17938

Skagit County
Coordinated Water System Plan
Regional Supplement

July 2000

Prepared by:
Economic and Engineering Services, Inc.

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C E R T I F I C A T I O N

The technical material and data contained in this report were prepared under the supervision and direction of the undersigned, whose seal as a professional engineer licensed to practice as such, is affixed below.

Robert L. Wubbena, P.E., President
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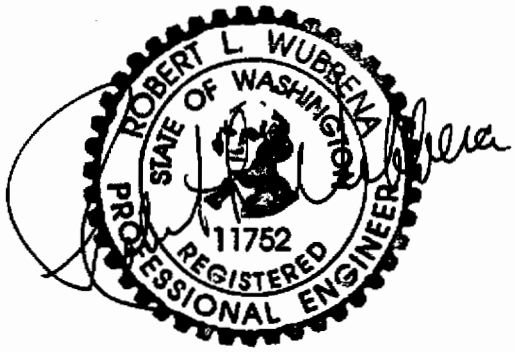

EXPIRES 09-10 - 01

Acknowledgements

This update to the Skagit County Coordinated Water System Plan (CWSP) was developed with extensive input from representatives of Skagit County (County), City of Anacortes, Skagit County PUD No. 1, and the other members of the Water Utility Coordinating Committee (WUCC).

The County also appointed a Citizen's Advisory Committee (CAC) that provided valuable comments on helping clarify the intent and interpretation of the CWSP. They also helped confirm the CWSP's consistency with the County Comprehensive Plan.

We appreciate everyone's assistance in establishing an implementable and useful water supply plan for Skagit County's citizens for the future.

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Glossary of Acronyms and Terms

The following definitions are applicable to interpretation of the Coordinated Water System Plan. Additional definitions may be found in Chapter 246-290 WAC, "Drinking Water Regulations of the State Board of Health," effective April 1999, Department of Health, LD-11, Olympia, WA 98504.

Acronyms:

APWA	The American Public Works Association
AWWA	The American Water Works Association
ccf	One hundred cubic feet
cfs	Cubic feet per second
CIP	Capital Improvement Program
CWSP	Coordinated Water System Plan (Chapter 70.116 RCW)
CWSSA	Critical Water Supply Service Area (Chapter 70.116 RCW and Chapter 248-56 WAC)
DOH	Department of Health, State of Washington
Ecology	Department of Ecology, State of Washington
ESA	Environmentally Sensitive Area
EPA	United States Environmental Protection Agency
ERU	Equivalent Residential Unit
gpcd	Gallons per capita per day
gpd	Gallons per day
gpm	Gallons per minute
MGD	Million gallons per day
MOA	Memorandum of Agreement
PUD No. 1	Public Utility District No. 1 of Skagit County
RCW	Revised Code of Washington

SCHD	Skagit County Health Department
SCPPC	Skagit County Planning and Permit Center
SEPA	State Environmental Policy Act
SMA	Satellite Management Agency. An organization, individual, or other entity which is prequalified, as provided in the CWSP, to render services such as operation, maintenance, development, or management of water systems in Skagit County.
SSP	Satellite System Program. A program established to provide for technical, contract, and other services to meet management needs of satellite systems.
STPD	Swinomish Tribal Planning Department
ULID/LUD	Utility Local Improvement District/Local Utility District
USGS	United States Geological Survey
USRP	Utility Service Review Procedure. An administrative procedure established under local agency jurisdiction to identify the water purveyor best able to serve an area where new public water service is requested. (See Designated Purveyor).
WAC	Washington Administrative Code
WPP	Watershed Planning Process
WRIA	Water Resource Inventory Area
WSDOT/APWA	Combined standards for public works construction practices of the Washington Department of Transportation and the American Public Works Association, 1984 Edition.
WSP	Water System Plan
WUCC	Skagit County Water Utilities Coordinating Committee

Terms:

Classes of Public Water Systems	Public water systems are generally classified into 2 categories as follows: Group A - serving 15 or more connections or 25 or more people/day for 60 or more days/year. Group A systems must meet both State and federal Safe Drinking Water Act requirements.

Group B - serving less than 15 connections (but more than one single family residence) and less than 25 people for 60 days or more/year or less than 15 connections and any number of people for less than 60 days per year. Group B systems must meet State requirements.

Group A systems are divided into a series of subgroups as diagrammed in Exhibit 1 at the end of this Glossary of Acronyms and Terms section. A full description of the classes of systems is contained in WAC 246-290-010.

A Community System is a system that has 15 or more connections, or serves 25 or more people for 180 days or more per year.

A Non-Transient System serves 25 or more of the same non-residents per day.

A Transient System serves fewer than 25 residents or different residents. See Exhibit 1-1, page 1-7.

Conjunctive Use

The utilization of two or more water sources by a single entity, or several entities operating through interties, in a manner which optimizes system operation and/or maximizes use of the combined resources.

Designated Purveyor or Designated Utility

A water purveyor (utility) identified to provide water service to a given area. When willing to provide the service in a timely and reasonable manner, the designated purveyor is assigned an exclusive right to provide public water service to the area and is required to include the area within its approved Water System Plan.

Designated Service Area	The geographic area including the existing service area and future service area of a designated utility.
Development Permit	Any land use or environmental permit or license required from a local government for a project, including, but not limited to building permits, subdivisions, binding site plans, special use permits, planned unit developments, conditional uses, shoreline substantial development permits, site plan review, permits or approvals required by critical area ordinances, site-specific rezones authorized by a comprehensive plan or subarea plan, but excluding the adoption or amendment of a comprehensive plan, subarea plan, or development regulations.
Expanding Water Systems	Those public water systems installing additions, extensions, changes, or alterations to their existing source, transmission, storage, or distribution facilities which will enable the system to increase in size their existing service area and/or their number of approved service connections. New individual retail or direct service connections onto an existing distribution system shall not be considered an expansion of the public water system.
Expansion of Service	See "Expanding Water System"
Extension of Service	Installation of service lines during in-fill growth not requiring system growth as defined by expansion of service.
Fire Flow	The rate of water delivery needed for the sole purpose of fighting fires. The fire flow volume shall be in addition to the requirements of the water system for domestic demand, and a 20 psi residual pressure should be maintained throughout the system under combined maximum demand flow conditions.

Fire Suppression	The use of landscaping techniques and building materials that hinder or prevent the ignition or spread of fire. Specific fire suppression techniques addressed by Skagit County Code 14.04.190.
Franchise Area	Non-exclusive area in which a utility is permitted by the Government with jurisdiction to extend facilities in public rights-of-way. A franchise area is not equivalent to a service area.
Interlocal Agreement	See Service Area Agreement
Intertie	A physical connection between individual water systems which allows water supply to be transferred in one or both directions. An intertie can be established as a primary source, secondary or peaking supply, or emergency supply. Ordinarily, the use of an intertie is governed by a written agreement or contract between the utilities. A modification to water rights issued by Ecology may also be required.
In-Fill	The addition of service connections that can be met without upgrades to source-of-supply, storage and/or distribution system.
Land Use Designation	The land use(s) allowed in a geographical area by right or permit, as provided in the Skagit County Comprehensive Plan and Zoning Ordinance in unincorporated Skagit County or by Muncipalities within incorporated areas.
Level of Service	Operational features, such as pressure, flow, reliability, etc., provided to the customer by the water system.
New Construction	Any addition of supply, transmission, distribution, or storage facilities, either in a new water system or an expanding water

system, which provides a capability to serve additional dwelling units or other buildings.

Public Water System

Any water supply system intended, or used, for human consumption or other domestic uses, including source, treatment, storage, transmission, and distribution facilities where water is furnished to any community or group of individuals, or is made available to the public for human consumption or domestic use, but excluding all water supply systems serving one single family residence. Water systems meeting all of the following requirements are not included:

1. Purchase their entire supply of water from another public water system;
2. Do not treat the water; and
3. Do not sell water. Businesses or systems merely storing and distributing water provided by others are exempt unless that system sells water as a separate item or bills separately for the water provided.

Remote System

A public water system, located within the designated service area of a utility, that is detached/distant from the primary facilities of the utility. A remote system has its own source of supply, pending connection to the utility primary source and distribution facilities.

Rural Water Service

Water service provided by an individual well, a stand alone public water system, or extension of a water system from within an urban growth area that is designed to provide rural water service. The rural water service shall be designed to meet the rural water supply needs of the rural area users as defined by the Skagit County Comprehensive Plan, the Coordinated Water System Plan, and the criteria established for the water service in Section 4 and on Table 4-1 of the Coordinated Water System Plan. The design shall be guided by the projected rural area water supply and fire protection associated with the requirements of the Skagit County

	Comprehensive Plan, based on the physical or hydraulic capacity requirements as outlined in the Coordinated Water System Plan and the designated water utility's waters system plan.
Satellite System	A public water system located within that portion of the Critical Water Supply Service Area not designated as a contiguous service area for any existing utility. Multiple satellite systems may be owned and/or operated by a single utility without necessity of physical connection between systems.
Service Area	A geographical area assigned to a water purveyor for the purpose of providing both current and future public water service. Boundaries are defined by agreements among adjacent utilities and are recorded on a set of maps on file with Skagit County. Water service provided within designated service areas must be consistent with the land use plans of those governments with jurisdiction as regulatory authority.
Service Area (Existing)	A specific area within which direct service or retail service connections to customers of a public water system are currently available.
Service Area (Future)	A specific area for which water service is planned by a public water system as determined by written agreement among purveyors.
Service Area Agreement	An agreement signed by water utilities which identifies the designated service area for which the utility has retail water service responsibility.
Service Connection	A physical connection through which water may be delivered to a customer for discretionary use. Unless otherwise indicated, all such connections, whether currently in use or not, shall be considered as a service connection. The service connection

	defines the limit of the water utility's responsibility for system design and operation unless otherwise provided for in the water utility's condition of service policies. Utility customers such as mobile home parks, planned unit developments, condominiums, apartment buildings, industrial/commercial sites, or other similar complexes are generally considered exterior to the water system. In such cases, the purveyor shall be required to meet design standards for water systems up to the point of service to the customer; and beyond that point, the applicable plumbing and building codes, fire codes, county health regulations, and local ordinances are deemed to be sufficient to protect the public health and to ensure adequate water service. These customers are not themselves considered herein as water purveyors unless specifically designated as such by DOH.
Service Line	That portion of the distribution system from the water main to service tap.
Urban Water Service	Water service provided by a water system(s) that has been designed to provide service throughout the designated urban growth area. The urban water service shall be designed to meet the water supply needs of the residential, commercial, industrial, and other water needs as defined by the Skagit County or City Comprehensive Plan, the Coordinated Water System Plan, and the designated water utility's Water System Plan using the design criteria outlined in Section 4 and on Table 4-1 of the Coordinated Water System Plan and in accordance with the schedule required by the Comprehensive Plan.

Water System Plan	A written plan prepared for a particular water system and service area which identifies a schedule of needed improvements, a financial program, and an operations program. A water system which is expanding within a designated service area may be required to include other elements in its plan. Details of Water System Plan requirements can be found in WAC 246-290-100.

Section 1
Executive Summary

1.1 Introduction

The 1999 Skagit County Coordinated Water System Plan (CWSP) represents the continued efforts of the Skagit County Water Utility Coordinating Committee (WUCC) representing the Skagit County agencies, the area's regional water supply utilities, City of Anacortes (City), and Public Utility District No. 1 of Skagit County (PUD); Indian Tribes; the individual water utilities; and the State Department of Health (DOH) and Department of Ecology (Ecology) to manage the County's potable water issues according to all applicable statutes and ordinances. During a one-year period, monthly meetings were held to review the existing 1993 CWSP and provide changes to reflect the current water system community in Skagit County (County) and to provide guidance for the future. These actions were conducted with the primary objective of meeting the public drinking water supply needs of the County and establishing a "functional water plan" as an element of the city and County Comprehensive Plans.

This 1999 CWSP provides a further refinement of process and strategy for the existing water utilities to define their role in a program to meet the County's Comprehensive Plan. The regional water supply, transmission, and storage plan represents the collective views of the WUCC and integrates the documented views of other State and local governments. The CWSP, when integrated with the Comprehensive Plans of the County, local governments, and the pending Skagit River Watershed Plan, represents a significant piece of the larger resource and growth management plan for municipalities and the County's future.

1.2 Recommendations

The WUCC recommends, and the CWSP provides for, the following:

1.2.1 Management Area

The CWSP specifically provides plans for the provision of public water supply in the County. The area is divided into designated utility service areas and a satellite system area. The CWSP and the Public Water System Coordination Act assign responsibility for planning, designing, financing, constructing, and operating all public water systems in the designated areas. Each designated and expanding water system is required to prepare a Water System Plan (WSP) for their service area within one year of the effective date of this CWSP.

1.2.2 Supply Area

The source of supply for the CWSP and the management area is a combination of sub-regional systems (City and PUD) serving the urban areas and other Group A and Group B public systems (see Exhibit 1-1) serving development in rural areas. The urban systems rely primarily upon surface water sources and the rural systems upon groundwater/wells.

1.2.3 Supply Area - Interties

Interties between existing water utilities are designated to allow conjunctive use of surface and groundwater, emergency supply, and wholesale delivery of supply in accordance with the CWSP. The CWSP and associated water rights for the City and PUD authorizes the use of the two supply systems interchangeably.

1.2.4 Water Supply and Land Use

The CWSP is consistent with the city and County Comprehensive Plans. As the functional water plan for the city and County Comprehensive Plans, the CWSP will continue to be amended as the land and resource management plans are further evaluated, considered, and adopted through annual amendments.

As the land use and WSPs for the rural area are further developed, the routing of water system distribution and transmission lines through previously unsewered areas should consider their potential impact on development patterns. Pipe sizing must also reflect long-term plans for public water service in rural areas and should not be based on speculative land uses.

1.2.5 Designated Service Area

The designated water service areas represent the geographical area where the identified utility has accepted responsibility to provide a safe and adequate water supply in a timely and reasonable manner consistent with the State Environmental Policy Act (SEPA), the State Growth Management Act (GMA), and the County-wide Planning Policies and Comprehensive Plans of local governments with land use authority. The expanding water system must update its WSP at least every six years and be consistent with the Comprehensive Plan.

