plans indicates that such a requirement may be difficult to enact. In order to get Council support for clearing limits, data showing a need for such a requirement is necessary. Perhaps the recommendation can be revised to include:

King County should evaluate the impact of land clearing and development on aquifer recharge in the East King County GWMA to determine if forest retention requirements are justified in order to preserve existing aquifer recharge. In particular, such a study should examine the loss of recharge resulting from clearing on glacial till soils and recommend percent clearing limits for new development.

p. 2-146, WQ-4A1 - King County adopted a landscaping ordinance in January, 1994 (Ord. No. 11210). Most of the elements recommended in WQ-4A1 are contained within the ordinance. Perhaps WQ-4A1 should simply recommend that the cities consider adopting a similar ordinance.

Table 3.8.1 - There should be some discussion of the criteria and process used by the GWAC to establish priorities for implementation.



**King County
Solid Waste Division**

Department of Natural Resources

Yesler Building
400 Yesler Way, Room 600
Seattle, WA 98104-2637

(206) 296-6542

March 18, 1996

TO: Mark Isaacson, Project Manager, Surface Water Management Division

FM: Kevin Kiernan, Engineering Services Manager

Handwritten initials 'KK' in black ink.

RE: East King County Ground Water Management Plan

Thank you for providing us the opportunity to review the Draft Management Strategies for the East King County Ground Water Management Plan and the Supplement Draft Area Characterization. This memorandum is organized to first comment on management strategies and then comment on the Supplement Draft Area Characterization.

Section 2.2.4 Education Program should acknowledge the significant progress the Solid Waste Division has in place encouraging waste reduction and recycling. The focus of this program is to reduce the amount of solid waste to be landfilled. Issue 2 - New educational elements should be modified to recognize the existence of this program. References here and elsewhere to "Metro" should be changed to the Water Pollution Control Division of the Department of Natural Resources.

Section 2.3.7 addresses said waste landfill issues, and Proposed Management Strategy SW-5 Available Waste Facilities considers solid waste service levels. The discussion prior to this recommendation seems to imply that the Ground Water Advisory Committee believes that the rural area of King County does not have sufficient waste disposal facilities and therefore illegal dumping occurs. The recommendation, however, is to provide an expanded waste disposal program for wastes not acceptable at standard transfer stations or landfills. Is the concern service level for all waste or service level for wastes currently not accepted? Examples of wastes not accepted at transfer stations are dangerous, hazardous, dusty and bulky wastes. In any case, the Solid Waste Division is looking at solid waste service levels through the vehicle of a Comprehensive Solid Waste Management Plan Update. This plan and its associated EIS will consider cost, service level and illegal dumping. Illegal dumping is not solely related to convenience. Cost of disposal and remoteness with respect to the ability to dump unobserved are also major factors with respect to illegal dumping. These factors will be considered in the Comprehensive Solid Waste Management Plan and the GWAC should participate in this process.

Mark Isaacson
March 18, 1996
Page 2

Hazardous wastes are managed outside the solid waste disposal system. A mobile hazardous waste collection facility ("Wastemobile") makes several stops annually within this study area. Was that service considered? Hazardous waste management is coordinated through the local Hazardous Waste Management Plan. This plan is coordinated through the Seattle-King County Department of Public Health, Water Pollution Control Division, Solid Waste Division, the Suburban Cities Association, and the City of Seattle. The public process for this plan was recently completed although if you act quickly, input may still be possible.

Also, we would like to be provided the opportunity to provide input and comment on future determinations with regard to the following:

- Elimination of certain categorical exemptions to SEPA (SA-1A).
- Designation of Environmentally Sensitive Areas (SA-1B).
- Adoption of General Aquifer Protection Policies (SA-1C).
- Enhanced Environmental Review to Protect Aquifers (SA-1D).
- Ground Water Concern Areas (SA-1E).
- Well Head Protection Facilitation (SA-2).
- Sole Source Aquifer Program.

We have also reviewed the Draft East King County Ground Water Management Plan Supplement Area Characterization for landfills and have the following comments and suggestions:

On page 38 is stated that the Solid Waste Division has had responsibility for the Cedar Falls Landfill since 1958. This is inaccurate. It should be stated that the precursor of the Solid Waste Division, the Department of Sanitary Operations, took responsibility for the landfill in 1958.

The text on page 39 overstates the significance of ground water quality exceedances and also does not accurately reflect the results presented in the referenced table. The referenced table indicates one exceedance of a ground water quality standard is for 1,2 - Dichloroethane. Additional volatile organic compounds detected were either as in the case of acetone qualified as being present in the method blank or were detected at levels below the ground water protection standard. I would suggest replacing the text beginning with "the results of sample analysis have indicated" with the following:

Mark Isaacson
March 18, 1996
Page 3

In July of 1993, the Solid Waste Division prepared an Evaluation of Ground Water Quality Data for the period of September 1986 through March 1992 (King County Solid Waste Division March 1992). This analysis indicated that levels of iron and manganese are elevated above secondary standards and above levels found in background. This analysis also indicated that standards for coliforms are also exceeded. Certain volatile compounds have been sporadically detected at levels near or below the ground water protection standards. This report concluded that certain wells appeared to be impacted by the landfill and others did not. On the basis of this finding additional wells were installed to attempt to identify interconnections if any between the water encountered in the various wells. The water quality results from these new wells and the hydrogeologic data collected from these new wells will be used to better understand and evaluate the impacts of this site.

I would also suggest that you replace the text for the Duvall landfill with the following.

Three wells were installed at the Duvall Landfill in 1983. Of the three wells only one has historically yielded sufficient water to allow sampling. Results from this well have not indicated any significant concerns. However, the Solid Waste Division has installed 15 new wells to better understand the stratigraphy beneath the site. The water quality results from these new wells and the hydrogeologic data collected will be used to better understand and evaluate the impacts of this site.

The first full paragraph on page 40 should be amended. During the closure of the site perimeter drains were installed which collect surface water which may be impacted by leachate. These drains collect large volumes of water which is trucked from the site and disposed of as a wastewater in the Metropolitan King County Sewer System. Analysis of the ground water collected shows very low levels of leachate indicators. The cost of collecting and disposing of this ground water is significant and the Solid Waste Division is looking at whether some upstream diversion of groundwater around the landfill is possible and or could remedy the need to collect such a dilute waste stream.

Thank you for the opportunity to comment. If you have any questions please call me on extension 6-4419.

KK:SJ:er
SJ4/ekcgwmp.doc

cc: Rodney G. Hansen, Manager, Solid Waste Division
Shirley Jurgensen, Supervising Engineer
Anne Holmes, Senior Engineer



**King County
Road Services Division**

**Department of
Transportation**

Yesler Building
400 Yesler Way MS 4Y
Seattle, WA 98104-2637

March 19, 1996

TO: Paul Shallow, King County Department of Natural Resources
Ground Water Program

FM: Jesse Krail, King County Road Engineer, Department of Transportation,
Road Services Division

RE: Review of Redmond - Bear Creek Valley, Issaquah Creek Valley,
East King County, and Vashon Island Ground Water Management Plans

Thank you for the opportunity to review the referenced groundwater management plans. Department of Transportation, Road Services Division, Environmental Unit and Maintenance Operations Section staff have completed a review of the documents. The referenced groundwater management plans provide excellent guidance for protecting groundwater resources. However, we have the following comments about some of the plan policies:

Issaquah Creek Policy SA1A, Redmond Policy SA1A, and East King County SA1A

Road Services Division will want to be closely involved with any decisions made about revisions to existing SEPA exemptions. We perform a large quantity of SEPA exempt maintenance and upgrade work on King County bridges and roads, and this work is done on a tight timeline. Changes to exemptions for routine maintenance projects could significantly reduce our ability to service roads and bridges with a quick turn-around. This could result in unsafe conditions on our roadways. We request some acknowledgment and commitment within the management plans of the need for our Division's input to that decision-making process.

Issaquah Creek Policies ST-1 and ST-2A, Redmond Policies ST1A and ST2A,
East King Policies ST-1A and ST-2A, and Vashon Policies ST-1 and ST-2B

Road Services Division will want to be closely involved in any effort to revise the Surface Water Design Manual. We request some acknowledgment and commitment within the management plans of the need for our division's input to that decision-making process.

Issaquah Policy ST-6, Redmond Policy ST 5A, East King Policy ST-6A, Vashon Policy ST-6

As noted in previous comments from Jon Cassidy, Road Services Maintenance Division, a six-year budget process is already in place to guide our capital expenditures. Changes or additions in project prioritization must take the existing planning process into consideration. From the groundwater protection aspect, we certainly agree in concept to giving high priority to physically susceptible areas when identifying retrofit opportunities.

However, there are other planning factors in road construction/retrofit that must be taken into account that may be of higher or equally high priority.

Vashon Policy WQ-1A

The Division wishes to assist in the development of the ordinance that establishes clearing guidelines and performance standards with retention requirements.

Vashon Policy WQ-9, Item 5

This policy calls for maintaining high ground water recharge areas in residential or non-intensive uses at low densities. Has there been consideration of how this policy will impact existing or proposed roads crossing through these areas? The plan should take this issue into account.

East King County Plan Environmental Checklist (Item 14 -Transportation)

This checklist item states that there will be no impacts to transportation. The checklist should be based on some analysis of the impacts to the Division's ability to provide transportation facilities based on the cost of proposed/anticipated retrofits. SEPA review is obviously not an appropriate vehicle for cost/benefit analysis, but impact of cost on ability to provide and maintain transportation facilities and resulting transportation system impacts is a legitimate avenue to pursue.

East King County plan Table 3.8.1, Implementation Priority

This table should include Division staff time and cost estimates based on our need to participate in further policy review and development.

Thank you again for the opportunity to comment on these plans. Please call Supervising Environmental Engineer Vicki Shapley at 296-6520 or Environmental Engineer Kathy Fendt at 296-8779 if you have any questions concerning our comments.

JK:kf

cc: Jon Cassidy, Supervising Engineer
Lydia Reynolds, Manager, Project Support Services
Vicki Shapley, Supervising Environmental Engineer
Kathy Fendt, Environmental Engineer



Renny Lillejord, P.S.

P.O. Box 1075
Snoqualmie, Washington 98065

Telephone 206 222 7003
Fax 206 222-7003

July 2, 1996

Lisa Dally Wilson
GROUNDWATER PROGRAM HYDROGEOLOGIST
1547 211th Avenue NE
Redmond, Washington 98053

Re: East King County Groundwater Management Program Draft

Dear Lisa:

The draft as submitted to the Groundwater Advisory Committee in June 1996 is acceptable, with the conditions as mentioned below. Therefore, the following water purveyors for whom I am either a designated service consultant, system operator, manager or contractual administrator concur with this draft:

Ames Lake Water Association
Dawnbreaker Water Association
Fall City Water District
Jung Oestreich #1
Redwood Water System
Riverbend Homeowners Association
Sallal Water Association
Spring Glen Water Association
Upper Preston Water Association
Wilderness Rim Association
Tovey Community Water System

First of all I want to express my personal appreciation to you and your staff for the work you have done in working with the committee to alter this plan so that it is, at least, a proposed beginning to a long-term groundwater management program.

I have a concern, that in order for this proposed draft to go forward, funding will have to come from the County Council along with the Department of Ecology. Likewise, the additional participators which are the cities and water purveyors will need to offer their fair share of labor, effort and monetary assistance in order to help establish an ongoing program. If this does not happen, the probability of a successful and effective program being manifested is highly unlikely. The King County Council, I believe, needs to recognize the importance of a long-term water supply plan for the benefit of present and future residents of the county. This, in my opinion, is the greatest issue of importance facing the county today.

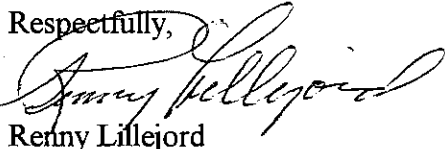
Chapter 173-100-WAC is quite well defined as to how this groundwater program should progress. I believe that we are close to this WAC definition with the draft plan that is being proposed. Here, again, as I have stated in previous letters, there needs to be a recognition of the importance of factual and scientific field investigation. This investigation needs to be long term and not subject to the changing political climates of the day. As you know, groundwater is a major resource and should be recognized as such not only in King County, but through the State of Washington.

This brings up the absolute need for this research and development. The present process being utilized by the Department of Ecology is totally inadequate to investigate the real water availability so that issues like water rights can be processed and granted based on factual information. Factual information is a definite need that any groundwater management program has to have. It may become necessary for the Department of Ecology to have the responsibility of processing water rights removed from their realm of activity and assigned to another agency that will not be subject to political changes.

It should be understood that the above concurrence will be withdrawn if this plan is substantially changed by King County or the Department of Ecology. I believe, the only people who should be doing any alterations to this plan are the ones on the groundwater advisory committee.

I sincerely recommend that the Department of Natural Resources retain you and your staff as the facilitator to continue on with the groundwater management program. This program is still in its embryo stage and needs a steady hand.

Respectfully,



Renny Lillejord

cc: Above Listed Purveyors



**King County
Water and Land Resources Division**

Department of Natural Resources

700 Fifth Avenue, Suite 2200
Seattle, WA 98104-5022

(206) 296-6519
(206) 296-0192 FAX

September 3, 1998

Dick Jones
Chair, East King County Ground Water Advisory Committee
Post Office Box 244
Carnation, WA 98014

Dear Mr. Jones:

Enclosed please find a copy of Motion 10494, passed by the Metropolitan King County Council on July 6, 1998, regarding its concurrence with the East King County Ground Water Management Plan.

The King County Council voted to require several changes in the Management Strategies document. Its recommendations, and the rationale for each, are listed in the enclosed concurrence letter that Council wrote (dated June 12 with the motion number "10494" stamped on each page). The concurrence letter states agreement with the goals and objectives of the groundwater program and specifies the revisions that are necessary for Council's concurrence with the plans. We will include both the motion and concurrence letter in Appendix B ("Letters of Concurrence or Comment") of the Management Plan.

We believe that the best course of action, for the sake of groundwater protection, is to make the changes required by Council, finalize the plans and submit them to Ecology for certification, and proceed to implementation. This cover letter, transmitting to you the motion and concurrence letter from Council, describes in detail the changes we will make to the document to accomplish these requirements. Please let me know at your earliest convenience if you agree with the approach and the proposed changes. I do not know whether it will be necessary (or even possible after such a long time) to call a meeting of the Ground Water Advisory Committee to ratify these changes. If you think that this is necessary, please call me (at 206-296-8323) and I will be glad to assist you in assembling the committee members.

The recommendations from Council include:

Management Strategy AP-1A (Adoption of general aquifer protection policies, p. 2-10): The first bullet (with "export" language) will be replaced with the following: "While protection and sustainable use of ground water based drinking supplies in the East King County Ground Water Management Area is preferred over importing or exporting water outside of the Ground Water Management Area, exporting water will not be prohibited, provided local water needs are met first."

Management Strategy SG-2B1 (Reclamation Plans, p. 2-43): The text of this strategy will be replaced with the following: "King County will provide comments to the State Department of Natural Resources on mine reclamation plans proposed within the East King County Ground Water Management Area. Additionally, consistent with KCCP Policy NE-333, King County will develop with affected jurisdictions, Best Management Practices for mining operations." We will keep this issue in mind in developing our approach to Well Head Protection.

Section 3.4 (Management Committee, p. 3-5): The following sentence will be added as the second sentence in the paragraph immediately following the bulleted item on p. 3-6: "The Management Committee shall be established by motion by the Metropolitan King County Council with members nominated by the Council, each serving staggered terms of three years."

Section 3.7 (Implementation of the Plan, p. 3-8) will have the following sentence added at the end of the first paragraph: "In particular, King County implementation efforts will be phased in over time and are dependent upon the availability of funding."

As the enclosed concurrence letter by County Council says, King County is pressing ahead to begin implementation of the groundwater program. We at King County Department of Natural Resources are developing approaches for the various management strategies included in the Management Plans, working on a long-term funding option which will allow us to expanding our efforts in new directions, and establishing contacts with agencies and municipalities which may help this effort. We will of course be able to accomplish more when long-term funding is secured.