1.2.6 Receivership and Satellite System Management

Existing State law provides for the County to be the "receiver of last resort" of any of the existing 185 public water systems in the study area that are

unable to comply with the federal and State regulations and customer service requirements specifically outlined in federal, State, and local (CWSP) procedures.

The CWSP provides for those utilities with designated service areas to assume lead responsibility, in lieu of the County, for correcting the deficiencies of failing systems within their service area if receivership is invoked. If the designated system does not assume responsibility or the systems are not located within a designated service area, the goal of the CWSP is for the PUD to accept receivership responsibility.

The PUD is recognized as the Satellite Management Agency (SMA) for purposes of the CWSP. Under this program, the PUD will provide water service to new developments in the County outside of previously designated service areas, except as provided by this CWSP. Water systems for such new developments must be designed and constructed consistent with PUD minimum design standards. Ownership of the system is then to be transferred to the PUD.

1.2.7 Water Conservation and Monitoring

The Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs (see Appendix A) were used to guide the development of the demand forecast and related water conservation program for the CWSP.

A regional data management program will be developed as a part of the Skagit Basin Watershed Plan. This program will be implemented to document water use trends and evaluate successful implementation of the conservation program.

1.2.8 Minimum Design Standards

The Minimum Design Standards developed by the WUCC and discussed in Section 4, once adopted by local government ordinances, will be applied to water purveyors County-wide. The recommended Design Standards reference urban growth areas (UGAs) and non-UGAs. They are consistent with the city and County Comprehensive Plans and Planning Policies.

1.2.9 Individual Wells and Groundwater Management

Groundwater remains an available resource for additional water supply development. Quantity and quality considerations are variable throughout the County. In general, the potential for development of an adequate supply progressively increases in an up-gradient (easterly direction in the Skagit River Valley).

In the western and urban area, surface water supplies will be the predominant source. In the rural areas, groundwater development should continue, except where the Skagit River Watershed Plan recommends an alternative supply plan (see 1.2.10), provided individual wells meet County siting criteria and Ecology minimum well standards. However, where new development of individual/single family homes is proposed within the designated service area of existing utilities, the CWSP provides a process for the developer to consult with the utility for potential service before the building permit is issued. The decision for connection to the public water system or construction of a private supply rests with the developer, unless connection to a public water system is a condition of a land-use permit.

The County, cities, and tribes continue to support groundwater protection programs. Aquifer recharge areas are currently protected by ordinances adopted pursuant to the Critical Areas requirements of the Comprehensive Plan. The Skagit County Health Department should further address groundwater protection in its septic system enforcement program.

1.2.10 Regional Supply System

The Joint Operating Agreement between the City of Anacortes and the PUD (see Appendix B) provides one segment and one phase of the regional supply plan. This regional supply system represents the framework to meet the growth management needs of the County for public water supply, and will require continuing evaluation to establish the most cost-effective program consistent with public policy.

The 50-year Memorandum of Agreement (MOA) serves as another segment of the regional supply plan. The MOA simplifies water rights issues and provides for minimum in-stream flows that will be integral to watershed planning efforts.

The third segment of regional supply planning and management will be developed through the watershed planning process (WPP). The WPP will evaluate all water issues and needs within the County. The plan will link potable water demands with other surface water, groundwater, in-stream, and out-of-stream demands.

The final segment of regional supply planning will be coordination of all water use with the requirements of the Endangered Species Act (ESA). The linkage of the ESA, MOA, WPP, and Joint Operating Agreements will provide the documentation for sound water supply management in Skagit County.

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1.2.11 Administrative Framework

The CWSP requires participation by all members of the WUCC. The CWSP, after certification by the County and adoption by DOH, becomes the regional public water supply and functional plan, all related decisions by local or State government must be guided by the plan.

The Utility Service Review Procedure (USRP), Exhibit 5-1, represents how the County anticipates administering its responsibilities. The water utilities are responsible for updating their WSPs for their designated areas in accordance with DOH regulations.

The responsibility of satellite system program implementation on a regional basis within non-designated service areas has been assigned to the PUD. The program includes ownership, operation, and management of new systems as well as the responsibility for accepting receivership of existing systems through court proceedings on behalf of Skagit County.

1.2.12 Plan Updating

The following identifies the primary requirements for ensuring that the CWSP remains a current functional plan of the city and County Comprehensive Plans and supports the County-wide Planning Policies. The program is designed to continue to be both responsive to existing needs and to place responsibility on designated agencies to maintain accountability. As a functional plan, the CWSP must be adopted by reference in utility water system plans or other appropriate documents. The acceptance of accountability should be verified by appropriate intergovernmental agreements or memorandums of understanding.

(1) This CWSP has been reviewed to assure conformance with County-wide Planning Policies and applicable Comprehensive Plans pursuant to Chapter 70.116 RCW.

(2) The WUCC will assist DOH, as requested, in the resolution of any questions or issues the State identifies in its review process.

(3) Annual meetings of the WUCC should be scheduled to review the CWSP.

(4) The minimum design standards presented in Section 4 will be reviewed annually by the WUCC. Recommended revisions will be submitted to the Skagit County Planning and Permit Center (SCPPC) for adoption.

(5) The objectives and procedures outlined in the CWSP are considered to be reasonable and achievable by all properly operated water systems.

Repeated failure by a system to provide safe, reliable, and minimum levels of water service, as measured by the CWSP criteria, should serve as a basis to evaluate viability of the system. Non-viable systems should be candidates for receivership, voluntary transfer of ownership, or merger proceedings.

(6) This CWSP should be revised and updated, as necessary, as prescribed by Chapter 70.116 RCW.

Exhibit 1-1
Public Water System Definition

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Public Water Systems

- All systems except those serving only one single family residence or less than five residences on the same farm

Group A

System that regularly serves:
- 15 or more residential connections

or
- 25 or more people/day for 60 or more days/yr

Group B

System that serves:
- Less than 15 residential connections

and
- Less than 25 people/day

or
- 25 or more people/day during fewer than 60 days/yr

Community

- System that regularly serves 15 or more year-round residential connections, or 25 or more year-round residents (for 180 or more days/yr).

Noncommunity

- Any system that is not a community system.

Nontransient (NTNC)

- System that serves 25 or more of the same people/day for 180 or more days/yr.

Group B

- System that serves:
- 25 or more different people/day during 60 or more days/yr

or
- 25 or more of the same people/day for less than 180 days/yr and during more than 59 days/yr

or
- 1,000 or more people for two or more consecutive days

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Section 2
The Coordinated Water System Plan Process

2.1 Introduction

The Public Water System Coordination Act, enacted in 1977 and codified as Chapter 70.116 RCW, establishes a procedure for the State's water utilities to coordinate their planning and construction programs with adjacent water utilities and other local governmental activities including planning under the Growth Management Act (GMA).

The Public Water System Coordination Act and the water reservation process of the Water Resource Act may be used individually or in combination by the local public water utilities. Implementation of either of these laws requires that a Coordinated Water System Plan (CWSP) be prepared for the study area. This Skagit County (County) CWSP Update has been prepared in accordance with the requirements of both State programs. The goal of this update is the further refinement of CWSP guidance and coordination with the GMA and the 50-year Memorandum of Agreement (MOA) regarding water rights and in-stream water levels for the Lower Skagit River and Cultus Mountain streams.

2.2 Application Within Indian Reservations

Three Indian Reservations are located within the Skagit Critical Water Supply Service Area (CWSSA). These are: (1) the Sauk-Suiattle Indian Tribe; (2) the Swinomish Indian Tribal Community; and, (3) the Upper Skagit Indian Tribe.

In this CWSP Update, as with the process in 1993, the Swinomish Indian Tribal Community continues to voluntarily participate for the purpose of promoting regional cooperation and efficiency in water service delivery. However, it is the Tribe's position that the Tribe and land within the Reservation, regardless of ownership, is not subject to the various State laws that are referenced throughout the Skagit CWSP.

2.3 CWSP History

In 1982, the area generally known as Fidalgo Island was designated a CWSSA and the Skagit Board of County Commissioners initiated planning under the Public Water System Coordination Act. That first Plan was approved and adopted by the Board of County Commissioners on December 18, 1984.

In considering the need for an update to that Plan in 1989, the Skagit County Water Utilities Coordinating Committee (WUCC) realized that many of the water

system issues being addressed had implications outside the Fidalgo Island area. Subsequently, based on the recommendations of the Preliminary Assessment, the WUCC designated all of Skagit County a CWSSA through Resolution No. 12437, dated March 26, 1990.

The first County-wide CWSP was approved by the Board of County Commissioners in July 1993.

2.4 CWSP Update Preparation

The 1998 update to the CWSP was initiated. Preparation of this CWSP update involved the joint efforts of participating WUCC members, County and State agency staff, and the Consultant through a 12-month process, which included monthly WUCC meetings. The meetings addressed issues of revision, WUCC recommendation, public involvement through the Citizen's Advisory Committee (CAC) process, and adoption by the Board of County Commissioners. In addition, special meetings were held by a subgroup of the WUCC to address fire flow issues related to the facility design standards and specifications.

The 1995 Legislature passed Engrossed Second Substitute Senate Bill (E2SSB) 5448. This Bill created several modifications to the earlier version of the Public Water System Coordination Act. Appendix C provides a comparison of the modified provisions. The 1999 CWSP has been prepared to be consistent with the new changes, as far as the Department of Health (DOH) has implemented them.

It should be noted that WAC 246-290, which are regulations governing Group A public water systems, was updated effective April 1999. These changes are also included in the CWSP.

The following areas received particular emphasis during update of the CWSP:

2.4.1 Water System Service Area

Each utility was requested through correspondence, and during the WUCC meetings, to verify its service area boundaries as established in 1993. Most existing service area issues were resolved by the water systems in question. All changes were incorporated and the service area boundaries of the larger Group A systems and the smaller systems with intent to expand, were updated and plotted on base maps. Systems previously identified as expanding, but which had not completed and submitted a Water System Plan (WSP) were re-categorized as non-expanding and the service area was assumed to correspond to the existing area in service.

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2.4.2 Minimum Design Standards

This 1999 CWSP incorporates revision of design guidelines for utilities, including: material specifications, construction practices, distribution facilities, metered services, fire flow requirements, etc. The content and application of these standards were developed jointly through input of WUCC representatives and the County to be consistent with applicable land use plan and development ordinance requirements.

The revised standards are discussed in Section 4. When accepted and adopted through ordinance by the cities and County and approved by DOH, they will become the minimum standards for all new water system improvements. A water utility may adopt these standards by reference, or may adopt more stringent standards. The standards shall not be inconsistent with the applicable comprehensive plans. Adoption of these standards shall not be considered a substitute for standard construction specifications in WSPs to qualify for exceptions to the project report and construction document submittal requirements in WAC 246-290. In addition, reference to these standards will not be accepted as a substitute for specifications in construction documents.

2.4.3 Utility Service Review Procedure

The Utility Service Review Procedure (USRP) was developed to identify the appropriate purveyor, both willing and capable, to provide water service to new developments and expansions. This procedure utilizes the recognized future service areas as a basis for assigning new applicants for development permits to water utilities. In undesignated areas, the procedure emphasizes adjacent utilities with an approved WSP as the preferred service providers. If adjacent and qualified utilities do not elect to provide service or do not exist, the County will refer a developer to the Public Utility District No. 1 of Skagit County (PUD) as the Satellite Management Agency (SMA). The recommended program for utility service review is outlined in Section 5.

2.4.4 Regional Water Supply

The County's regional supply needs were evaluated in increments through the year 2050. Forecasts of future water demand were made based upon population projections provided by the Office of Financial Management (OFM), water use data provided by local utilities, and anticipated increased requirements for industrial water supply. Projected water savings from a water conservation program were factored into the water demand forecast.

An increase in water demand of approximately 84.5 MGD (peak day use) is forecast to be required for the County area by the year 2050. The preferred

future supply option continues to be development of local groundwater sources by individual utilities in the rural areas of the County provided that it is consistent with the watershed planning. The City of Anacortes (City) and the PUD should continue to be the regional providers of water in the urban area. Under terms of the Joint Operating Agreement, expansion of both surface and groundwater source capacity will focus on the Skagit River under authority of existing water rights and in accordance with the 50-Year Memorandum of Agreement (MOA).

2.4.5 Individual Water System Plans

State Board of Health rules (WAC 246-291) require that certain categories of public water systems shall develop a WSP for review and approval by DOH. One listed category is "Public water systems located in areas utilizing the Public Water System Coordination Act of 1977, Chapter 70.116 RCW and Chapter 246-293 WAC." As relates to this Act, the plan is to describe the utility's proposed method for serving its designated area.

Elements of the WSP are to be based upon a 20-year planning period with identification of specific improvements and a financial program for the first six years. The purveyor is to update the plan at least every five years. However, DOH may require a plan submission or update at any time.

The planning requirements are determined by DOH and vary for utilities based upon their size. Systems with 1,000 service connections or more are to prepare a complete WSP. All other systems are to prepare an abbreviated plan with the level of detail to be determined in consultation with DOH staff. A description of the information and data required under the two levels of plans is presented in Appendix D.

In addition to the above requirements, all systems within a CWSSA must, in the preparation or update of their plan, address concerns relating to the entire CWSSA. These concerns include:

- ❑ Map of future service area,
- ❑ Signed service area agreement,
- ❑ Population and water demand projections,
- ❑ Design standards,
- ❑ Implementation of minor and major regional projects,
- ❑ Implementation of water utility service review procedure,
- ❑ Implementation of satellite system program, and
- ❑ Water conservation program.

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2.5 Regional Supplement

This 1999 CWSP has been prepared under the provisions of WAC 246-293-220 which allows for a CWSP which consists of: (1) a compilation of water system plans approved by DOH, and (2) a supplement which addresses water purveyor concerns relating to the entire CWSSA. All completed WSPs of the individual utilities referenced herein are on file with DOH or the County. The review and approval procedure for this document is outlined in Section 11.

Table 2-1 lists those systems with 50 or more permanent connections (i.e., WUCC members) and also those smaller systems that have indicated an intent to expand. This table serves a number of purposes, including the following:

- ❑ Identifies for each utility its degree of compliance with the planning requirements of the CWSP.
- ❑ Assists the County and DOH in their review of the CWSP for consistency with County policies and State statutes and regulations.
- ❑ Directs the County and DOH attention to those utilities that must satisfy basic CWSP planning requirements before system improvement and/or expansion of service takes place.