Thank you for the dedication and diligence of the East King County Ground Water Advisory Committee on this lengthy project. Please contact me at 206-296-8323 to discuss any questions you have about the above changes to the plans, and about what we can do to start the implementation phase of the groundwater program.

Sincerely,



Ken Johnson
Groundwater Program Lead

KJ:pra23

Enclosures

cc: Distribution List

DISTRIBUTION LIST

Bob Hanson, City of Snoqualmie
Bruce Wagner, Citizen at Large
Christi Norman, Citizen at Large
Dave Kiehle, Department of Natural Resources
Dave Somers, Tulalip Indian Tribe
Dick Deccio, City of Carnation
Dick Jones, East King County Ground Water Advisory Committee
Ethan Moseng, DOH NW Drinking Water
Gary Turney, US Geological Survey
Gerald Prior, Citizen at Large
Helen Nilon, League of Women Voters
Holly Kean, East King County Regional Water Association
Jerry Sherrid, Mt. Baker-Snoqualmie National Forest
Joe Dominczyk, Water District # 119
John Light, City of Duvall
Judy Brazington, Snoqualmie Valley Grange
Ken McDowell, City of Duvall
Larry Stockton, City of North Bend
Laura H. Lowe, Department of Ecology
Mike Fisher, City of Duvall
Phil Messina, City of North Bend
Phillip Price, Citizen at Large
Renny Lillejord, Ames Lake Water Association
Robin Boynton, Citizen at Large
Ron Bogt, Weyerhaeuser
Scott Nicholson, Snoqualmie Sand and Gravel
Steve Heacock, King Conservation District
Sue Kahle, US Geological Survey
Susan Schmoll, Citizen at Large
Ted Muller, Department of Fisheries
Terry Olson, Water District # 119
Tom Cooney, Carnation Research Farms
Vera Heavens, Citizen at Large
Walt Canter, Citizen at Large

09/23/97

ROB MCKENNA
PETE VON REICHBAUER
CYNTHIA SULLIVAN
JANE HAGUE
LARRY PHILLIPS
Brian Derdowski

Introduced By:

sub 6/12/98 kn

Proposed No.:

97-595

MOTION NO. **10494**

A MOTION regarding concurrence with the recommendations contained in the East King County Ground Water Management Plan.

WHEREAS, the Washington State Growth Management Act requires jurisdictions to designate critical areas, including areas with a critical recharging effect on aquifers used for potable water, RCW 36.70A.050, and

WHEREAS, Policy C-5 of the Countywide Planning Policies states that all jurisdictions that are included in ground water management plans shall support the development, adoption and implementation of the plans, Ordinance 11446, and

WHEREAS, Policy NE-333 of the King County Comprehensive Plan states that King County should protect the quality and quantity of the ground water countywide by placing a priority on implementation of ground water management plans, and

WHEREAS, the Washington State Department of Ecology has designated King County as the lead agency responsible for coordinating and undertaking the activities necessary for development of ground water management programs in the county, WAC 173-100-080, and

1 WHEREAS, a ground water advisory committee has been established for the East
2 King County ground water management area, and

3 WHEREAS, the ground water advisory committee contained representatives of
4 local governments, special purpose districts, water associations, agricultural interests, well
5 drilling firms, industry and environmental organizations, and

6 WHEREAS, the East King County ground water advisory committee has overseen
7 the development of the East King County Ground Water Management Plan, and

8 WHEREAS, the oversight provided by the ground water advisory committee has
9 included reviewing the work plan, schedule and budget for development of the plan,
10 assuring that the proposed plans are technically and functionally sound and verifying that
11 the proposed plan is technically and functionally sound and verifying that the proposed
12 plan is consistent with Washington state laws and authorities of affected agencies, WAC
13 173-100-090, and

14 WHEREAS the Washington State Department of Ecology, the King Conservation
15 District, Washington State Department of Natural Resources, Water District 119, City of
16 Duvall, Ames Lake Water Association, Dawnbreaker Water Association, Riverbend
17 Homeowners Association, Rutherford Estates, Sallal Water Association, Spring Glen
18 Water Association, Fall City Water District (formerly District 127), Wilderness Rim
19 Association and the Upper Preston Water Association are required to implement some of
20 the recommendations in the East King County Ground Water Management Plan and have
21 issued letters of concurrence, and

22 WHEREAS, following the King County council's review and comment on the
23 plan's recommendations, the East King County Ground Water Management Plan will be

1 submitted to the Washington State Department of Ecology for certification in accordance
2 with WAC 173-100-120, and

3 WHEREAS, following the Department of Ecology's certification of the East King
4 County Ground Water Management Plan, the metropolitan King County council will be
5 responsible for implementing those portions of the Plan which are within their
6 jurisdictional authority to implement;

1 NOW, THEREFORE BE IT MOVED by the Council of King County:

2 The King County executive is hereby requested to transmit to the East King County
3 Ground Water Advisory Committee a letter, substantially in the form attached, identifying
4 the county's findings and indicating areas of county concurrence and non-concurrence with
5 recommendations contained in the East King County Ground Water Management Plan.

6 This letter should contain the following:

- 7 1. a clear statement of concurrence or nonconcurrence;
8 2. a statement of agreement with the goals and objectives of the ground water
9 program; and
10 3. specific revisions necessary for county concurrence.

11 PASSED by a vote of 11 to 0 this 6th day of July

12 1998.

13 KING COUNTY COUNCIL
14 KING COUNTY, WASHINGTON

15 *Louise Miller*
16 Chair

17 ATTEST:

18 *[Signature]*
19 Clerk of the Council

20 Attachments:

- 21 1. Concurrence Letter

King County does not concur with Management Strategy SG-2B1 (Reclamation Plans) as it is currently written. This finding of inconsistency is based upon the fact that the State DNR has regulatory authority over mine reclamation plans. King County's regulatory authority is limited to offering comments on proposed reclamation plans to DNR for consideration.

King County can make a finding of consistency only if the text of Management Strategy SG-2B1 is amended as follows: "King County will provide comments to the State DNR on mine reclamation plans proposed within the East King County Ground Water Management Area. Additionally, consistent with KCCP Policy NE-333, King County will develop with affected jurisdictions, Best Management Practices for mining operations.

King County does not concur with the recommendations of Section 3.4 as they are currently written. King County can concur with the East King County Ground Water Management Plan if a statement is added to Section 3.4 which states: "The Management Committee shall be established by motion by the Metropolitan King County Council with members nominated by the Council, each serving staggered terms of three years.

King County does not concur with the recommendations contained in Section 3.7 regarding implementation of the Plan. A finding of inconsistency is based upon existing obligations imposed by federal, state and local laws related to county revenues and expenditures. These limitations restrict the county from being able to fully commit to Plan implementation following certification.

King County can make a finding of consistency only if the text of Section 3.7 is amended to include the following statement: "King County implementation efforts will be phased in over time and is dependent upon the availability of funding."

King County places a high priority on implementing the specific management strategies relating to wellhead protection, development of best management practices, education, and mapping of critical aquifer recharge areas. Once the Council adopts a long-term funding option, the County would start to undertake other implementation activities. Such activities would include coordinating and staffing the anticipated interjurisdictional ground water management committees; developing a data collection and management program to monitor ground water quality and quantity; and enhancing education programs to promote ground water protection.

Thank you for the dedication and diligence of the East King County Ground Water Advisory Committee on this lengthy project. Please contact Mark Isaacson, Department of Natural Resources, Water and Land Resources Division, at 206-296-8369 to discuss starting this work.

Sincerely,

Ron Sims
King County Executive

June 12, 1998

Dick Jones
Chair, East King County Ground Water Advisory Committee
P.O. Box 244
Carnation, WA 98014

Dear Mr. Jones:

King County generally agrees with the goals and objectives of the East King County Ground Water Management Plan, yet makes a statement of nonconcurrence based on its finding of inconsistency between the recommendations contained in the Plan and the intent of chapter 90.44 RCW and other federal, state and local laws. The County recognizes the importance of the Plan's recommendations to preserve and protect ground water, a highly valued natural resource. The County's role in implementing the recommendations of this Plan reflects the County's responsibility as a resource manager, a land development regulator, and the permitting authority for the unincorporated areas of King County.

King County's statement of nonconcurrence is based on its finding of inconsistency between several recommendations included in the Plan and adopted county comprehensive planning policies and county laws. These recommendations must be modified as set forth below to achieve consistency and to allow county concurrence with the Draft Ground Water Management Plan. These recommendations include Management Strategy AP-1A, Management Strategy SG-2B1, Section 3.4, Ground Water Management Committee and Section 3.7, Plan Implementation. A summary of the basis for inconsistency and the changes necessary for King County concurrence follows.

King County does not concur with the "export" language currently included in Management Strategy AP-1A. This finding of inconsistency is based upon the fact that that the strategy:

1. is inconsistent with County Wide Planning Policy CA-6;
2. is inconsistent with King Count Comprehensive Plan Policy F-304; and
3. would prohibit exporting water from the East King County Ground Water Management Area, which contains an aquifer (North Bend Aquifer) that potentially could serve future water demands of the County.

King County can make a finding of consistency only if the text of Management Strategy AP-1A is amended as follows: "While protection and sustainable use of ground water based drinking supplies in the East King County Ground Water Management Area is preferred over importing or exporting water outside of the Ground Water Management Area, exporting water will not be prohibited, provided local water needs are met first.

**East King County
Ground Water Advisory Committee**

Chair, Dick Jones

P.O. Box 244, Carnation, WA 98014

Phone (425) 339-3988 – FAX (425) 339-3888

email: robin98@earthlink.net

December 11, 1998

Ken Johnson
Lead, Groundwater Program
Water and Land Resources Division
King County Department of Natural Resources
700 Fifth Avenue, Suite 2200
Seattle, WA 98104-5022

Dear Mr. Johnson:

In response to your letter of September 3, 1998, a meeting of the East King County Ground Water Advisory Committee was held on November 19, 1998 to consider ratification of the East King County Ground Water Management Plan.

The four changes to the plan recommended by the Metropolitan King County Council were considered and accepted with the following points of clarification we wish to put on record:

Management Strategy AP-1A

The agreement to this change is with the understanding that local water needs are met **first and always** before any water exporting is allowed, and that **prior and post monitoring** of export sources are conducted as defined in the Plan.

Section 3.4

Regarding appointments to the Ground Water Management Committee, the East King County Ground Water Advisory Committee respectfully requests special consideration be given to its members who have worked up to 7 years drafting the final document, and who have maintained an active interest in its implementation.

Section 3.7

The committee encourages the County Council to secure a permanent funding source as soon as possible to prevent further delays in implementing the East King County Ground

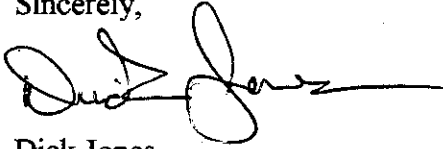
EKC/GWAC – Page 2

Letter to Ken Johnson, 12/11/98

Water Management Plan, and to carry out implementation in the order in which the priorities were listed in the Plan.

We look forward to finishing the East King County Ground Water Management Plan and submitting it to Ecology with the changes as recommended by Council.

Sincerely,

A handwritten signature in black ink, appearing to read "Dick Jones", with a long horizontal flourish extending to the right.

Dick Jones

Chair, East King County Ground Water Advisory Committee

cc: Louise Miller, King County Council
Brian Derdowski, King County Council
Laura H. Lowe, Department of Ecology
EKC/GWAC members in attendance:
Robin Boynton, Citizen at Large
Bob Hanson, City of Snoqualmie
Vera Heavens, Citizen at Large
Renny Lillejord, Ames Lake Water Association
Terry Olson, Water District #119
Larry Stockton, City of North Bend
Gary Turney, U.S. Geological Survey
Ed Carlson, City of North Bend

Appendix C

Alternative Funding Sources

**East King County
Ground Water Management Plan**

December 1998

APPENDIX C ALTERNATIVE FUNDING SOURCES

TYPE	NAME	GOALS	PROGRAM	ELIGIBLE	CONTACT	AWARD AMOUNT	DUE DATE
PRIVATE FOUNDATION	Jessie Smith Noyes Foundation Environment Grants	Preventing irreversible damage to the natural systems upon which life depends, and strengthening individuals and institutions committed to protecting natural systems and ensuring a sustainable society. The Foundation funds several environmental program areas, which may encompass pollution prevention funding.	Water and Toxics This program focuses on groundwater protection and restoration. It supports efforts to adopt and implement public policies affecting groundwater protection and restoration, including pollution prevention and source reduction. It may be used to strengthen technical and outreach capabilities of individuals and organizations promoting these goals. The program has a particular geographic emphasis on states in the Southeast, Southwest, and the Rocky Mountain West.	Only tax-exempt organizations with 501(c)(3) status are eligible for funding. Interested parties should request the Foundation's Annual Report from the funder contact. A Letter of Inquiry no longer than three pages should be sent to the Foundation, which will be reviewed. The Foundation will request full proposals for projects it would like to consider.	The Jessie Smith Noyes Foundation 6 East 39th Street, 12th Floor New York, NY 10016 (212) 684-6577 Fax: (212) 689-6549 E-mail: noyes@jgc.org Questions about the Water and Toxics program should be directed to Millie Buchanan at the phone number and address listed above. Letters of Inquiry should be sent to Stephen Viederman, President at the address listed above.	Unspecified	Letters of inquiry may be sent at any time during 1996.
PRIVATE FOUNDATION	The Bullitt Foundation Environment Program Grants	The Bullitt Foundation invites proposals from non-profit organizations for projects that protect and restore the environment in the Pacific Northwest. This region is defined as Washington, Oregon, Idaho, western Montana (including the	The trustees also will consider environmental proposals that do not fall within other priority fields. They will be most interested in projects that address important issues in imaginative ways, and projects that use the Foundation's support as leverage to obtain greater resources elsewhere.	non-profit organizations	Funder Contact: Emory Bundy Director Bullitt Foundation 1212 Minor Avenue Seattle, WA 98101-2825 (206) 343-0807	Unspecified	Due Date: Proposals must be received by 1 April 1996, 1 August 1996, or 1 December 1996.

TYPE	NAME	GOALS	PROGRAM	ELIGIBLE	CONTACT	AWARD AMOUNT	DUE DATE
		eastern slope of the continental divide), the rain forest region of southern Alaska, and British Columbia.					
PRIVATE FOUNDATION	Give to the Earth Foundation 4000 Pheasant Ridge Drive Minneapolis MN 55449	This foundation funds a variety of small environmental projects.	Call to obtain guidelines that can be mailed or sent electronically.	Applicant's organizations must have minimal administrative overhead and results must be tangible.	Contact: Ellen Liberatori (800) 933-9628	Typical grant size is \$2,500.	
PRIVATE FOUNDATION	Wilburforce Foundation 1200 Westlake Avenue North, Suite 414 Seattle, WA 98109-3528	Funds wildlife and habitat protection and environmental education projects.	Call for application materials.	Contact: Timothy Greyhavens, Executive Director (206) 286-4554			
PRIVATE FOUNDATION	The W. Alton Jones Foundation Sustainable World Program	Project Description: The W. Alton Jones Foundation generally solicits funding proposals from organizations and projects which match its interests and criteria, however, the Foundation also does consider unsolicited funding proposals under its	Specific Foundation interest areas which address pollution prevention include: a) Economics for a Sustainable Planet: create models which value biodiversity, balance the economy, and assess the full cost of human activity on the planet. B) Eliminate Systematic Contamination: in aquifers; and in three areas affecting the health of children: pesticides and	The Foundation can only fund charitable organizations. Before submitting a proposal, send a letter of inquiry describing the goals of the project, and briefly explaining how the requested funding will contribute to meeting these goals. The letter should be a	W. Alton Jones Foundation 232 East High Street Charlottesville, Virginia 22902-5178 (804) 295-2134 Fax: (804) 295-1648 Interested parties should call the funder contact, request an annual report, and grant application procedures. The Foundation requests that interested parties read this Foundation information.	Award Amount: unspecified	Due Date: Letters of Inquiry accepted year round