To assure a high degree of plan compliance, the WUCC maintains its recommendation that:

- ❑ All water utilities that have not done so, should immediately complete and file Service Area Agreements with the County.
- ❑ Failure to have on file a Service Area Agreement or WSP should result in denial of proposed system expansions. As WSPs receive DOH approval, they may be administratively included within the adopted CWSP.
- ❑ If a service area conflict arises, development activity should be denied within the contested service area until the conflict is resolved.
- ❑ Due to the importance of tracking the status of these utilities, the County should be responsible for updating the service area maps and Table 2-1. The AutoCAD files used to develop the base map and all service areas have been provided to the County for this purpose.

Table 2-1
Water Utility Planning Status Summary

No.	PWS-Name	PWS ID #	System Group	Agreement Filed	Approved # of Residential Connections (or ERUs)	Expanding System	Plan Type (1)
	System with More Than 50 Permanent Connections						
1	ANACORTES, CITY OF	02200C	A	Yes	no limit	Yes	F
2	BIG LAKE WATER ASSOCIATION	67009	A	No	70	No	SWSMP
3	BLANCHARD EDISON WATER ASSN. INC.	074508	A	No	438	No	SWSMP
4	CAPE HORN MAINTENANCE COMPANY	11060M	A	Yes	371	Yes	A
5	CEDARGROVE ON THE SKAGIT	119174	A	Yes	292	Yes	F
6	COLONY MOUNTAIN	14069F	A	No	83	No	SWSMP
7	CONCRETE UTILITIES	03950M	A	Yes	440	Yes	A
8	DEL MAR COMMUNITY SERVICE INC	185808	A	Yes	346	Yes	A
9	GUEMES ISLAND WATER COMPANY	08236M	A	Yes	175	Yes	A
10	HAMILTON WATER DEPT	307000	A	Yes	97	Yes	A
11	LA CONNER WATER DEPT	433500	A	Yes	no limit	Yes	A
12	LEIF ERICKSON REC ASSOC	23735H	A	Yes	173	No	A
13	LYMAN WATER DEPARTMENT	490500	A	Yes	185	Yes	A
14	SAMISH FARMS WATER ASSN INC	75645X	A	Yes	492	Yes	A
15	SAMISH RIVER PARK	756704	A	No	87	No	SWSMP
16	SHELTER BAY	78155Q	A	No	911	No	SWSMP
17	SKAGIT COUNTY PUD 1 - FIDALGO	00932Y	A	Yes	no limit	Yes	F
18	SKAGIT COUNTY PUD 1 - JUDY	79500E	A	Yes	no limit	Yes	F
19	SKAGIT CO WATER DISTRICT #1	00392Q	A	Yes	145	Yes	A
20	SNEE-OOSH LAND COMPANY	808009	A	No	77	No	SWSMP
21	SWINOMISH UTILITY & ENVIR SRV AUTH	IH7560	A	Yes	353	Yes	A
22	UPPER SKAGIT PUBLIC UTILITY	IH825U	A	No		Yes	A
	Expanding-Less Than 50 Permanent Connections						
28	BACUS HILL WATER CORPORATION	?	A	No	?	Yes	A
29	CARLSON WATER SYSTEM	02109W	B	Yes	9	Yes	A
30	CASCADE RIVER COMMUNITY CLUB	114940	A	No	93	Yes	A
31	ROCKPORT WATER SYSTEM	736006	A	Yes	60	Yes	F
32	WILDERNESS VILLAGE COMM. ASSOC.	968795	A	Yes	40	Yes	A

(1) "F" indicates full plan, "A" indicates abbreviated plan, and "SWSMP" indicates small water system management program.

Section 3
Water Utility Service Areas

3.1 Introduction

The Public Water System Coordination Act requires that a procedure be established to identify the existing and future service areas of public water utilities within the Critical Water Supply Service Area (CWSSA).

Two obligations accompany the establishment of service area boundaries. The first obligation is that Skagit County (County) and State governments recognize an identified utility as the responsible agency for providing all public water service within a designated area. The second obligation is that the utility shall assume responsibility, within its service area, for planning and implementing water system development and proper utility management consistent with the State Environmental Policy Act (SEPA) and Growth Management Act (GMA), the adopted County-wide Regional Policies, applicable Comprehensive Plans, and County and city land-use plans.

It is recognized that for many applicants compliance with SEPA may consume a great deal of time. Such time cannot be considered as unreasonable, if the amount of time is typical and consistent with similar actions in the County. It is also recognized that this authority allows the designated utility to separately deny a water connection until there is compliance with SEPA, County-wide Planning Policies, and land-use plans. In this event, no other agency may supply or authorize the supply of public water.

Where reference is made to city and County land-use plans, such reference shall be construed to include adopted development regulations consistent therewith. The manner in which this responsibility is to be fulfilled is to be described in the utility's water system plan (WSP) for areas within a utility's designated service area. The Utility Service Review Procedure (USRP) gives first right-of-refusal of service to an adjacent utility with an approved WSP that provides for expansion. An existing system shall be considered "adjacent" to the proposed development if service can be provided with a waterline extension not to exceed one-half mile in length. If service will not be provided by an adjacent utility, the developer will be referred to the Public Utility District No. 1 of Skagit County (PUD) as the preferred Satellite Management Agency (SMA).

The Coordination Act provides the legal mechanism, for public and private water utilities alike, to establish an exclusive service area. The basic service areas were designated in the 1993 Coordinated Water System Plan (CWSP) which identified

the boundaries of the "designated" service area. For all other utilities, their current service area is preserved as their geographical area of responsibility and operation. This condition applies even though, as a result of the CWSP, a non-expanding system may be located entirely within the boundaries of a larger system.

From the County's perspective, designated service areas mean a specific utility has accepted responsibility for development of cost-effective and efficient service to accommodate the future growth that these areas will experience consistent with the SEPA, GMA, and the County-wide Planning Policies. Growth management objectives established for these areas by each jurisdiction's Comprehensive Plans and applicable land use plans must be accounted for in each utility's approved plan and actual improvements.

3.2 Service Area Commitments and Procedures

The designated service area defines the area within which all future customers will be provided retail water service by the designated utility. An important distinction is that a utility's water facilities, such as sources of supply and reservoirs, can be located outside the utility's future service area. These facilities can be located within another utility's retail service area, provided the facilities are not used for direct retail service without the written concurrence of the designated utility.

The designated service area is the exclusive service area of the identified utility. As a condition of being granted a designated service area, the utility must meet certain obligations and commitments, as described in the following:

3.2.1 Water System Plan and Service Area Agreement

Each utility was requested to prepare and have on file with the County and/or the State Department of Health (DOH) a WSP by 1994. Utilities not having a signed service area agreement will have exclusive rights only to their existing area in service in 1993. In this case, service outside of the utility's existing service area will be assigned to the PUD, except where the one-half mile rule applies.

3.2.2 Conditions of Service by Designated Utility

Water service may be provided by the designated utility either through direct connection to the utility's existing water system or as a detached, remote system managed by the utility or others through agreement. In either case, the utility shall identify for the applicant all of the conditions of service which must be agreed to prior to the provision of water service. The Coordination Act requires that the utility be willing to extend service in a timely and reasonable manner and be consistent with SEPA, GMA, the adopted County-

wide Planning Policies for Skagit County, and County and city land-use plans.

3.2.3 Service Area Adjustment

If in the future a utility determines its service area is either too large or too small, or that it is unable to provide service, the service area boundaries may be revised at any time. This boundary revision shall require the signing of revised service area agreements by all purveyors impacted by the boundary change. Such revised agreements shall be executed by the authorized utility representative(s) and filed with the Skagit County Planning and Permit Center (SCPPC) and Skagit County Health Department (SCHD) for inclusion in the official CWSP file, and incorporated as a part of the County's annual Comprehensive Plan amendment review and approval.

3.2.4 CWSP Update

This CWSP shall be reviewed by the Water Utility Coordinating Committee (WUCC) and updated as necessary. Service areas adopted in this CWSP may also be revised, if such revisions are considered appropriate by the utilities concerned and incorporated as a part of the County's annual Comprehensive Plan amendment review and approval.

3.3 Service Area Selection

Selection of service areas was negotiated during the 1993 CWSP process. For this update, service area selection was limited to revision of boundary issues.

Service areas have been determined and mapped for all Group A and Group B utilities indicating an intent to expand their service area. All systems currently known to meet the definition of an expanding system are listed in Table 3-1. Their service area boundaries are shown in Exhibit 3-1.

A listing of the remaining non-expanding and Group B systems appears in Tables 3-2 through 3-4. System location by quarter-quarter section (40 acre tract) is shown on Exhibit 3-2. This list may be incomplete, particularly for the Group B systems of less than 15 connections. Considerable effort was made to inventory all systems, but resources did not allow a total search of State and County records.

The data contained in Tables 3-1 through 3-4 regarding present and future service connections represent approved connections by SCHD or DOH.

3.4 Service Area Agreements

3.4.1 Form of Agreement

Signed Service Area Agreements (Agreement) are on file with the SCHD and SCPPC.

Where understandings concerning joint service, transfer of service, or common boundaries require more specific terms than are provided in the Agreement, the affected utilities are to document the specific conditions in an attachment to the Agreement. In order for these understandings to be recognized in implementing the CWSP, the utilities must place them on file with the County as an attachment to the Agreement.

To confirm designated service areas and establish their legal service boundary, all expanding water utilities must have a completed Agreement on file with the County. Each Agreement shall be reviewed in conjunction with individual WSPs. Should a utility not have a signed Agreement on file, subsequent requests for system expansion will be denied.

3.4.2 Expanding/Extending Small Systems

A number of the smaller systems have indicated an intent to increase the number of service connections in the future. These added connections will constitute "expansion" or "extension" of service dependent on whether changes to source, transmission, storage, or distribution facilities are required. If it is the desire of the systems to expand beyond their existing service area, they are not precluded from seeking such recognition. This may be accomplished through an appropriate request to the County. Any such request shall include documentation that the utility's expansion plans are consistent with the objectives of the CWSP and the submittal of a WSP in accordance with State and County requirements and incorporated as a part of the County's annual Comprehensive Plan amendment review and approval.

Table 3-1

Skagit County Expanding Community Systems [1]

No.	PWS-Name	PWS ID # [2][4]	Group	Approved # Of Residential Connections (or ERUs)
1	ALGER COMMUNITY CLUB INC	01400K	A	0 [3]
2	ANACORTES, CITY OF	02200C	A	no limit
3	CAPE HORN MAINTENANCE COMPANY	11060M	A	371
4	CARLSON WATER SYSTEM	02109W	B	9
5	CASCADE RIVER COMMUNITY CLUB	114940	A	93
6	CEDARGROVE ON THE SKAGIT	119174	A	292
7	CONCRETE UTILITIES	03950M	A	440
8	DEL MAR COMMUNITY SERVICE INC	185808	A	346
9	GUEMES ISLAND WATER COMPANY	08236M	A	175
10	HAMILTON WATER DEPT	307000	A	97
11	LA CONNER WATER DEPT	433500	A	no limit
12	LEIF ERICKSON REC ASSOC	23735H	A	173
13	LYMAN WATER DEPARTMENT	490500	A	185
14	ROCKPORT WATER SYSTEM	736006	A	60
15	SAMISH FARMS WATER ASSN INC	75645X	A	492
16	SKAGIT COUNTY PUD 1	00932Y	A	no limit
17	SKAGIT COUNTY PUD 1	79500E	A	no limit
18	SKAGIT CO WATER DISTRICT #1	00392Q	A	145
19	SKAGIT RIVER COLONY	592443	A	0 [3]
20	SWINOMISH UTILITY & ENVIR SRV AUTH	IH7560	A	353
21	UPPER SKAGIT PUBLIC UTILITY	IH825U	A	
22	WILDERNESS VILLAGE COMM. ASSOC.	968795	A	40

[1] These systems required to prepare individual Water System Plans. See Exhibit 3-1 for location.

[2] PWS ID # means DOH Public Water System ID number.

[3] Zero indicates no service connection, i.e. campground.

[4] See Table 8-7 for WSP status.

Note: Blanchard Edison is a non-expanding system. See Table 3-3.

Table 3-2

Skagit County Non-Expanding, Non-Community Systems [1]

(See Exhibit 3-2)

No.	PWS-Name	PWS ID# [2]	Group	Type [3]	LOCATION				Approved No. of Residential Connections (or ERUs)
					SUB	SEC	TWP	RGE	
1	CROWN PACIFIC LTD	76850X	A	NTNC	NE/NW	14	35	6	0
2	SAMISH GRADE SCHOOL	75648F	A	NTNC	NE/NE	25	36	4	0
3	TESARO REFINING CO	780501	A	NTNC		28	35	2	0
4	EUILON, INC	87650R	A	NTNC		33	35	2	0
5	ALGER FOOD MART	66025N	A	TNC	NE/NE	18	36	4	0
6	ANDERSON FEED & GRAIN	065022	A	TNC	SW/SE	12	35	1	1
7	AVALON LINKS GOLF CLUB	00952F	A	TNC	NE/NW	17	35	4	0
8	BREAZEALE INTERPRETIVE CENTER	16624R	A	TNC	SE/NW	30	35	3	0
9	BUFFALO RUN RESTAURANT	567853	A	TNC	NW/NW	18	35	11	0
10	BURLINGTON KOA	09535K	A	TNC	SW/NW	5	35	4	3
11	CAMP BROTHERHOOD INC	10824M	A	TNC	NE/NE	31	33	5	4
12	CHUCKANUT MANOR RESTAURANT	12954N	A	TNC	NW/NE	21	36	3	0
13	CHURCH OF GOD OF PROPHECY	12971M	A	TNC	NW/NW	14	35	5	0
14	CREEKSIDE CAMPING	289775	A	TNC	NW/SE	10	35	7	0
15	DECEPTION PASS SP - ROSARIO BEACH	SP2145	A	TNC	SW/NE	22	34	1	0
16	DJ'S TEXACO	12924W	A	TNC	SW/SW	7	35	11	0
17	EAGLE COUNTRY STORE	01421L	A	TNC	SE/SW	7	35	11	0
18	FIRE MT SCOUT RESERVATION	25155C	A	TNC	NE/SW	28	34	5	0
19	GOOD FOOD DRIVE IN WATER SYSTEM	736808	A	TNC	NE/NE	13	35	10	0
20	GRANDY CREEK GROCERY	071456	A	TNC	NE/SW	10	35	7	0
21	GUEMES ISLAND RESORT INC	30110F	A	TNC	NE/SE	26	36	1	0
22	LAKE ERIE TRAILER PARK	43886H	A	TNC	SW/NW	12	34	1	0
23	LAKE MCMURRAY RECREATION RESORT	066047	A	TNC	SE/SW	19	33	5	0

[1] Not required to have a Water System Plan. See Exhibit 3-2 for location of System.