TYPE	NAME	GOALS	PROGRAM	ELIGIBLE	CONTACT	AWARD AMOUNT	DUE DATE
		Sustainable World Program.	endocrine disruptors; air pollution; and lead poisoning	maximum of two pages and may be sent at any time during the year.			
GOVERNMENT	Washington WaterWeeks Mini-Grants	Grants up to \$500 are offered to implement environmental education activities during the WaterWeeks Festival (the month of September.)			PO Box 1354 Olympia, WA 98507-1354 (206) 943-3642	up to \$500	The deadline for applicants is in May/June.
GOVERNMENT	US Environmental Protection Agency	Funding available for variety of environmental education projects.			EPA Environmental Education Grants Region 10, SO - 143, 1200 Sixth Avenue Seattle, WA 98101 Sally Hanft, Environmental Education Grants Coordinator (206) 553-1207 or 1-800 424-4EPA	Grants of under \$5,000 are encouraged, but can be much higher.	
GOVERNMENT	Washington State Department of Ecology	Projects must be water quality related and how a clear benefit to the public at large.	Centennial Clean Water Fund	Project funds available to public bodies (cities, towns, ports, districts, etc.) Citizen groups may work with public bodies to whom Grants and loans are issued.	Water Quality Program PO Box 47600 Olympia, WA 98504-7600 Kim McKee, (360) 407-6566		
BUSINESSES	Puget Sound Power and Light Company	Gives small grants to organizations within its service area for environmental education,			Corporate Contributions Program PO Box 97034 Bellevue, WA 98009-9734 (206) 462-3799		

TYPE	NAME	GOALS	PROGRAM	ELIGIBLE	CONTACT	AWARD AMOUNT	DUE DATE
		conservation and water quality improvement projects					
PRINTED RESOURCES	EPA and the North American Association for Environmental Education (NAAEE)	Publication: <i>Grant Funding for Your Environmental Education Project</i> which provides strategies for identifying potential sources of funding. This publication can be purchased for \$5 from NAAEE, Publications and Member Services, PO Box 400, Troy, Ohio, 45373.					
PRINTED RESOURCES	The 1994 Pacific Northwest Grantmakers Forum Member Directory.	Lists more than fifty major foundations in the Pacific Northwest region.	You can purchase it by calling the Forum at (206) 624-9899, or you can visit the Seattle Public Library's Grantsmanship Center in the Science and Social Sciences Department on the Second Floor. The Grantsmanship Center has a complete collection of resources for anyone seeking grant funding. For more information, call 386- INFO. They are at the following address: Seattle Public Library 1000 4th Avenue Seattle, WA 98104				
PRINTED RESOURCES	The National Small Flows Clearinghouse	Computer bulletin board that can help you "tread the murky waters of	The bulletin board lists grant and loan opportunities, and provides information on funding alternatives, highlights of		Brad Maust, (800) 624-8301.		

TYPE	NAME	GOALS	PROGRAM	ELIGIBLE	CONTACT	AWARD AMOUNT	DUE DATE
		environmental finance."	successful funding methods and referrals to financing experts.				
GOVERNMENT	Rural Development	<p>Rural Utilities Service Water And Waste Program Mission Statement:</p> <p>The Rural Utilities Service's mission is to serve a leading role in improving the quality of life in rural America by administering its electrification, telecommunications, and water and waste programs in a service-oriented, forward-looking, and financially responsible manner.</p> <p>The Rural Utilities Service's Water and Waste Loan and Grant Programs provide for investment of funds in the most needy communities for critically needed water and waste facilities. Loan and grants are available to rural areas and towns with populations of 10,000 or less for</p>	<p>Water 2000. Today, across rural America, many families are without the basic necessity of safe, affordable running water in their homes. In the autumn of 1994, the Department of Agriculture proposed to coordinate and focus its efforts with those of other Federal, State, and local governmental agencies; private sector citizens, groups, corporations, and foundations; lending institutions; Tribal governments; and nonprofit water and community groups to eliminate this inequity before the end of the century. This initiative is called Water 2000.</p> <p>The Rural Utilities Service through its Water and Waste Disposal Loan and Grant programs will provide direction for this initiative. SDA/Rural Development State Directors will provide leadership at the state level.</p> <p>The Water 2000 Report issued in February 1995 outlines the principles by which this initiative will be pursued.</p>		<p>Washington State Office Mary E, McBride, Rural Development State Director Federal Building, Room 319 301 Yakima Street Wenatchee, WA 98807 (509) 664-0240</p> <p>Washington Water and Waste Program Director Sandra Boughton (509) 664-0243</p>		

TYPE	NAME	GOALS	PROGRAM	ELIGIBLE	CONTACT	AWARD AMOUNT	DUE DATE
		the construction, replacement, expansion, or other improvements of such facilities.					
GOVERNMENT	Rural Development		The National Drinking Water Clearinghouse is operated by the West Virginia University Research Corporation, Morgantown, West Virginia, with grant funds under the Technical Assistance Training Grant Program. The NDWC collects and stores information and publications relevant to small water systems and other issues related to drinking water. Services that are provided include a resource center, referral service, toll-free number, electronic bulletin board, product distribution, conference participation, and quarterly newsletters.		To access this information resource contact the NDWC at (800) 624-8301. To access the electronic bulletin board call (800) 932-7459. For written inquiries contact: <i>On Tap</i> Editor or NDWC, PO Box 6064, Morgantown, WV 26506-6064.		
GOVERNMENT	Rural Development		Water and Waste Disposal Loans Purpose: To develop water and waste disposal (including solid waste disposal and storm drainage) systems in rural areas and towns with a population not in excess of 10,000. RUS also guarantees water and waste disposal loans made by banks and other eligible lenders.	Rural areas and towns with a population not in excess of 10,000. The funds are available to public entities such as municipalities, counties, special-purpose districts, Indian tribes, and corporations not operated for profit.			
GOVERNMENT	Rural Development		Water and Waste Disposal Grants			Grants may be made for	

TYPE	NAME	GOALS	PROGRAM	ELIGIBLE	CONTACT	AWARD AMOUNT	DUE DATE
			Purpose: To reduce water and waste disposal costs to a reasonable level for rural users. The same types of applicants are eligible for grants as are for loans.			up to 75 percent of eligible project costs in some cases.	
GOVERNMENT	Rural Development		<p>Technical Assistance and Training (TAT) Grants Purpose: To make grants to nonprofit organizations to provide technical assistance and training to associations on a wide range of issues relating to the delivery of water and waste disposal service. (See below for examples)</p> <p>A percentage of the Water and Wastewater Grant Program is available each year to provide technical assistance for rural communities with a population of 10,000 or less. Grant funds may be used to assist communities and rural areas identify and evaluate solutions to water or wastewater problems, improve facility operation and maintenance activities, or prepare funding applications for water or wastewater treatment facility construction projects.</p>	Rural communities with a population of 10,000 or less. Private, nonprofit organizations that have been granted tax-exempt status from the Internal Revenue Service may be eligible for grant funds provided they can demonstrate the ability, background, experience, legal authority, and actual capacity to provide technical assistance/training on a regional basis to small, rural communities.	Pre-applications may be filed with the State offices (see addresses and telephone numbers in our staff listings below) for projects to be operated within a single State. For projects providing multi-state services, pre-applications should be sent to the assistant Administrator, Water and Waste Program at the address listed.		Between October 1 and December 31.
GOVERNMENT	Rural Development		<p>Emergency Community Water Assistance Grants</p> <p>Purpose: To assist rural communities that have had a</p>	Grants can be made in rural areas and cities or towns with a population not in excess of 10,000 and		The maximum grant is \$500,000 when a	

TYPE	NAME	GOALS	PROGRAM	ELIGIBLE	CONTACT	AWARD AMOUNT	DUE DATE
			significant decline in quantity or quality of drinking water. Grants may be made for 100 percent of project costs.	median household income of 100 percent of a State's non-metropolitan median household income.		significant decline in quantity or quality of water occurred within 2 years or \$75,000 to make emergency repairs and replacement of facilities on existing systems.	
GOVERNMENT	Rural Development		<p>Rural Water Circuit Rider Technical Assistance</p> <p>Purpose: To provide technical assistance for the operation of rural water systems. The RUS, through contracting, has assisted rural water systems with day-to-day operational, financial, and management problems. The assistance may be requested by officials of rural water systems or the RUS. The program complements RUS' loan supervision responsibilities.</p>	Rural water systems			

WATER AND WASTE LOAN AND GRANT PROGRAMS

Some examples of grants that have been made under the TAT Grant Program are:

The National Rural Water Association (NRWA) of Duncan, Oklahoma, has operated the Wastewater Technician Program under the TAT Program since 1988 when they contracted with their State-affiliate Rural Water associations to employ full-time wastewater technicians in 15 States. The program has expanded over the years so that the NRWA and their State associations now provide full-time wastewater technician assistance/training in all of the 48 contiguous States and a full-time water technician in Puerto Rico. These technicians provide technical assistance/training to system operators in the areas of water or wastewater treatment, facility operations/maintenance, system financial management, regulatory compliance, and conservation issues. They also provide liaison support for interactions with regulatory and funding agencies.