[2] DOH Public Water System ID number.

[3] TNC means Transient/Non-Community System.

Table 3-2 (Cont)
Skagit County Non-Expanding, Non-Community Systems

No.	PWS-Name	PWS ID# [2]	Group	Type [3]	Location				Approved No. of Residential Connections (or ERUs)
					SUB	SEC	TWP	RGE	
24	LAKE TYEE	44970B	A	TNC	SW/SW	27	36	8	1
25	LEISURE TIME-GRANDY CREEK RESORTS	28980T	A	TNC	NW/NE	10	35	7	1
26	LOG HOUSE INN	476726	A	TNC	SE/NW	7	35	11	0
27	MADRONA COMMUNITY, INC	02154L	A	TNC	SW/NW	32	36	1	0
28	MARBLEMOUNT RANGER STATION	NP6006	A	TNC	NW/NE	12	35	10	7
29	MCHAVEN INC	44357N	A	TNC	NE/SW	30	33	5	0
30	MILLER, HOWARD/STEELHEAD PARK	839750	A	TNC	NW/NE	35	35	9	0
31	OYSTER BAR, THE	651859	A	TNC	NW/NW	16	36	3	0
32	OYSTER CREEK INN	65189B	A	TNC	SW/SW	9	35	3	1
33	PIT STOP BAR & GRILL	353988	A	TNC	NE/NE	7	35	4	0
34	POTLATCH BEACH-DIVISION II	69036M	A	TNC	SW/NW	35	36	1	16
35	ROCKPORT STATE PARK	SP740H	A	TNC	SW/SE	27	35	5	1
36	SHAKE MILL CAFE	042222	A	TNC	NW/NW	13	35	10	0
37	SKAGIT RIVER RESORT, LLC	13344P	A	TNC	NW/NE	23	35	10	0
38	SKAGIT SPEEDWAYS, INC	07264A	A	TNC	SW/SW	29	36	4	0
39	STRELL'S WEST BEACH TRACTS	00853V	A	TNC	NE/NW	2	35	1	0
40	TAYLOR SHELLFISH FARMS	73420E	A	TNC	NE/NW	16	36	3	0
41	THOUSAND TRAILS - LA CONNER	00439X	A	TNC	SW/NW	27	34	2	0
42	THOUSAND TRAILS PHASE 2- MT VERNON	88123Y	A	TNC	NW/SE	30	36	4	47
43	THOUSAND TRAILS PHASE I- MT VERNON	88124F	A	TNC	SE/NE	30	36	4	0
44	WALLA WALLA COLLEGE MARINE STATION	924800	A	TNC	SE/NE	2	34	12	0
45	WILDERNESS VILLAGE TRAILER PARK	968753	A	TNC	SW/NE	22	35	10	0

[1] Not required to have a Water System Plan. See Exhibit 3-2 for location of System.

[2] DOH Public Water System ID number.

[3] TNC means Transient/Non-Community System.

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Table 3-3
Skagit County Non-Expanding Community Systems
See Exhibit 3-2

No.	PWS-Name	PWS ID#	Group	Type	Location				Approved Proved # of Residential Connections (or ERUs)
					SUB	SEC	TWP	RANGE	
1	BIG LAKE WATER ASSN.	067009	A	COMM	SE/SW	25	34	4	70
2	BLANCHARD EDISON WATER ASSOCIATION	74508	A	COMM	SE/SW	35	36	3	438
3	COLONY MOUNTAIN	14069F	A	COMM	NW/NW	26	36	3	83
4	DOUBLE CREEK WATER ASSOCIATION	56951H	A	COMM	SW/NW	33	36	4	6
5	EAGLE VALLEY WATER SYSTEM	022178	A	COMM	NW/NW	31	36	5	51
6	HEADQUARTERS WATER ASSOC INC	32050H	A	COMM	SW/SW	22	33	4	0
7	POTLATCH BEACH WATER ASSOCIATION	69034L	A	COMM	SE/SE	35	36	1	30
8	PRAIRIE ACRES WATER SYSTEM	69157T	A	COMM	SW/NW	25	36	4	48
9	PRAIRIE ESTATES WATER SYSTEM	30984C	A	COMM	NW/SE	26	36	4	19
10	PRESSENTIN CREEK WILDERNESS	69273C	A	COMM	NE/NE	24	35	7	55
11	RIVER LANE COMMUNITY CLUB INC	72773L	A	COMM	NE/SE	9	35	8	21
12	ROLF BRUUN WATER SYSTEM	08915H	A	COMM	NE/SE	32	33	4	14
13	SAMISH ISLAND WATER CO	75650L	A	COMM	SE/SE	26	36	2	0
14	SAMISH RIVER PARK, INC.	756704	A	COMM	NE/NW	7	35	4	87
15	SAUK MOUNTAIN ESTATES W.A.	170495	A	COMM	SE/NW	27	35	9	24
16	SAUK-SUIATTLE COMMUNITY	IH731W	A	COMM	SW/NW	29	33	10	20
17	SECRET HARBOR SCHOOL	77200X	A	COMM	SW/NW	4	35	1	0
18	SHANGRI LA COMMUNITY CLUB	77846U	A	COMM	SE/SW	13	35	6	58
19	SHELTER BAY COMMUNITY INC	78155Q	A	COMM	SW/NE	2	33	2	911
20	SNEE-OOSH LAND CO	808009	A	COMM	NW/SE	27	34	2	77
21	SUNSET WEST WATER ASSOC	86205F	A	COMM	NW/NE	15	34	1	39
22	TIMBERLINE TRAVELERS PARK	88398L	A	COMM	SE/NW	11	35	7	35
23	VALLEY VIEW ESTATES WATER ASSN	90993A	A	COMM	SE/NW	9	35	4	50
24	WILDLIFE ACRES WATER ASSOCIATION	96882T	A	COMM	NE/NE	33	36	4	20

Table 3-4
Skagit County Group B Systems
See Exhibit 3-2

No.	PWS-Name	PWS ID#	Location				Approved # of Residential Connections (or ERUs)
			SUB	SEC	TWP	RANGE	
1	ALBERTS SERVE U GROCERY	16481H	SW/NE	9	8	35	0
2	ALVERSON TRACT OWNERS ASSOC.	646429	NE/NW	36	36	1	0
3	ANDALS CUSTOM MEATS	18161Q	SW/SW	33	34	4	3
4	AVERY LANE WATER SYSTEM	02013X	NE/NE	14	35	4	5
5	BACUS ROAD #1	64327Y	SW/NW	12	35	5	9
6	BAKER LAKE SHELL & GROCERY	42382Q	NW/NW	15	35	7	2
7	BAKER RIVER WORK CENTER	FS0269	SE/NW	12	35	7	0
8	BAY VIEW HOME ASSOCIATION	06428J	NW/NE	31	35	3	0
9	BERRY S/P WATER ASSOCIATION	01376B	NW/SE	13	36	3	5
10	BIG LAKE	23634V	SW/SW	36	34	4	10
11	BIZ POINT WATER SYSTEM	400278	NW/NE	15	34	1	0
12	BONNIE ACRES WATER ASSOCIATION	00382F	NW/SW	14	34	1	11
13	BRIDGEWATER WATER SYSTEM	011763	SE/NE	2	35	4	3
14	CAB IN THE WOODS, A	980587	NW/SW	23	35	10	0
15	CAMPBELL LAKE COMMUNITY WELL	012556	SW/NW	18	34	2	0
16	CASCADE MOUNTAIN INN	24794L	SE/SW	11	35	7	2
17	CASCADIAN HOME FARM WATER SYSTEM	02722K	NE/SE	20	35	10	0
18	CEDARDALE APARTMENTS	12030X	NW/NW	8	33	4	0
19	CONCORD LANE COMMUNITY ASSOCIATION	00033A	SW/SW	12	35	4	0
20	COTTONTAIL WATER SYSTEM	01493E	SE/SE	32	36	4	4
21	DALSEG, RALPH	18201A	SW/NE	20	33	4	2
22	DAY CREEK CHAPEL	04447D	NE/SW	29	35	6	0
23	DAY CREEK STORE	04448X	NE/NW	29	35	6	0
24	DEANES LAKE ERIE WATER SYSTEM	026630	SW/NE	11	34	1	0

Table 3-4 (Cont)
Skagit County Group B Systems
See Exhibit 3-2

No.	PWS-Name	PWS ID#	Location				Approved # of Residential Connections (or ERUs)
			SUB	SEC	TWP	RANGE	
25	DRIFTWOOD SHORES WATER SYSTEM	19960A	NW/SW	2	35	1	0
26	DUNTON H COMMUNITY WATER SUPPLY	20472D	NW/SW	12	34	1	0
27	EAGLES NEST	06603P	SW/SE	35	34	2	26
28	EAST NORTH BEACH COMM. WATER ASSN.	21351A	SW/NW	36	36	1	0
29	ERWIN WATER SYSTEM	013853	NE/NE	15	34	1	4
30	FINNEY CREEK GIRL SCOUT CAMP	251243	NW/SE	13	25	7	0
31	FROSTY WATER ASSOCIATION	87944Y	SW/NW	16	33	4	8
32	FUN-ON-THE FARM WATER SYSTEM	003769	NE/SE	5	36	4	2
33	GREEN CLIFFS ASSOCIATION, INC	11491E	NE/NW	15	34	1	5
34	GUEMES SEAVIEW WATER SYSTEM	02164V	SE/SE	36	36	1	5
35	GUEMES WATER ASSN (526-38)	593761	SE/NW	2	35	1	10
36	HATHWATER WELL	03196Q	SE/SW	18	36	5	3
37	HIDDEN COVE WATER SYSTEM	44401D	NE/NW	16	35	8	0
38	HILLSIDE MOTEL	33248P	SE/SE	18	33	4	0
39	HINEGARDNER - VERNER WATER SYSTEM	02452Y	SE/NE	11	35	4	2
40	HOPE ISLAND WATER ASSOCIATION	34215E	NE/NE	34	34	2	0
41	HUMPHREY HILL WATER SYSTEM	06021D	SW/SE	29	36	4	6
42	IDA ESTATES WATER SYSTEM	013159	SE/SE	10	35	4	7
43	KING GEORGE WATER SYSTEM	00118H	SW/SE	36	34	4	0
44	KOVAC'S	10747K	NE/NW	6	35	4	0
45	KWONESUM WATER SYSTEM	61426C	SW/SW	24	34	2	9
46	LAKE CAMPBELL ADULT FAMILY HOME	30977N	NE/SE	12	34	1	0
47	LAKE CAVANAUGH FIRE DISTRICT NO 7	024458	NW/NW	36	33	6	0

Table 3-4 (Cont)

Skagit County Group B Systems

See Exhibit 3-2

No.	PWS-Name	PWS ID#	Location				Approved # of Residential Connections (or ERUs)
			SUB	SEC	TWP	RANGE	
48	LAKE CAVANAUGH MOUNTAIN MARKET	437007	NW/NW	36	33	6	0
49	LAKE MCMURRAY STORE	00569U	NW/SE	25	33	4	0
50	LAKE TERRACE WATER ASSN	00542P	SE/NE	35	34	4	8
51	LEROY ANDERSON	02353B	NE/NE	34	34	2	0
52	LOWER CEDARDALE WATER CO	48700J	SW/SW	2	33	4	0
53	LUNZ RESORT	48929Y	NE/NW	18	34	2	0
54	MARBLE MOUNT SALMON HATCHERY	79516T	SW/NW	17	35	11	0
55	MARBLEMOUNT COMMUNITY CLUB	031303	SE/SW	1	35	11	0
56	MATSON ROAD WATER SYSTEM	04338J	NW/SE	26	36	4	2
57	MEMORY LANE WATER ASSOCIATION #2	05929M	NE/NE	16	35	7	6
58	MEMORY LANE WATER SYSTEM	017210	NE/NW	16	35	7	6
59	MORGAN MEATS INC	27080K	SE/SW	21	35	4	0
60	MOUNTAIN VIEW SUBDIVISION	03774Y	SW/NW	26	34	4	14
61	NORTH BEACH WATER ASSOCIATION	007461	SW/NE	36	36	1	0
62	NORTH BEACH WATER CO	600006	SE/SW	25	36	2	0
63	OCEAN ACRES INCORPORATED	62846F	SW/NW	11	35	1	0
64	OCEAN VIEW PLACE	64701V	NW/NW	2	34	1	0
65	PICHA WATER SYSTEM	02166W	NE/NE	27	35	3	2
66	R. J. HIDEAWAY	07245A	SW/SE	12	35	10	0
67	REEF POINT COMMUNITY WELL	71694E	NW/NW	27	34	2	0
68	ROSARIO BEACH APARTMENTS	00134Y	SE/NE	22	34	1	0
69	ROUTON WATER SYSTEM	52931Q	SE/SE	7	36	4	0
70	SAMISH STATE SALMON HATCHERY	75677Q	NW/NW	32	36	4	0
71	SAUK RIVER CHRISTIAN CAMP	76452E	SE/SE	18	33	10	0

Table 3-4 (Cont)