The Rural Community Assistance Program (RCAP), Inc., in Leesburg, Virginia operates the Technitrain Program with grant funds under the TAT grant Program. RCAP has operated the program since 1988. The program began with 180 communities and has expanded to around 500 communities in 47 States and Puerto Rico. RCAP is a private, nonprofit, 501(c)(3) corporation and is made up of a national office and six regional offices with multi-state service areas. Representatives of the six regional CAPs and six at-large directors make up the RCAP Board of Directors. Since 1969, RCAP's mission has been to empower and assist residents and elected officials in small, rural communities to improve their quality of life. In the case of the RUS funded Technitrain program, RCAP provides on-site, community-specific assistance to participating communities in addressing their individual needs relative to water, wastewater, and solid waste issues.

Sources:

“Funding Sources for Watershed Stewardship Projects” list compiled by the Community Stewardship Program, King County Water and Land Resources, available on the Internet at www.metrokc.gov, click on Agencies, then Department of Natural Resources, then Water and Land Resources Division, and then Resources. If you have any comments or questions, please e-mail to emaia@pwd.metrokc.gov or call Water and Land Resources at (206) 296-6519.

Rural Utilities Service Water and Waste Program, USDA. For comments or questions, please send e-mail to the following address: mplank@rus.usda.gov.

Pacific Northwest Pollution Prevention Research Center, 1326 Fifth Ave, Suite 650, Seattle, WA 98101. Phone: (206) 223-1151, fax: (206) 223-1165, e-mail: office@pprc.org, WWW address: <http://pprc.pnl.gov/pprc/>.

Appendix D

**Guidelines for Development of Ground Water
Management Areas and Programs**

**East King County
Ground Water Management Plan**

December 1998

Chapter 173-100 WAC

GROUND WATER MANAGEMENT AREAS AND PROGRAMS

WAC

- 173-100-010 Purpose.
- 173-100-020 Authority.
- 173-100-030 Overview.
- 173-100-040 Definitions.
- 173-100-050 Probable ground water management areas.
- 173-100-060 General schedule.
- 173-100-070 Designation of ground water management areas for program planning purposes.
- 173-100-080 Lead agency responsibilities.
- 173-100-090 Ground water advisory committee.
- 173-100-100 Ground water management program content.
- 173-100-110 SEPA review.
- 173-100-120 Hearings and implementation.
- 173-100-130 Designation of ground water areas.
- 173-100-140 Intergovernmental agreements.
- 173-100-150 Appeals.
- 173-100-160 Regulation review.

WAC 173-100-010 Purpose.

The purpose of this chapter is to establish guidelines, criteria, and procedures for the designation of ground water management areas, subareas or zones and to set forth a process for the development of ground water management programs for such areas, subareas, or zones, in order to protect ground water quality, to assure ground water quantity, and to provide for efficient management of water resources for meeting future needs while recognizing existing water rights. The intent of this chapter is to forge a partnership between a diversity of local, state, tribal and federal interests in cooperatively protecting the state's ground water resources.

[Statutory Authority: RCW 90.44.400. 86-02-004 (Order DE 85-24), § 173-100-010, filed 12/20/85.]

WAC 173-100-020 Authority.

This chapter is promulgated by the department of ecology pursuant to RCW 90.44.400, 90.44.410, 90.44.420, 90.44.430 and 90.44.440.

[Statutory Authority: RCW 90.44.400. 86-02-004 (Order DE 85-24), § 173-100-020, filed 12/20/85.]

WAC 173-100-030 Overview.

This regulation establishes a process for the identification and designation of ground water management areas and for the development of comprehensive ground water management programs. From a general schedule of probable ground water management areas, the department of ecology in cooperation with local government will designate specific ground water management areas, subareas, or depth zones within such areas and

will appoint a lead agency to develop a ground water management program and an advisory committee to oversee the development of the program for each designated area. Following completion of the program and a public hearing to be held by the department of ecology, the program must be certified to be consistent with the intent of this chapter. The program will then be implemented through state regulations and local ordinances. The programs must thereafter be periodically reviewed.

[Statutory Authority: RCW 90.44.400. 86-02-004 (Order DE 85-24), § 173-100-030, filed 12/20/85.]

WAC 173-100-040 Definitions.

For the purposes of this chapter the following definitions shall apply:

(1) "Aquifer" means a geologic formation, group of formations or part of a formation capable of yielding a significant amount of ground water to wells or springs.

(2) "Department" means the Washington state department of ecology.

(3) "Ground water" means all waters that exist beneath the land surface or beneath the bed of any stream, lake or reservoir, or other body of surface water, whatever may be the geological formation or structure in which such water stands or flows, percolates or otherwise moves.

(4) "Ground water advisory committee" means a committee appointed by the department to assist in the development of a ground water management program.

(5) "Ground water area or subarea" means a geographic area designated pursuant to RCW 90.44.130.

(6) "Ground water management area" means a specific geographic area or subarea designated pursuant to this chapter for which a ground water management program is required.

(7) "Ground water management program" means a comprehensive program designed to protect ground water quality, to assure ground water quantity and to provide for efficient management of water resources while recognizing existing ground water rights and meeting future needs consistent with local and state objectives, policies and authorities within a designated ground water management area or subarea and developed pursuant to this chapter.

(8) "Ground water management zone" means any depth or stratigraphic zone separately designated by the department in cooperation with local government for ground water management purposes within a ground water management area. Ground water management zones may consist of a specific geologic formation or formations or other reasonable bounds determined by the department consistent with the purposes of this chapter.

(9) "Ground water right" means an authorization to use ground water established pursuant to chapter 90.44 RCW, state common or statutory law existing prior to the enactment of chapter 90.44 RCW, or federal law.

(10) "Ground water user group" means an established association of holders of ground water rights located within a proposed or designated ground water management area.

(11) "Lead agency" means the agency appointed by the department to coordinate and undertake the activities necessary for the development of a ground water management

program. Either the department or an agency of local government may be the lead agency.

(12) "Local government" means any county, city, town, or any other entity having its own incorporated government for local affairs including, but not limited to, a metropolitan municipal corporation, public utility district, water district, irrigation district, and/or sewer district.

(13) "Local government legislative authority" means the city or town council, board of county commissioners, special district commission, or that body assigned such duties by a city, county or district charter as enacting ordinances, passing resolutions, and appropriating funds for expenditure.

(14) "Probable ground water management area" means a specific geographic area identified by the department, in cooperation with other state agencies, local government and ground water user groups, as a candidate area for designation as a ground water management area pursuant to this chapter.

[Statutory Authority: RCW 90.44.400. 86-02-004 (Order DE 85-24), § 173-100-040, filed 12/20/85.]

WAC 173-100-050 Probable ground water management areas.

The department in cooperation with local government and ground water user groups shall identify probable ground water management areas.

(1) Probable ground water management areas may be proposed for identification at any time by the department upon its own motion or at the request of other state agencies, local government or ground water user groups.

(2) Probable ground water management area boundaries shall be delineated so as to enclose one or more distinct bodies of public ground water as nearly as known facts permit. Probable ground water management subareas shall be delineated so as to enclose all or any part of a distinct body of public ground water. Boundaries shall be based on hydrogeologic properties such as limits to lateral extent of aquifers, major perennial rivers, and regional ground water divides or as deemed appropriate by the department to most effectively accomplish the purposes of this chapter.

(3) The criteria to guide identification of probable ground water management areas shall include, but not be limited to, the following:

- (a) Geographic areas where ground water quality is threatened;
- (b) Aquifers that are declining due to restricted recharge or over-utilization;
- (c) Aquifers in which over-appropriation may have occurred and adjudication of water rights has not yet been completed;
- (d) Aquifers reserved or being considered for water supply reservation under chapter 90.54 RCW for future beneficial uses;
- (e) Aquifers identified as the primary source of supply for public water supply systems;
- (f) Aquifers underlying a critical water supply service area where the coordinated water system plan established pursuant to chapter 70.116 RCW has identified a need for a ground water management program;
- (g) Aquifers designated as sole source aquifers by the federal Environmental Protection Agency;

(h) Geographic areas where the ground water is susceptible to contamination or degradation resulting from land use activities;

(i) Aquifers threatened by seawater intrusion; or

(j) Aquifers from which major ground water withdrawals have been proposed or appear imminent.

(4) The state agency, local government or ground water user group requesting probable ground water management area identification shall provide sufficient information for the department to determine if the area should be so identified. The department and other affected state and local governments and user groups may cooperate in preparing the request for identification.

(a) The request for identification shall be presented in a concise, factual report form and shall consider the guidelines and criteria set forth in subsections (2) and (3) of this section as they relate to the proposed area. It shall also contain: (i) Supporting data as to the need for such identification; (ii) a general description of and rationale for the proposed ground water management area boundary; (iii) goals and objectives for the proposed ground water management area; (iv) an estimated cost of developing the ground water management program and potential funding sources; (v) recommendations for agencies, organizations and groups to be represented on the ground water management area advisory committee; and (vi) a recommendation for the lead agency, taking into consideration the responsibilities contained in WAC 173-100-080.

(b) The recommendation for lead agency shall first be submitted to the county or counties with jurisdiction for written concurrence. Such written concurrence shall be included with the information required in (a) of this subsection. If such concurrence cannot be obtained, the department shall attempt to mediate an agreement between the parties.

(c) The agency or ground water user group initiating the request for identification shall hold at least one public meeting for the purpose of receiving comments from the public, affected local, state and tribal agencies and ground water user groups.

(d) Upon completion, the request for identification shall be submitted to the department and other affected state and local agencies and ground water user groups for their review and comment. Comments shall be submitted to the department.

(5) If the department is proposing an area for identification, the department shall prepare a report containing the information in subsection (4)(a) of this section, hold a public meeting, and submit the report to affected state and local agencies and ground water user groups for their review and comment.

(6) Based upon review of the request for identification together with any comments received and a finding that the proposed area meets the guidelines and criteria of subsections (2) and (3) of this section, the department shall identify the proposed area as a probable ground water management area, establish the general planning boundaries and appoint a lead agency. When a probable ground water management area is included within only one county and that county indicates its desire to assume lead agency status, the department shall appoint the county as lead agency. The department shall notify affected state and local agencies, ground water user groups, tribal governments and local news media of such identification.

[Statutory Authority: Chapters 43.27A and 90.44 RCW. 88-13-037 (Order 88-11), § 173-100-050, filed 6/9/88. Statutory Authority: RCW 90.44.400. 86-02-004 (Order DE 85-24), § 173-100-050, filed 12/20/85.]

WAC 173-100-060 General schedule.

The department shall establish a general schedule for the designation of specific ground water management areas. The general schedule shall guide the department in the designation of specific ground water management areas and in the allocation of the department's available water resources funding and staffing.

(1) The general schedule for designation of ground water management areas shall identify the relative priority of each of the probable ground water management areas. The relative priority of the probable ground water management areas shall be based upon:

(a) The availability of local or state agency resources to develop and implement a ground water management program;

(b) The significance, severity or urgency of the problems or potential problems described in the request for identification submitted for each area, with the highest priority given to areas where the water quality is imminently threatened;

(2) The department shall revise the general schedule as needed to comply with the intent of this chapter. After each revision the general schedule shall be published in the news media and the Washington State Register. A public hearing will be held in June of each year to receive public comment on the general schedule.

[Statutory Authority: RCW 90.44.400. 86-02-004 (Order DE 85-24), § 173-100-060, filed 12/20/85.]

WAC 173-100-070 Designation of ground water management areas for program planning purposes.

The department shall designate ground water management areas by order of the department in accordance with the general schedule. The department shall hold a public hearing within the county or counties containing the probable ground water management area prior to such designation. The order shall be issued to the lead agency as well as the agency or ground water user group originally requesting identification of the areas, with copies sent to other affected state agencies, local governments, tribal governments and those parties recommended for ground water advisory committee membership. Copies of the order shall be published by the department in newspapers of general circulation within the area. The order shall contain a general description of the planning boundary for the ground water management area and shall state that the department, in cooperation with the lead agency and local government, intends to appoint a ground water advisory committee to oversee the development of a ground water management program for the area.

[Statutory Authority: RCW 90.44.400. 86-02-004 (Order DE 85-24), § 173-100-070, filed 12/20/85.]

WAC 173-100-080 Lead agency responsibilities.

The lead agency shall be responsible for coordinating and undertaking the activities necessary for development of the ground water management program. These activities shall include collecting data and conducting studies related to hydrogeology, water quality, water use, land use, and population projections; scheduling and coordinating advisory committee meetings; presenting draft materials to the committee for review; responding to comments from the committee; coordinating SEPA review; executing inter-local agreements or other contracts; and other duties as may be necessary. The lead agency shall also prepare a work plan, schedule, and budget for the development of the program that shows the responsibilities and roles of each of the advisory committee members as agreed upon by the committee. Data collection, data analysis and other elements of the program development may be delegated by the lead agency to other advisory committee members.

[Statutory Authority: RCW 90.44.400. 86-02-004 (Order DE 85-24), § 173-100-080, filed 12/20/85.]

WAC 173-100-090 Ground water advisory committee.

(1) The ground water advisory committee shall be responsible for overseeing the development of the ground water management program; reviewing the work plan, schedule and budget for the development of the program; assuring that the program is technically and functionally sound; verifying that the program is consistent with this chapter and with the respective authorities of the affected agencies; and formulating and implementing a public involvement plan.

(2) The membership of each ground water advisory committee shall represent a broad spectrum of the public in order to ensure that the ground water is protected and utilized for the greatest benefit to the people of the state. The committee shall include, but not be limited to, representation from the following groups:

- (a) Local government legislative authorities within the designated area;
- (b) Planning agencies having jurisdiction within the designated area;
- (c) Health agencies having jurisdiction within the designated area;
- (d) Ground water user groups within the designated area, including domestic well owners;
- (e) The department;
- (f) Department of social and health services;
- (g) Other local, state, and federal agencies as determined to be appropriate by the department;
- (h) Tribal governments, where a ground water management program may affect tribal waters;
- (i) Public and special interest groups such as agricultural, well drilling, forestry, environmental, business and/or industrial groups within the area, as determined to be appropriate by the department.

(3) The department shall appoint, by letter, members and alternates to the ground water advisory committee after seeking nominations from the groups listed above. Members and alternates shall serve until the ground water management program for the area is certified. The department may appoint replacement members or alternates upon request of the appointee or the ground water advisory committee.

(4) The lead agency shall hold the first meeting of the ground water advisory committee within sixty days of the appointment of the committee. Public notice shall be given for each meeting. The lead agency shall chair the first meeting, during which the advisory committee shall determine, by general agreement, rules for conducting business, including voting procedures, and the chairperson of the advisory committee.
[Statutory Authority: RCW 90.44.400. 86-02-004 (Order DE 85-24), § 173-100-090, filed 12/20/85.]

WAC 173-100-100 Ground water management program content.