Skagit County Group B Systems

See Exhibit 3-2

No.	PWS-Name	PWS ID#	Location				Approved # of Residential Connections (or ERUs)
			SUB	SEC	TWP	RANGE	
72	SAUK STORE ROAD SYSTEM	76453Y	NE/SW	21	35	9	0
73	SEAWAY HOLLOW ASSOCIATION	77160B	SW/SW	31	36	2	0
74	SHELLY-RAMERMAN	03188H	SW/SE	15	34	1	4
75	SJOBOEN WATER SYSTEM	79447Y	NE/NE	19	35	9	0
76	SKAGIT CONSERVATION ASSOCIATION	484762	SE/NE	11	33	4	0
77	SKAGIT HOME PARK WATER SYSTEM	795072	NE/NE	16	35	8	0
78	SKAGIT VALLEY GRANGE #620	79527K	SE/NE	22	35	4	0
79	SKELTON, CLIFF WATER SYSTEM	043669	SE/SE	16	34	2	0
80	SPRING WATER WATER SYSTEM	83360C	SW/NE	13	35	7	0
81	SUNNY SLOPE WATER SYSTEM	853400	SW/SW	27	34	2	0
82	SWANSON LANE WATER SYSTEM	661017	SW/SE	31	33	4	0
83	SWINOMISH SNEE-OOSH N. SATELLITE	IH017K	SE/SE	16	34	2	8
84	TAGGART QUARRY WATER SYSTEM	06424F	NW/SE	13	34	1	6
85	THIBERT'S CRAB MARKET, INC.	144334	NE/SE	4	34	2	0
86	THOMAS CREEK	53553U	SE/SE	2	35	4	14
87	TOTEM GIRL SCOUT COUNCIL CAMP	88866E	NW/SE	13	25	7	0
88	TOTEM TRAIL CAFE	88880V	SW/NE	22	35	10	0
89	WAGON WHEEL MOTEL	92067K	SE/NE	35	34	2	0
90	WEST BEACH WATER ASSOCIATION	02034Y	SW/NE	2	35	1	0
91	WILD FERN	10969C	NE/SW	21	35	9	0
92	WILDWOOD LANE CORP	96885B	SE/SW	2	34	1	0
93	WSP - BOW HILL PORT OF ENTRY #33	50678V	NW/NW	7	35	4	0

Key to Exhibit 3-2

PWS ID	PWS-NAME
00033A	CONCORD LANE COMMUNITY ASSOCIATION
00118H	KING GEORGE WATER SYSTEM
00134Y	ROSARIO BEACH APARTMENTS
003769	FUN-ON-THE FARM WATER SYSTEM
00382F	BONNIE ACRES WATER ASSOCIATION
00439X	THOUSAND TRAILS - LA CONNER
00542P	LAKE TERRACE WATER ASSN
00569U	LAKE MCMURRAY STORE
007461	NORTH BEACH WATER ASSOCIATION
00853V	STRELL'S WEST BEACH TRACTS
00952F	AVALON LINKS GOLF CLUB
011763	BRIDGEWATER WATER SYSTEM
012556	CAMPBELL LAKE COMMUNITY WELL
013159	IDA ESTATES WATER SYSTEM
01376B	BERRY S/P WATER ASSOCIATION
013853	ERWIN WATER SYSTEM
01421L	EAGLE COUNTRY STORE
01493E	COTTONTAIL WATER SYSTEM
017210	MEMORY LANE WATER SYSTEM
02013X	AVERY LANE WATER SYSTEM
02034Y	WEST BEACH WATER ASSOCIATION
02154L	MADRONA COMMUNITY, INC
02164V	GUEMES SEAVIEW WATER SYSTEM
02166W	PICHA WATER SYSTEM
022178	EAGLE VALLEY WATER SYSTEM
02353B	LEROY ANDERSON
024458	LAKE CAVANAUGH FIRE DISTRICT NO 7
02452Y	HINEGARDNER - VERNER WATER SYSTEM
026630	DEANES LAKE ERIE WATER SYSTEM
02722K	CASCADIAN HOME FARM WATER SYSTEM
031303	MARBLEMOUNT COMMUNITY CLUB
03188H	SHELLY-RAMERMAN
03196Q	HATHWATER WELL
03774Y	MOUNTAIN VIEW SUBDIVISION
042222	SHAKE MILL CAFE
04338J	MATSON ROAD WATER SYSTEM
043669	SKELTON, CLIFF WATER SYSTEM
04447D	DAY CREEK CHAPEL
04448X	DAY CREEK STORE
05929M	MEMORY LANE WATER ASSOCIATION #2
06021D	HUMPHREY HILL WATER SYSTEM
06424F	TAGGART QUARRY WATER SYSTEM
06428J	BAY VIEW HOME ASSOCIATION

PWS ID	PWS-NAME
065022	ANDERSON FEED & GRAIN
06603P	EAGLES NEST
066047	LAKE MCMURRAY RECREATION RESORT
067009	BIG LAKE WATER ASSN.
071456	GRANDY CREEK GROCERY
07245A	R. J. HIDEAWAY
07264A	SKAGIT SPEEDWAYS, INC
08915H	ROLF BRUUN WATER SYSTEM
09535K	BURLINGTON KOA
10747K	KOVAC'S
10824M	CAMP BROTHERHOOD INC
10969C	WILD FERN
11491E	GREEN CLIFFS ASSOCIATION, INC
12030X	CEDARDALE APARTMENTS
12924W	DJ'S TEXACO
12954N	CHUCKANUT MANOR RESTAURANT
12971M	CHURCH OF GOD OF PROPHECY
13344P	SKAGIT RIVER RESORT, LLC
14069F	COLONY MOUNTAIN
144334	THIBERT'S CRAB MARKET, INC.
16481H	ALBERTS SERVE U GROCERY
16624R	BREAZEALE INTERPRETIVE CENTER
170495	SAUK MOUNTAIN ESTATES W.A.
18161Q	ANDALS CUSTOM MEATS
18201A	DALSEG, RALPH
19960A	DRIFTWOOD SHORES WATER SYSTEM
20472D	DUNTON H COMMUNITY WATER SUPPLY
21351A	EAST NORTH BEACH COMM. WATER ASSN.
23634V	BIG LAKE
24794L	CASCADE MOUNTAIN INN
251243	FINNEY CREEK GIRL SCOUT CAMP
25155C	FIRE MT SCOUT RESERVATION
27080K	MORGAN MEATS INC
289775	CREEKSIDE CAMPING
28980T	LEISURE TIME-GRANDY CREEK RESORTS
30110F	GUEMES ISLAND RESORT INC
30977N	LAKE CAMPBELL ADULT FAMILY HOME
30984C	PRAIRIE ESTATES WATER SYSTEM
32050H	HEADQUARTERS WATER ASSOC INC
33248P	HILLSIDE MOTEL
34215E	HOPE ISLAND WATER ASSOCIATION
353988	PIT STOP BAR & GRILL
400278	BIZ POINT WATER SYSTEM

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Key to Exhibit 3-2 (Cont)

PWS ID	PWS-NAME
42382Q	BAKER LAKE SHELL & GROCERY
437007	LAKE CAVANAUGH MOUNTAIN MARKET
43886H	LAKE ERIE TRAILER PARK
44357N	MCHAVEN INC
44401D	HIDDEN COVE WATER SYSTEM
44970B	LAKE TYEE
476726	LOG HOUSE INN
484762	SKAGIT CONSERVATION ASSOCIATION
48700J	LOWER CEDARDALE WATER CO
48929Y	LUNZ RESORT
50678V	WSP - BOW HILL PORT OF ENTRY #33
52931Q	ROUTON WATER SYSTEM
53553U	THOMAS CREEK
567853	BUFFALO RUN RESTAURANT
56951H	DOUBLE CREEK WATER ASSOCIATION
593761	GUEMES WATER ASSN (526-38)
600006	NORTH BEACH WATER CO
61426C	KWONESUM WATER SYSTEM
62846F	OCEAN ACRES INCORPORATED
64327Y	BACUS ROAD #1
646429	ALVERSON TRACT OWNERS ASSOC.
64701V	OCEAN VIEW PLACE
651859	OYSTER BAR, THE
65189B	OYSTER CREEK INN
66025N	ALGER FOOD MART
661017	SWANSON LANE WATER SYSTEM
69034L	POTLATCH BEACH WATER ASSOCIATION
69036M	POTLATCH BEACH-DIVISION II
69157T	PRAIRIE ACRES WATER SYSTEM
69273C	PRESSENTIN CREEK WILDERNESS
71694E	REEF POINT COMMUNITY WELL
72773L	RIVER LANE COMMUNITY CLUB INC
73420E	TAYLOR SHELLFISH FARMS
736808	GOOD FOOD DRIVE IN WATER SYSTEM
745080	BLANCHARD EDISON WATER ASSOCIATION
75648F	SAMISH GRADE SCHOOL
75650L	SAMISH ISLAND WATER CO
756704	SAMISH RIVER PARK, INC.
75677Q	SAMISH STATE SALMON HATCHERY
76452E	SAUK RIVER CHRISTIAN CAMP
76453Y	SAUK STORE ROAD SYSTEM
768500	CROWN PACIFIC LTD
77160B	SEAWAY HOLLOW ASSOCIATION
77200X	SECRET HARBOR SCHOOL
77846U	SHANGRI LA COMMUNITY CLUB
780501	TESARO REFINING CO

PWS ID	PWS-NAME
78155Q	SHELTER BAY COMMUNITY INC
79447Y	SJOBOEN WATER SYSTEM
795072	SKAGIT HOME PARK WATER SYSTEM
79516T	MARBLE MOUNT SALMON HATCHERY
79527K	SKAGIT VALLEY GRANGE #620
808009	SNEE-OOSH LAND CO
83360C	SPRING WATER WATER SYSTEM
839750	MILLER, HOWARD/STEELHEAD PARK
853400	SUNNY SLOPE WATER SYSTEM
86205F	SUNSET WEST WATER ASSOC
87650R	EUILON, INC
87944Y	FROSTY WATER ASSOCIATION
88123Y	THOUSAND TRAILS PHASE 2- MT VERNON
88124F	THOUSAND TRAILS PHASE I- MT VERNON
88398L	TIMBERLINE TRAVELERS PARK
88866E	TOTEM GIRL SCOUT COUNCIL CAMP
88880V	TOTEM TRAIL CAFE
90993A	VALLEY VIEW ESTATES WATER ASSN
92067K	WAGON WHEEL MOTEL
924800	WALLA WALLA COLLEGE MARINE STATION
968753	WILDERNESS VILLAGE TRAILER PARK
96882T	WILDLIFE ACRES WATER ASSOCIATION
96885B	WILDWOOD LANE CORP
980587	CAB IN THE WOODS, A
FS0269	BAKER RIVER WORK CENTER
IH017K	SWINOMISH SNEE-OOSH N. SATELLITE
IH731W	SAUK-SUIATTLE COMMUNITY
NP6006	MARBLEMOUNT RANGER STATION
SP2145	DECEPTION PASS SP - ROSARIO BEACH
SP740H	ROCKPORT STATE PARK

Section 4
Minimum Design Standards

4.1 Introduction

This Section of the Coordinated Water System Plan (CWSP) provides a set of minimum design and performance specifications for new water utilities and for all existing utilities planning to install capital facilities for expansion purposes in the Skagit County Critical Water Supply Service Area (CWSSA). Municipalities are included in this definition with respect to service outside their corporate limits.

In Subsection 4.3, the application of these minimum design standards for water utility planning and construction is set forth. The design standards themselves are described in Subsection 4.5 *General Provisions*, identifying laws, regulations and standard specifications which are applicable unless otherwise superseded; and Subsection 4.6 *Specific Provisions*, detailing specific design standards adopted by the Water Utility Coordinating Committee (WUCC) of Skagit County (County).

The Public Water Systems Coordination Act and the procedures outlined in the CWSP apply uniformly to all public water supply systems in Skagit County as they relate to design standards in the unincorporated area, and other administrative procedures. These standards do not supersede any other legally constituted and applicable standards that are more stringent.

4.2 Purpose

The purpose of these standards is to set a base level of utility planning, design, and construction for public water utilities. This base level must provide for development at a level of service consistent with adopted land use plans and ordinances of the agencies with jurisdiction.

Subject to certain exceptions contained in the Public Water System Coordination Act, each utility, including municipalities, is to adopt design standards as a part of its water system plan (WSP). It is intended that a utility may adopt the minimum design standards described herein or may adopt higher standards, provided such standards are not inconsistent with applicable land use plans.

The design of facilities for the expansion of an existing system or establishment of a new system, including Group B systems, must be reviewed and approved by either the Skagit County Health Department (SCHD) or State Department of Health (DOH) before any construction begins. This review and approval will be based upon

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the minimum standards identified herein, unless the utility has adopted more stringent standards that are not inconsistent with applicable comprehensive plans.

Following completion of the CWSP, all expanding Group A Water Systems (see Table 3-1) must update their WSPs to be consistent with this CWSP. The documentation must include the documents listed below.

To conduct the system review process, DOH and SCHD require the documentation shown on Table 4-1 to be on file:

Table 4-1
System Review Process Required Documentation

System Designation	Required Documentation on File With DOH
Group A Water Systems	***(See Exhibit 1-1 and 3-1)***
Large and Expanding Systems	DOH Operating Permit and Approved Water System Program including CIP/CFP
Non-Expanding Systems	DOH Operating Permit, Small Water Management Program, and CIP/CFP
Group B Water Systems	***(See Exhibit 1-1 and Appendix E)***
Existing Systems	Approval Status and Water Facilities Inventory
New Systems	Completed Group B Workbook and Satellite System Management Agreement (if applicable)

4.3 Application of Standards - Priority and Ranking

These standards are set forth to ensure a sufficient quantity and quality of water is provided to ensure public health, and sufficient flow is available for public safety in areas of the County where fire protection is specified. Plans for expansion must be consistent with other County and water supplier adopted land use plans and WSPs, as generally outlined below.

The following list of policies and plans (Table 4-2) is intended to reflect the priority or ranking of authority. For example, the Skagit County County-wide Planning Policies establish the overall objective or policy. Number 4, or Water System Plans, must be consistent with, or help implement, the Planning Policies.

Table 4-2
Policy and Plans Priority and Ranking

Planning Documents	Purpose
1. Skagit County Countywide Planning Policies	Land use planning and policy
2. Skagit County, City, and Town Comprehensive Plans	Land use planning and policy
3. Skagit County Coordinated Water Supply Plan (CWSP)	County wide functional water supply plan
4. Water System Plan (WSP) (or Completed Group B Workbook)	Individual water system plan
5. Capital Improvement Plan (CIP) for 6, 10, and 20-Year Planning Horizon	Capital Facilities Plan (CFP)/Capital Improvement Plan (CIP)
6. System Annual CFP/CIP (Update to #4)	Annual CFP/ Budget
7. Modified CFP/CIP (Special Project Modification)	Modified CFP/Budget

4.3.1 Definition of Expansion and In-Fill

For purposes of application of the design standards presented herein, "expansion of service" is defined as systems requiring upgrades to source of supply, storage, and/or the distribution system (including extension of mains) to provide new water service and meet health and fire flow demands. Additional service is considered "in-fill" when service can be met without upgrades to the existing source of supply, storage, and/or the distribution system. Repair of existing systems shall not be considered expansion.