The program for each ground water management area will be tailored to the specific conditions of the area. The following guidelines on program content are intended to serve as a general framework for the program, to be adapted to the particular needs of each area. Each program shall include, as appropriate, the following:

- (1) An area characterization section comprised of:
 - (a) A delineation of the ground water area, subarea or depth zone boundaries and the rationale for those boundaries;
 - (b) A map showing the jurisdictional boundaries of all state, local, tribal, and federal governments within the ground water management area;
 - (c) Land and water use management authorities, policies, goals and responsibilities of state, local, tribal, and federal governments that may affect the area's ground water quality and quantity;
 - (d) A general description of the locale, including a brief description of the topography, geology, climate, population, land use, water use and water resources;
 - (e) A description of the area's hydrogeology, including the delineation of aquifers, aquitards, hydrogeologic cross-sections, porosity and horizontal and vertical permeability estimates, direction and quantity of ground water flow, water-table contour and potentiometric maps by aquifer, locations of wells, perennial streams and springs, the locations of aquifer recharge and discharge areas, and the distribution and quantity of natural and man-induced aquifer recharge and discharge;
 - (f) Characterization of the historical and existing ground water quality;
 - (g) Estimates of the historical and current rates of ground water use and purposes of such use within the area;
 - (h) Projections of ground water supply needs and rates of withdrawal based upon alternative population and land use projections;
 - (i) References including sources of data, methods and accuracy of measurements, quality control used in data collection and measurement programs, and documentation for and construction details of any computer models used.
- (2) A problem definition section that discusses land and water use activities potentially affecting the ground water quality or quantity of the area. These activities may include but are not limited to:
 - Commercial, municipal, and industrial discharges
 - Underground or surface storage of harmful materials in containers susceptible to leakage
 - Accidental spills
 - Waste disposal, including liquid, solid, and hazardous waste
 - Storm water disposal

- Mining activities
- Application and storage of roadway deicing chemicals
- Agricultural activities
- Artificial recharge of the aquifer by injection wells, seepage ponds, land spreading, or irrigation
- Aquifer over-utilization causing seawater intrusion, other contamination, water table declines or depletion of surface waters
- Improperly constructed or abandoned wells
- Confined animal feeding activities

The discussion should define the extent of the ground water problems caused or potentially caused by each activity, including effects which may extend across ground water management area boundaries, supported by as much documentation as possible. The section should analyze historical trends in water quality in terms of their likely causes, document declining water table levels and other water use conflicts, establish the relationship between water withdrawal distribution and rates and water level changes within each aquifer or zone, and predict the likelihood of future problems and conflicts if no action is taken. The discussion should also identify land and water use management policies that affect ground water quality and quantity in the area. Areas where insufficient data exists to define the nature and extent of existing or potential ground water problems shall be documented.

(3) A section identifying water quantity and quality goals and objectives for the area which (a) recognize existing and future uses of the aquifer, (b) are in accordance with water quality standards of the department, the department of social and health services, and the federal environmental protection agency, and (c) recognize annual variations in aquifer recharge and other significant hydrogeologic factors;

(4) An alternatives section outlining various land and water use management strategies for reaching the program's goals and objectives that address each of the ground water problems discussed in the problem definition section. If necessary, alternative data collection and analysis programs shall be defined to enable better characterization of the ground water and potential quality and quantity problems. Each of the alternative strategies shall be evaluated in terms of feasibility, effectiveness, cost, time and difficulty to implement, and degree of consistency with local comprehensive plans and water management programs such as the coordinated water system plan, the water supply reservation program, and others. The alternative management strategies shall address water conservation, conflicts with existing water rights and minimum instream flow requirements, programs to resolve such conflicts, and long-term policies and construction practices necessary to protect existing water rights and subsequent facilities installed in accordance with the ground water management area program and/or other water right procedures.

(5) A recommendations section containing those management strategies chosen from the alternatives section that are recommended for implementation. The rationale for choosing these strategies as opposed to the other alternatives identified shall be given;

(6) An implementation section comprised of:

(a) A detailed work plan for implementing each aspect of the ground water management strategies as presented in the recommendations section. For each recommended management action, the parties responsible for initiating the action and a schedule for implementation shall be identified. Where possible, the implementation plan should include specifically worded statements such as model ordinances, recommended governmental policy statements, interagency agreements, proposed legislative changes, and proposed amendments to local comprehensive plans, coordinated water system plans, basin management programs, and others as appropriate;

(b) A monitoring system for evaluating the effectiveness of the program;

(c) A process for the periodic review and revision of the ground water management program.

[Statutory Authority: RCW 90.44.400. 86-02-004 (Order DE 85-24), § 173-100-100, filed 12/20/85.]

WAC 173-100-110 SEPA review.

The proposed ground water management program shall be subject to review pursuant to the State Environmental Policy Act, chapter 43.21C RCW, as required under the applicable implementing regulations.

[Statutory Authority: RCW 90.44.400. 86-02-004 (Order DE 85-24), § 173-100-110, filed 12/20/85.]

WAC 173-100-120 Hearings and implementation.

(1) Upon completion of the ground water area management program, the department shall hold a public hearing within the designated ground water management area for the purpose of taking public testimony on the proposed program. Local governments are encouraged to hold joint hearings with the department to hear testimony on the proposed management program. Following the public hearing, the department and each affected local government shall prepare findings on the ground water management program within ninety days. This period may be extended by the department for an additional ninety days. The findings shall evaluate the program's technical soundness, economic feasibility, and consistency with the intent of this chapter and other federal, state and local laws. The findings shall identify any revisions necessary before the program can be certified and shall contain a statement of the agency's concurrence, indicating its intent to adopt implementing policies, ordinances and programs if required, or a statement of nonconcurrence with the program if such be the case.

(2) The lead agency will consolidate the findings and present them to the advisory committee. Statements of nonconcurrence shall be resolved by the committee and the program revised if necessary.

(3) The program shall then be submitted by the ground water advisory committee to the department which shall certify that the program is consistent with the intent of this chapter.

(4) Following such certification, state agencies and affected local governments shall adopt or amend regulations, ordinances, and/or programs for implementing those provisions of the ground water management program which are within their respective jurisdictional authorities.

(5) The department, the department of social and health services and affected local governments shall be guided by the adopted program when reviewing and considering approval of all studies, plans and facilities that may utilize or impact the implementation of the ground water management program.

[Statutory Authority: RCW 90.44.400. 86-02-004 (Order DE 85-24), § 173-100-120, filed 12/20/85.]

WAC 173-100-130 Designation of ground water areas.

The procedures provided in RCW 90.44.130 may be utilized by the department to designate ground water areas, subareas, or zones for the purposes described therein either in conjunction with the procedures of this chapter or independently thereof.

[Statutory Authority: RCW 90.44.400. 86-02-004 (Order DE 85-24), § 173-100-130, filed 12/20/85.]

WAC 173-100-140 Intergovernmental agreements.

In order to fully implement this chapter, the department may negotiate and enter into cooperative agreements with Indian tribal governments, adjacent states and Canadian governmental agencies when a ground water management area is contiguous with or affects lands under their jurisdiction. Such cooperative agreements shall not affect the jurisdiction over any civil or criminal matters that may be exercised by any party to such an agreement. Intergovernmental agreements shall further the purposes of this chapter, and shall serve to establish a framework for intergovernmental coordination, minimize duplication, and efficiently utilize program resources to protect ground water resources.

[Statutory Authority: RCW 90.44.400. 86-02-004 (Order DE 85-24), § 173-100-140, filed 12/20/85.]

WAC 173-100-150 Appeals.

All final written decisions of the department pertaining to designation of ground water management areas, certification of ground water management programs, permits, regulatory orders, and related decisions pursuant to this chapter shall be subject to review by the pollution control hearings board under chapter 43.21B RCW.

[Statutory Authority: RCW 90.44.400. 86-02-004 (Order DE 85-24), § 173-100-150, filed 12/20/85.]

WAC 173-100-160 Regulation review.

The department of ecology shall initiate a review of the rules established in this chapter whenever new information, changing conditions, or statutory modifications make it necessary to consider revisions.

[Statutory Authority: Chapters 43.27A and 90.44 RCW. 88-13-037 (Order 88-11), § 173-100-160, filed 6/9/88.]

Appendix E

Management Strategy References

**East King County
Ground Water Management Plan**

December 1998

APPENDIX E

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