4.3.2 Urban Growth Areas

The minimum design standards described herein shall apply to all Urban Growth Areas (UGAs). The water utility/purveyor may adopt design standards that at least meet or exceed those standards prescribed herein so long as not inconsistent with applicable comprehensive plans.

4.3.3 Non-Urban Growth Areas

Water systems in non-UGAs of the County are required to meet or exceed these minimum standards. System design criteria shall be based on land use plans for the area being served. The system must also meet the water system hydraulic requirements and DOH requirements.

4.3.4 Existing System Conformance with Minimum Standards

Existing water systems are not required to utilize these minimum standards for connection of new retail customers to existing mains (in-fill) or for repair/replacement of facilities so long as no expansion of service area is

involved. However, when in-fill development is such that demand exceeds the water system's ability to meet quantity, quality, and pressure requirements, the necessary upgrades to the system shall meet these minimum standards. When existing facilities must be repaired or replaced to serve an expanded service area, all new construction shall meet these minimum standards.

4.3.5 Interpretation of Standards

Where two sets of standards may apply, the most stringent standard shall prevail, provided standards are not inconsistent with applicable comprehensive plans. In the event that a lesser or alternative standard is proposed by local fire officials, water system, or local government, the alternative interpretation of the minimum standards shall be in writing and limited to items for which the agency has legal jurisdiction (i.e., interpretation of fire flow). In the event that an alternative interpretation of the minimum standards is applied, the liability for the variance lies with the approving agency.

4.3.6 Indian Tribes

As noted in Section 2, there is a legal question as to whether the State laws governing the CWSP process apply to non-Indian owned fee lands within Indian reservations and activities thereon. Therefore, the standards contained herein are recommended for all systems, but they might not be binding upon public water systems serving reservation fee lands or trust lands within the reservation.

As is the case regarding existing non-expanding water systems, Tribes are encouraged to adopt the standards contained herein or develop more stringent standards. Such action will enhance the goal of achieving consistency and uniformity in system design and construction throughout the CWSSA.

4.3.7 Water System Plans and Applicable Land Use Plans

New and expanding utilities shall meet water system planning requirements using land use designations as prescribed by the government with land use authority and/or jurisdiction. Such designations shall be identified in the utility's WSP, and shall be used to establish design requirements. The sequence outlined in Section 4.2 should be followed.

The utility shall prepare a WSP and a program of capital improvements required to provide the anticipated level of service within their designated water service area, consistent with the land use plan. When the utility is

requested to provide water service, it will identify that portion of planned capital facilities as well as other installations necessary to provide the service requested consistent with applicable land use plans and development ordinances. In such cases, the utility and developer may reach an agreement to provide the desired service through a schedule of improvements, which is specified by a legally binding contract.

A phased development plan shall be developed as provided in Subsection 4.3.8. The plan shall be consistent with applicable County and city ordinances and codes in effect for the utility and future capital requirements needed for the development at its maximum potential densities as designated by the applicable general purpose government. A phased development plan shall depict the capital facilities for phased construction and their conformance with these standards.

Once a water utility's plan is approved, the utility should coordinate with its land use planning agency with jurisdiction regarding any proposed land use changes which impact the required level of water service. The water service related cost of said impacts, as determined by the utility, should be fully considered by the planning agency in acting on the proposed land use change.

4.3.8 Phased Development

If water service is requested of a utility in an area where only limited service is currently provided, the cost of installing all facilities at once in order to meet the desired level of service may be prohibitive. In this case, the utility and developer may reach an agreement to provide the desired service through a schedule of improvements over a reasonable period of time consistent with applicable land use plans and development ordinances. This phased development plan must be approved by the County and the purveyor for service in unincorporated areas, the city agency with jurisdiction within corporate limits, the County and the city agency with jurisdiction within UGAs, and must be consistent with the approved water comprehensive plan of the utility. A phased development plan must meet the requirements of County-wide Regional Policy 12.5 as implemented in comprehensive plans and development regulations.

A phased development plan shall be applicable when the following conditions are met:

(1) The written agreement between the utility and developer setting forth the phased development plan is submitted and approved prior to issuing a development permit (subdivision, plat, short plat, etc.). The plan must identify the water service level to be initially provided, projected growth expected in the new service area, additional capital

facilities required, a schedule of construction, and eventual level of service to be provided. The phased construction schedule must provide for compliance with design standards in a reasonable period of time and consistent with applicable land use plans and development ordinances.

(2) If the proposed new service is within the utility's designated service area, the utility shall have an approved comprehensive plan. If the new service is proposed outside of a designated service area, or if it is to be developed by a Satellite Management Agency (SMA), the utility or SMA shall submit an amendment to its comprehensive plan which addresses the needs of the new service area.

(3) All water mains and other permanent facilities installed during the phased development period shall be in accordance with the eventual system design identified in the utility's plan.

If land use changes occur, or if growth does not occur as anticipated, the utility may submit a revised plan, which identifies the reasons for relief from the original plan and a fixed date for compliance to be achieved.

4.4 Standards Incorporated By Reference

The existing standards listed below, or as may be modified by the appropriate authorities, are hereby incorporated by reference. Priority for application of these standards is in the order listed, but the most stringent applies. These standards will apply to water system design, installation, modification, and operation.

- ❑ Rules and Regulations of the State Board of Health Regarding Public Water Systems.
- ❑ Applicable State, County, or city rules, regulations, ordinances, and standards.
- ❑ Standards of the American Water Works Association (AWWA).
- ❑ Recommended Standards for Water Works (aka Ten States Standards)
- ❑ Standard Specifications for Road, Bridge, and Municipal Construction, as published by the Washington State Department of Transportation/ American Public Works Association (DOT/APWA), latest edition.

4.5 General Provisions

4.5.1 Source Development

New and previously unapproved sources must be designed to meet the Departments of Ecology (Ecology) and DOH regulations and design guidelines. These include Chapter 173-160 WAC, "Minimum Standards for Construction and Maintenance of Water Wells," as administered by Ecology, and Chapter 246-290 and 246-291 WAC, "Drinking Water Regulations of the State Board of Health," as administered by DOH.

All test and production wells must be drilled in accordance with detailed drilling and testing specifications, which have either been prepared by, or received prior approval, of the utility.

4.5.2 Water Rights

Water rights must be obtained in accordance with Ecology regulations and procedures. Copies of water rights documents, correspondence, and other records are to be maintained on file with the purveyor.

4.5.3 Water Quality

Water quality must be proven to conform with the federal Safe Drinking Water Act (as amended), DOH criteria specified in Chapter 246-290 and 246-291 WAC, and/or any additional requirements more stringently applied by the local health department. Each utility may reserve the right to reject any source whose raw water quality does not meet these criteria.

4.5.4 General Construction Standards

Selection of materials and construction of water system facilities in the Skagit County CWSSA shall conform to the provisions of Subsection 4, with the additional provisions:

(1) All owners/operators of water systems which have lines in County roads rights-of-way must comply with franchise requirements outlined in ordinances passed by the Board of County Commissioners authorizing such use of the road and rights-of-way.

(2) Construction within incorporated areas remains subject to municipal permitting requirements.

(3) All projects requiring design by a registered professional engineer shall be inspected by the utility or its designated representative before closure of any excavation.

4.5.5 Hydrostatic Pressure Test

A hydrostatic pressure leakage test will be conducted on all newly constructed water mains, fire lines, fire hydrant leads and stubouts in accordance with DOT/APWA Section 7-11.3(11) or AWWA C-600 specifications, unless specified otherwise by the designated utility.

4.5.6 Disinfection and Bacteriological Testing

All pipe, reservoirs, and appurtenances shall be flushed and disinfected in accordance with the standards of DOH, AWWA C651-86 and C652-86, or DOT/APWA Section 7-11.3(12), unless specified otherwise by the designated utility.

4.5.7 Utility Interties

Planning for specific locations, size, and alignment of major water lines should consider emergency interties with adjacent water utilities.

4.5.8 Flow Measurement

All Group A service lines shall be installed so that each residential, commercial, and industrial structure will have a separate metered service for domestic water received from the utility. If approved by the designated utility, domestic water consumption may be measured by a master meter for service to a complex, under single ownership, and where water utility line subdivision is impractical. Service lines providing fire flow may be required by the utility to be equipped with a fire detection check valve and/or appropriate cross-connection control devices as required by WAC 246-290-490.

All new groundwater sources for public water supplies shall be provided with an access port for measurement of depth to water, and measuring devices for determining flow rate and total production. Installation of these devices is also recommended for existing groundwater sources. All new sources for which water treatment is included shall be provided with flow measurement.

4.5.9 Cross Connection Control

Where the possibility of contamination of the supply exists, water services shall be equipped with appropriate cross connection control devices in accordance with Chapter 246-291 (Group B) or 246-290 (Group A) WAC. The designated utility and/or the County cross-connection control program shall determine the need, size, kind, and location of the device.

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4.6 Specific Provisions

4.6.1 Pressure Requirement

Water systems shall be designed to maintain a minimum residual pressure of 30 psi at the meter, or property line if there is no meter, under maximum demand flow conditions, excluding fire demand. For water systems requiring fire flow capability, the distribution system shall be designed to provide the required fire flow at a pressure of at least 20-psi at the hydrant during maximum instantaneous demand (MID) conditions (WAC 246-290).

4.6.2 Pipe Sizing and Materials

The minimum pipe diameter for distribution mains shall be 8 inches within UGAs. Minimum main size in non-UGAs will be determined by system hydraulic requirements. Land use activities generally included in these two categories are listed below in Subsection 4.6.12, Fire Flow Requirements. Exceptions to the minimum diameter requirement for sub-areas of the system may be granted by DOH under the following conditions:

(1) Fire flow is not required under current land use, the potential for reclassification of land use to a higher density in the foreseeable future is not anticipated or is remote, and a smaller diameter pipe for sub-areas of the system is justified by hydraulic analysis; or,

(2) A remote system serving four lots or less is to be developed within a designated service area and the designated utility has entered into a water service agreement with the developer which includes provisions for eventual direct connection of the development. Fire protection requirements, if any, must be met during the interim.

Water main size shall be adequate to deliver fire flow and to maintain the pressure requirement defined above. All water mains shall meet applicable engineering and health standards adopted by the State of Washington or the water purveyor, including Chapters 246-290 and 246-293 WAC.

Water mains serving fire hydrants, either as part of new construction or planned phased improvements, shall be not less than 8 inches diameter for a deadend line, nor less than 6 inches diameter if looped. Hydrant leads extending less than 50 feet or across a street shall be of a suitable size to carry the required fire flow, but shall not be less than 6 inches diameter. In a deadend cul-de-sac, normal domestic mains less than 6 inches diameter may be installed from the last hydrant to remaining residences.

All pipe material shall be equal to or greater than AWWA standard specifications unless previously approved by the DOH. All pipe material for new water systems shall be constructed with "lead-free" materials. The lead content for joint compound materials (solder and flux) used for pipe installation shall be less than 0.2 percent in order to be considered "lead-free." The lead content for all installed pipes shall be such that it does not contribute more than 0.011 mg/L to the water.

4.6.3 Isolation Valving

Valving shall be installed in a configuration that permits isolation of lines. A valve is not required for short block lines of less than 100 feet. Valves should be installed at intersections with maximum spacing at 500 feet in commercial, industrial, and multi-family districts, 800 feet in residential districts, and 1/4 mile in arterial mains.

4.6.4 Air and Air-Vacuum Relief Valves

In order to minimize problems associated with air entrainment, the purveyor shall provide for installation of air or combined air-vacuum relief valves at appropriate points of high elevation in the system. In no case shall the installation be such that there is a possibility of back-siphonage into the distribution system.

4.6.5 Blow-off Valves

A blow-off assembly shall be installed on all deadend runs of 200 feet or more, and at designated points of low elevation within the distribution system. The blow-off assembly shall be installed in the utility right-of-way except where an access and construction easement is provided for in writing by the water utility. In no case shall the installation be such that there is a possibility of back-siphonage into the distribution system.

4.6.6 Pressure Reducing Stations

A manifold system shall be installed at pressure reducing stations that provides for a redundant pressure reducing valve, a bypass valve, or other suitable device which assures reliability and continuity of service.

4.6.7 Storage

The sizing of permanent storage facility requirements are based upon five components:

(1) Working Storage, which is the increment of storage contained in the reservoir between the pump on and pump off operating elevations;

(2) Equalizing Storage, required to supplement production from water sources during high demand periods;

(3) Standby Storage, required as backup supply in case the largest source is out of service; and,

(4) Fire Storage, required in order to deliver the level of fire flow service identified in the utility's approved plan (see "Fire Flow Requirements" below) for the required duration.

(5) Dead storage, which is the increment of storage at the bottom of the tank to account for pump protection, silt stops, and meeting minimum pressure requirements.

As a minimum, sizing of storage facilities shall be adequate to provide for equalizing, working, and dead storage plus the larger of standby or fire storage requirements. Equalizing, operating, dead and standby storage volumes shall be determined using "Sizing Guidelines for Public Water Supplies," DOH. Fire storage volumes shall be determined using the fire flow and duration as provided in levels of service requirements of Skagit County or municipal ordinance and the utility's approved plan. Sites providing gravity flow should be considered when siting storage facilities.

4.6.8 General Facility Placement

Below-ground facilities shall be located in accordance with applicable municipal or County ordinance. Where no ordinance applies, water mains shall be installed at a location that is compatible with the existing water system, the terrain, and the location of other utilities. In new subdivisions, wherever practical, water mains should be installed parallel to the centerline on the north or east sides of the street.

In addition, all piping, pumping, source, storage, and other facilities shall be located on public rights-of-way or dedicated utility easements. Utility easements must be a minimum of 15 feet in width, and piping shall be installed no closer than 5 feet from the easement's edge. Exceptions to this minimum easement may be approved by the operating water utility. Unrestricted access shall be provided to all public water system lines and their appurtenances, and public fire hydrants that are maintained by public agencies or utilities.

4.6.9 Pipe Cover

The depth of trenching, installation of pipes, and backfill shall be such as to provide a minimum cover of 30 inches over the top of the pipe for transmission and distribution lines and 24 inches for service piping. Back-filling up to 12 inches over the top of the pipe shall be evenly and carefully

placed. The remaining depth of trench is to be filled in accordance with applicable construction standards identified in General Provision. Materials capable of damaging the pipe or its coating shall be removed from the backfill material.

4.6.10 Water, Sewer Line, and Stormwater Separation Distances

Whenever possible, transmission and distribution water piping shall be separated at least 10 feet horizontally from on-site waste disposal piping, drainfields, and/or wastewater gravity or force mains. The bottom of the water main shall be 18 inches above the top of the sewer. Where local conditions prevent such horizontal and/or vertical separation, closer spacing is permissible where design and construction meet the special requirements of Ecology criteria for Sewage Works Design. Where applicable, consideration should also be given to stormwater piping and the appropriate design criteria applied.

4.6.11 Fire Hydrants

Standard Conditions

All fire hydrants shall comply with standards issued by the Fire Marshal with jurisdiction. Hydrants shall be the dry-barrel type with two hose outlets with inside diameters of 2-1/2 inches and one large pumper outlet with an inside diameter of 4 inches. Small ports shall have national standards threads measuring 3.0625 inches outside diameter at 7-1/2 threads per inch. Pumper ports shall be No. 3 Pacific Coast threads measuring 4.828 inches outside diameter at 6 threads per inch. The operating nut shall be 1-1/4 inch pentagon. When fire protection facilities are to be installed by the developer, the work shall include access roads, serviceable prior to and during the time of construction.

Local fire authorities may require that a 5-inch Stortz fitting be added to the pumper port of new hydrants. Mutual aid response shall be analyzed to insure compatibility. The Fire Marshal is to be informed in writing when such standards are required.

Hydrants shall be set plumb to finished grade with the pumper port facing the street. The lowest outlet should be no less than 16 inches above grade level and with no less than 36 inches of clear area around the hydrant for clearance. View of hydrants shall not be obstructed by any structure or vegetation within a distance of 50 feet in the direction of vehicular approach.

Hydrants located in areas subject to heavy vehicular traffic (other than roadways), such as parking lots or driveways, shall be protected against

damage from collision. The color of all public hydrants shall be determined by the local fire authority in consultation with the water utilities. Location markers for flush hydrants shall carry the same color designation as determined above.

It shall be the installer's responsibility to notify the fire department in writing when a hydrant is available for use. Upon approval of the local fire protection authority and water utility, hydrants shall become the property of the water utility. The location of all valves, fire hydrants, and hydrant designed flow capacity shall be properly and accurately marked on identifiable plans or drawings, one copy of which shall be furnished to the Fire Marshal at the time of inspection.

All fire alarm systems, fire hydrant systems, fire extinguishing systems (including automatic sprinklers), wet and dry standpipes, basement inlet pipes, and other fire protection systems and appurtenances shall meet the approval of the local fire protection authority as to installation and location and shall be subject to periodic tests. Plans and specifications shall be submitted to the local fire protection authority for review and approval prior to construction.

Low Flow/Non-Standard Hydrants (Existing Systems)

It is recognized that some water systems have installed fire hydrants which do not provide fire flow that meets standards. Fire protection connection to these systems can result in negative pressures and possible cross contamination of the system.

Existing water systems, with installed hydrants having a capacity which is below minimum standards, must identify such hydrants by a color coding system to be determined by the Skagit County Fire Chiefs Association.

Maintenance and Testing Responsibilities

During the preparation of the 1993 CWSP, discussions regarding standards for fire hydrants and fire flow involved the WUCC, County Fire Marshal, city and district fire chiefs, attorneys, and the Consultant. One result of these discussions was identification of the need for a maintenance and testing agreement between the fire authorities and the water utilities. Therefore, a model agreement was developed for that purpose. A model agreement is included as Appendix F. The agreement clearly delineates basic responsibilities and should be executed by each utility providing fire flows and the appropriate fire official. Responsibility for individual items should be changed by mutual and written agreement between the utility and fire protection agency.

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4.6.12 Fire Flow Requirements

Water supply facilities for expanding public water systems shall be designed to meet the fire flow objectives set forth below, or additional requirements scheduled by the Fire Marshal with jurisdiction. Fire protection for new structures must meet the requirements identified by the Fire Marshal with jurisdiction. Utilities shall develop their capital improvement program for meeting these objectives in consultation with the appropriate local fire authorities. It is the intent that said program may be scheduled to be phased-in over a specific period considered to be reasonable for the individual circumstances and consistent with applicable land use plans and development ordinances. The program shall be described in the utility's WSP and be subject to DOH approval.

In applying the minimum fire flow standards described in Table 4-3 on the following page, the Uniform Fire Code will take precedence over specified building structure requirements, when site-specific interpretation is required. Also, common standards should be developed for application within County and city designated urban growth management areas. These common standards must equal or exceed the standards described herein.

4.7 Severability

If any provision of these standards or their application is found to be invalid, the remainder of the standards and their implementation are not affected.

Table 4-3
Minimum Fire Flow Design Standards For New And Expanding Water Systems[1]

Land Use Designations Or Densities	Minimum Fire Flow (Gallons Per Minute)	Minimum Duration (Minutes)	Maximum Hydrant Spacing (Feet)
Urban Growth Areas [2]			
Industrial	1500[4]	60	(3)
Commercial	1500 [4]	60	(3)
Multi-Family Residential	1500 [4]	60	500
Single-Family & Duplex Residential	1000	60	500
Non-Urban Growth Areas			
Commercial / Industrial	1500 [4]	60 [4]	(4)
1 Dwelling Unit Per Lot Less Than 2.5 Acres	500 [5]	30 [5]	900 [5]
1 Dwelling Unit Per Lot 2.5 Acres Or Larger	NONE [5]	NONE [5]	NONE [5], [6]
Natural Resource Lands	NONE [5]	NONE [5]	(5), (6)

(1) The design standards may be amended to reflect changes to Comprehensive Plan land use designations and/or their densities. Proposed amendments will be presented to the Skagit County CWSP WUCC for approval.

(2) These criteria establish a minimum water system design standard. Each water system in an urban growth area must comply with the standards of the local government with jurisdiction. When there are different or conflicting standards, the most stringent standard shall apply. Prior to the issuance of a development permit, the approving authority shall establish fire flow, duration and hydrant spacing requirements.

(3) As determined by the appropriate fire official.

(4) Fire flow for individual buildings or groups of buildings is to be determined by the Skagit County Fire Marshal per Uniform Fire Code Appendix IIIA and the Skagit County Fire Marshal policy on fire flow. The application of lesser or alternative standards shall be in accordance with Section 4.3.5 (Interpretation of Standards).

(5) Fire flow will be required for a Conservation and Reserve Development (CaRD) land division as follows.

CaRD Characteristics	Fire Flow Requirement
5 or more lots	Option 1: Fire flow of 500 gpm for 30 minutes with hydrant spacing of 900 ft. or, Option 2: Fire Marshal approved fire prevention water system that provides adequate pressure and flow to support NFPA 13D sprinkler systems is required for all residential dwellings. In addition, if the property is located in an Industrial Forest, Secondary Forest, or Rural Resource designated land the fire protection requirements as listed in Skagit County Code 14.16.850 (6)(b)(iii)(b-e) also apply.
4 or fewer lots	None required, unless the property is located in an Industrial Forest, Secondary Forest, or Rural Resource designated land. If the property is located in such designated land the fire protection requirements as listed in Skagit County Code 14.16.850 (6)(b)(iii)(b-e) apply. However, NFPA 13D sprinklers are only applicable to residential dwellings.

As of the effective date of the CWSP, where in-fill development or extension of an existing water system occurs to serve an existing platted lot, the Skagit County Fire Marshal may limit the requirement for fire flow or fire suppression in accordance with Table 4-1 to the newly developed lot only. Group B public systems may choose to separate the fire flow from water flow. Separate tank and hydrant(s) location is subject to Skagit County Fire Marshal approval.

(6) Hydrants shall be installed when water lines are installed or replaced and are capable of supplying a tanker truck with a minimum of 500 gallons per minute at a minimum residual pressure of 20 psi. Tanker truck filling hydrants are to be located at major roadway intersections and along roads at a spacing not to exceed one mile to assist in fire protection.

Section 5
Utility Service Review Procedure

5.1 Introduction

This Coordinated Water System Plan (CWSP) establishes a set of administrative procedures, water resource policies, and growth objectives for Skagit County (County) water purveyors. The procedures are to guide local officials, citizens, developers, and State and federal regulatory agencies in identifying the necessary facilities for providing an adequate water service.

Provisions of the Public Water System Coordination Act require that no new public water system be established within the Skagit County Critical Water Supply Service Area (CWSSA) unless it is determined that existing purveyors are unable to provide the service, in the manner defined in Section 3.1. Section 4.3 outlines the sequence of steps designed to ensure that the Skagit County County-wide Planning Policies, including the appropriate level of rural or urban water service, is available when development or building occurs. This CWSP is designed to identify the standards and the utility responsible for providing the service.

Therefore, the local government building permit process is the step where local governments should apply a regulatory or control point to ensure that the CWSP and the Skagit County County-wide Planning Policies are consistent. This legislation, in itself, does not preclude the use of wells that meet the County siting criteria as set forth in Chapter 12.48 Skagit County Code (SCC).

This section of the CWSP presents the administrative procedures for reviewing development proposals and associated requests for water service in the unincorporated portion of Skagit County. This review process is for the purpose of identifying existing purveyors who are willing and able to extend this new water service, and to document availability of water supply.

A general philosophy of the CWSP is that water utility service does not dictate growth patterns. On the contrary, land use policies should establish growth trends within the water utility service areas to permit the water utility management program to be responsive to, and provide service commensurate with applicable adopted land use policies.

Water system plans (WSPs) must address the water system facilities required to accommodate growth. This growth is projected to occur within each utility's service area, based on the State Environmental Policy Act (SEPA), the Growth Management Act (GMA), the County-wide Planning Policies for Skagit County, and County and city land-use plans. Capital improvements are planned and

constructed to conform with the anticipated service requirements associated with those plans.

In addition, if an applicant for water service is proposing a land use change, such a change could incur a significant financial burden on the provider of water service. Because water utilities must, of necessity, develop their systems to conform with applicable land use plans, any major change in land use may require substantial system improvements to serve the proposed development. Therefore, additional review procedures will apply to applications which propose a land use change.

5.2 Activities Within City Boundaries

Water service requests within established city limits are not subject to the Utility Service Review Procedure (USRP). Applicants for such water service must contact the city directly. In those cities served by the Public Utility District No. 1 of Skagit County (PUD) (currently Mount Vernon, Burlington, and Sedro Woolley), the request for water service will be referred to the PUD by the appropriate city administrator.

5.3 Activities Within Indian Reservations

As is noted in Section 2, there is legal question as to whether the State laws governing the CWSP process apply to non-Indian owned fee lands within a "Reservation" and activities thereon. It is the position of at least the Swinomish Indian Tribal Community that Tribal Utility Law applies to all lands within the exterior boundaries of its Reservation.

One result of this CWSP is that the areas within the three Indian Reservations are determined to be the exclusive future service areas of the Tribal water systems. However, in the instance of the Swinomish Indian Reservation, a number of existing systems are situated within the exterior boundaries. As set forth in Section 3 (Water Utility Service Areas), the current service areas of existing systems are preserved as their geographical area of responsibility and operation. This condition applies even though, as result of the CWSP, a non-expanding system may be located entirely within the boundaries of a larger system (e.g., a Tribal system).

Since the Swinomish Tribal water system is confirmed in this CWSP as having responsibility for the entire Swinomish Indian Reservation, the following utility service review procedures will apply:

- ❑ New water service within existing systems on the Reservation will be approved only for "in-fill" development consistent with current County, Department of Health (DOH), or Swinomish Tribal Planning Department (STPD) system approval, as applicable.

- ❑ The County will coordinate review of all "in-fill" water service requests with the STPD. The spirit of this coordination will be to seek to assure that new development is consistent with County and Tribal land use policies.

- ❑ Requests for water service for new developments or expansion of existing non-Tribal systems will be referred to the STPD. If service cannot be provided consistent with CWSP and Tribal policies, by extension of the Tribal system, or by a new remote Tribal system, the conditions of the Satellite Management Agency (SMA) program (see Section 6) will apply.

- ❑ The appeal procedure provided for herein will apply to water service issues related to non-Indian lands.

5.4 Utility Service Review Procedure

The USRP identifies the utility in whose designated service area a proposed development lies. It then describes, in order of priority, the available water service options.

Within the USRP process, reference to "service area(s)" means the specific geographical area described in the written agreement required by RCW 90.116.070(1) and WAC 246-293-250(1). The service area boundaries are identified by map in Section 3 of this CWSP and on file with Skagit County Planning and Permit Center (SCPPC) and/or Skagit County Health Department (SCHD). The boundary will include the area within which direct/retail service connection to customers is currently available (existing service area) and the area for which water service is planned (future service area) by the designated utility.

The USRP applies to all development proposals requiring approval by SCPPC. These include building permits and their related prior land use approvals for which either connection to, or a determination of, adequate and potable water is required. Included are related land use approvals that could affect future building permits such as: special use permits, variances, "quasi-judicial" property rezones, shoreline substantial development/conditional use permits, and boundary line adjustments.

At the time an application is submitted for permits or approvals involving water supply, or upon request, the SCPPC will initiate and administer the review procedure. A flow chart of steps to be followed in the USRP is provided as Exhibit 5-1.

The USRP procedures are intended to identify an existing water purveyor willing and able to provide water supply facilities and to include the new development within its service area. Such a determination is subject to the new development complying with the SEPA, GMA, the County-wide Planning Policies for Skagit

County, and County and city land-use plans. In effect, the result of the USRP is to assign the proposed new development or land use to the service area of a designated water utility. In the event that a designated utility is unable or unwilling to provide service, the referral process referenced in subsequent paragraphs is to be followed. The service identified through this process must be consistent with the SEPA, the GMA, the County-wide Planning Policies for Skagit County, and County and city land-use plans as described in Section 3.1.

Pursuant to State law, water service requests occurring within a contested service area or the service area of a utility that has not completed either its individual WSP or its service area agreement may be denied until these issues are resolved. If the affected utilities are unable or unwilling to resolve their service area conflicts, the local legislative authority may attempt to resolve the conflict through procedures established under RCW 70.116.060(5). If the local legislative authority chooses not to act, DOH shall render a determination following appropriate due process.

5.4.1 Review Process for Development Proposals or Water Service Requests in Conformance with Applicable Land Use Plans

When development and associated water service applications conform with land use plans and zoning ordinances, the USRP will generally follow the sequential steps outlined in Exhibit 5-1. This procedure is described by the following:

Responsible Agency

The SCPPC will coordinate review of all development proposals within the unincorporated area of the County. Through this coordination, the SCPPC will be responsible for ensuring the proposal is in conformance with the applicable comprehensive land use plans, zoning code, and utilities' comprehensive water system plans. Upon determination of appropriate land use designation, the SCPPC will review building permit requests for conformance with fire flow requirements adopted in this CWSP.

Individual Residential Developments

The review of proposals for development and use of an individual water supply will be coordinated by the SCPPC in the following manner.

If the proposed development is outside the designated service areas of existing purveyors, the applicant will be required to provide suitable evidence of the availability of an adequate water supply in accordance with SCC 12.48.

Where the proposed development is within the designated service area of an existing utility, the applicant will be notified of that utility. The intent of this referral is to bring the applicant and utility together for a discussion and

examination of the alternative of connecting to the existing public system, provided that the proposed development conforms to the SEPA, the GMA, the County-wide Planning Policies for Skagit County, and County and city land-use plans. Should the utility not be willing or able to provide timely service or the applicant considers the conditions of service to be unreasonable, an individual water system may be developed upon showing of an adequate water supply consistent with SCC 12.48. If agreement is reached, appropriate documentation of the availability of an adequate water supply must be included in the application for building permit as provided in SCC 12.48.

Public Supplies

Where three or more service connections are proposed, the applicant must coordinate the supply needs with an existing utility, as assigned. The SCHD will review the proposed water service request and refer the applicant to a designated utility, adjacent utilities, the PUD, or allow the creation of a new utility, as outlined in the steps below.

Proposed Development Within Designated Service Areas. The applicant will be referred to the designated utility. In response to a request for water service, the utility will give notice of its intent to exercise one of the following options, in order of priority:

- ❑ The designated utility provides service to extended or expanded mains provided by the developer or utility as agreed upon by the parties.

- ❑ The previous SMA approved designated utility approves design of a detached, remote system and upon construction in accordance with said design, owns and operates the system. Design of the system shall be in accordance with the standards and specifications of the designated utility. A contract establishes financial obligations for maintenance, operation, and management until the two systems are connected; or

- ❑ The previous SMA approved designated utility approves design of a detached, remote system and enters into an agreement specifying the operational requirements and financial obligations of the originators of the remote system. The remote system may be operated on a daily basis by an adjacent utility, or a developer/homeowners association under the direction and guidelines of the designated utility. The designated utility retains contractual responsibility for monitoring the water system operation and for water quality. Where the remote system consists of four or fewer connections and requires no fire flow, the designated utility may allow facilities which meet DOH standards

but are less stringent than the CWSP minimum design standards. It is anticipated that these more lenient standards will be utilized primarily when the small system will be absorbed and served by larger facilities planned for future installation by the designated utility; or

- ❑ The designated utility denies the provision of service for reasons other than failure to conform to the requirements of SEPA, GMA, the County-wide Planning Policies for Skagit County, and County and city land-use plans. Thus, the utility relinquishes that portion of its service area pursuant to the service area adjustment provision of Section 3 and service options are further determined through the procedures described below.

Proposed Development in Relinquished Service Areas or Un-Designated Areas. If a designated utility is unwilling or unable to provide service for reasons other than compliance with the SEPA, the GMA, the County-wide Planning Policies for Skagit County, and County and city land use plans or if the development is in an undesignated area, the following will occur:

- ❑ The SCPPC and/or SCHD identifies adjacent purveyors with an approved WSP that provides for expansion and gives them the first option to serve the new development. An existing system shall be considered "adjacent" to the proposed development if service can be provided with a service line extension not to exceed one-half mile in length. If responsibility is accepted, service area boundaries are changed; or

- ❑ If an existing purveyor is unwilling to assume ownership and/or system operational responsibility, the SCPPC and/or SCHD will refer the developer to the PUD for development of a remote/satellite system under ownership and/or management of the PUD.

Review of Contested Issues. Each of the referral steps described above may result in an offer of water service by an existing purveyor under conditions deemed to be unacceptable by the developer. For resolution of such issues, not involving compliance with SEPA, GMA, the County-wide Planning Policies for Skagit County, or County and city land use plans, an appeal process has been established and is described below in Sub-Section 5.5

Within the referral process, authority for creation of a new water system will be granted only in the non-designated area of the County and as a result of the denial of water service by the PUD for economic reasons or the imposition of conditions of service by the PUD that are unacceptable to the developer. The determination that a new system may be created within unincorporated

areas of the County will be by the Skagit County Hearing Examiner and the Skagit Board of County Commissioners. When such issues are associated with development activities within incorporated areas, their resolution will be through the procedures established by the responsible city or town.

Project Review

The proposed project must be reviewed with the assigned utility to identify the engineering, design standards, financial, managerial, and other requirements of service. Fire flow requirements consistent with the CWSP design standards (Section 4) will be determined for the proposed project by the appropriate Fire Marshal. Review by the assigned utility will ensure that the applicant and purveyor have discussed the requirements of both parties.

The utility will provide to the applicant either a satisfactory Public Water System Evaluation or a service connection fee receipt as per SCC 12.48.

Written Contract

After the preliminary plat and applicable land use permits are approved, a written contract should be developed and executed between the utility and applicant to formalize the conditions of service responsibilities. Prior to County approval of final plats or building permits, the water facilities are to be installed to meet the utility's minimum standards.

5.4.2 Review Process for Development Proposals or Water Service Requests Not in Conformance with Applicable Land Use Plans

If a development proposal requires a zoning change or alteration of applicable land use plans, then each affected utility shall be contacted by the SCPPC and allowed to comment on the proposal prior to approval of that change. By identifying new or additional utility costs associated with changes in land use or zoning, these costs of development can be integrated into the decision making process. This will allow the assignment of these costs to customers benefiting from the land use change.

5.5 Appeal Process

It may be expected that issues of protest or interpretation regarding requirements of the CWSP will be raised by either an applicant for a development permit or a utility. For issues related to development activities in the unincorporated area, a two-step appeals process will be established as described below and shown on Exhibit 5-2.

5.5.1 Issues Subject to Appeal and Review

Only water service issues relating to direct retail water services are subject to appeal and review under this process. Issues related to conformance with SEPA, GMA, the County-wide Planning Policies for Skagit County, and County and city land use plans, financing policies, and wholesale agreements are not subject to appeal and review under this process. In most instances, such issues will be identified when the applicant requests a Public Drinking Water System Evaluation from the water utility. Issues subject to review are limited to the following:

(1) Interpretation and application of water utility service area boundaries.

(2) Proposed schedule for providing service.

(3) Conditions of service, excluding published rates and fees.

(4) Design standards more stringent than the standards included in Section 4.

5.5.2 Step 1 Review Process

A recent change in the State law provides for a 120-day appeal period. This law is being interpreted, by DOH, such that the 120-day period commences at the first meeting between the purveyor and the applicant pursuant to the USRP process described in this Section. At the conclusion of this negotiation period, agreement to the satisfaction of both parties must be reached with written confirmation.

If an appeal exists, it will likely occur during the 120-day negotiation period. Therefore, the CWSP's 45-day local "Appeals" procedure, discussed in this subsection, will extend the 120-day period by the length of time equal to the time required to resolve the appeal.

It is expected that most issues will arise over the question of what constitutes timely and/or reasonable conditions of water service. The view of the Water Utilities Coordinating Committee (WUCC) is that the majority of such disputes can best be resolved if discussions between the parties are facilitated by persons knowledgeable as to public water system design, construction, and operation. To this end, the WUCC will form a subcommittee for purpose of peer review of appealable issues with the objective of reaching negotiated agreements.

If an applicant and a utility are unable to agree on conditions of service, a written request for review of the issues may be made to the SCHD or SCPPC by either party. The SCPPC will initiate review by sending a copy of the request to the chairperson of the WUCC. The WUCC will establish a process

for review and informal resolution of appeals. The process will generally function within the following framework:

Appeal Review Subcommittee

A subcommittee of the WUCC will be appointed by the Skagit Board of County Commissioners employing a staggered term format. Membership will consist of representatives of the following interests. Membership may change at the discretion of the WUCC as experience is gained in the appeal process.

❑ Municipal Corporation Water Utilities	2 members
❑ Non-municipal Corporation Water Utilities	2 members
❑ Well Drilling Industry	1 member
❑ Skagit County Department of Health	1 member
❑ Skagit County of Planning and Permit Center	1 member

(Note: The two Skagit County representatives will be ex-officio members.)

Objectives

The review process will be directed to achieving the following objectives:

- ❑ Provide a forum for negotiation of the issues between the parties.
- ❑ Facilitate the negotiations.
- ❑ Assure equitable representation between parties.
- ❑ Reach agreement between parties.
- ❑ Where parties choose not to participate in the negotiations, identify and evaluate the facts associated with the issues.

WUCC Subcommittee Report

The WUCC Subcommittee will conclude its review within 45-calendar days of receipt of the appeal. A 45-calendar day review period will serve as the standard for fact finding and facilitating agreement. When 45-calendar days does not provide adequate review, an extended review period can be set forth through establishment of a jointly agreed work plan. The WUCC Subcommittee chairperson will provide a written report to the SCPPC which contains the majority view of the Subcommittee. When the appeal has been resolved, the conditions of agreement will be reported. A full or conditional

notice of withdrawal of the appeal by the applicant should accompany the report. Where resolution was not achieved, the report should identify the controlling issues and the position of the parties. A Subcommittee recommendation for disposition of the issues is to be provided.

5.5.3 Step 2 Review Process

When the WUCC Subcommittee is not successful in facilitating a resolution of the appeal, the SCPPC shall formally forward the appeal and "Report" of the WUCC Subcommittee to the Skagit County Hearing Examiner. Further review will then take place under Skagit County Code 14.01. The report of the WUCC Subcommittee will be entered as part of the hearing record, be fully considered by the Hearing Examiner, but will not be binding with respect to substance or process.

In the event that a city is a party to an appeal relating to GMA issues, the appeal shall not be forwarded to the County Hearing Examiner. Instead, the appeal shall be referred to a third party arbitrator jointly agreed to by the city and the Board of County Commissioners.

5.5.4 Further Appeal

There shall be no further appeal of review conducted by a third party arbitrator. However, a request for review of the Hearing Examiner decision may be filed with the Skagit Board of County Commissioners pursuant to Skagit County Code 14.01. The decision of the Board shall be final and binding upon the parties to the appeal.

Upon completion of the appeal process, the SCPPC will continue processing of the development application consistent with the final resolution.

5.5.5 Appeal Process Review

The need for effectiveness and efficiency of the described process can only be determined through plan implementation. Refinement or re-direction may be needed. Adjustments should be made within the framework of the described appeal process. Major changes will require CWSP amendments.

5.6 Special Review Considerations

In the review of development proposals and associated requests for water service, the SCHD shall be guided by the following special considerations.

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5.6.1 Applications for Service to Non-Residential Properties

Commercial and industrial properties represent a fire flow responsibility that may greatly exceed flows required for residential housing. These flow requirements are critical to the sizing of the storage, pumping, and piping facilities. For these reasons, the SCPPC shall also use the referral process described herein for all proposed commercial and industrial developments.

5.6.2 Expansion of Small Water Systems

The inventory of small systems was updated by DOH for this CWSP. This inventory was of systems classified as Group A and Group B. A total of 162 systems in these categories were identified within the CWSSA. Expansion of all systems will be tracked by SCHD with respect to the number of active services versus initially approved services. Expansion beyond the initial approval will not be allowed without further review of system capabilities by the SCHD or DOH.

Special consideration is required for the future expansion of small systems (after adoption of the CWSP) both inside and outside designated service areas. These considerations are addressed below:

Expansion Outside Designated Service Areas

An expanding Group A - Non-Community, and Group B system located outside of designated service areas will be referred by the SCHD or SCPPC to adjacent, larger utilities with approved WSPs or the PUD as the SMA. This will allow the expanding system to discuss and evaluate utility service proposals by an adjacent utility, or SMA versus expansion. If the decision is made to pursue expansion, the system owner must submit to the SCHD or SCPPC a completed Service Area Agreement. A WSP commensurate with the planned system expansion must be submitted to, and be approved by, the appropriate agency, either DOH, or the SCHD or SCPPC.

Expansion Within Designated Service Areas

Expansion beyond initially approved service connections for an existing smaller utility located within a designated utility service area will not be allowed without approval by the larger utility. The CWSP places responsibility on the review agencies to recognize a specific utility's service area. In turn, the utility is responsible for effective management within that service area.

5.7 Receivership of Failing Systems

RCW 43.70.195, enacted by the 1990 State Legislature, provides that whenever an action is brought by the Secretary of Health or a local health officer to place a public water system in receivership, the petition shall include the names of one or more suitable candidates for receiver who have consented to assume operation of the water system. If there is no other person willing and able to be named as receiver, the court shall appoint the county in which the water system is located as receiver.

Through the establishment of service area boundaries and the review process described above, existing utilities have accepted the lead responsibility for providing public water supply within their designed service areas; and, therefore, should be the named receiver for the failing system. A logical extension of this responsibility is for the designated utilities to assist in correcting problems of failing systems within the boundaries of their service areas and accept ownership of the systems following the upgrade of the system to the utility's standards. It should be noted that regardless of the ultimate responsibility for providing future water service, it is the customers of the water system that have the primary responsibility for paying for the system upgrades.

Upon adoption of this CWSP by DOH, the Group A systems with 100 or more permanent connections, and all expanding public water systems, will be considered candidates that have consented to assume the receivership role described in RCW 43.70.195 for failing systems within their designated service area. The Secretary of Health or DOH will advise the court of the name of the designated utility in any future petition for receivership.

270165/exhibit5-1.prz
June 30, 1999

Exhibit 5-1
Utility Service Review Procedure

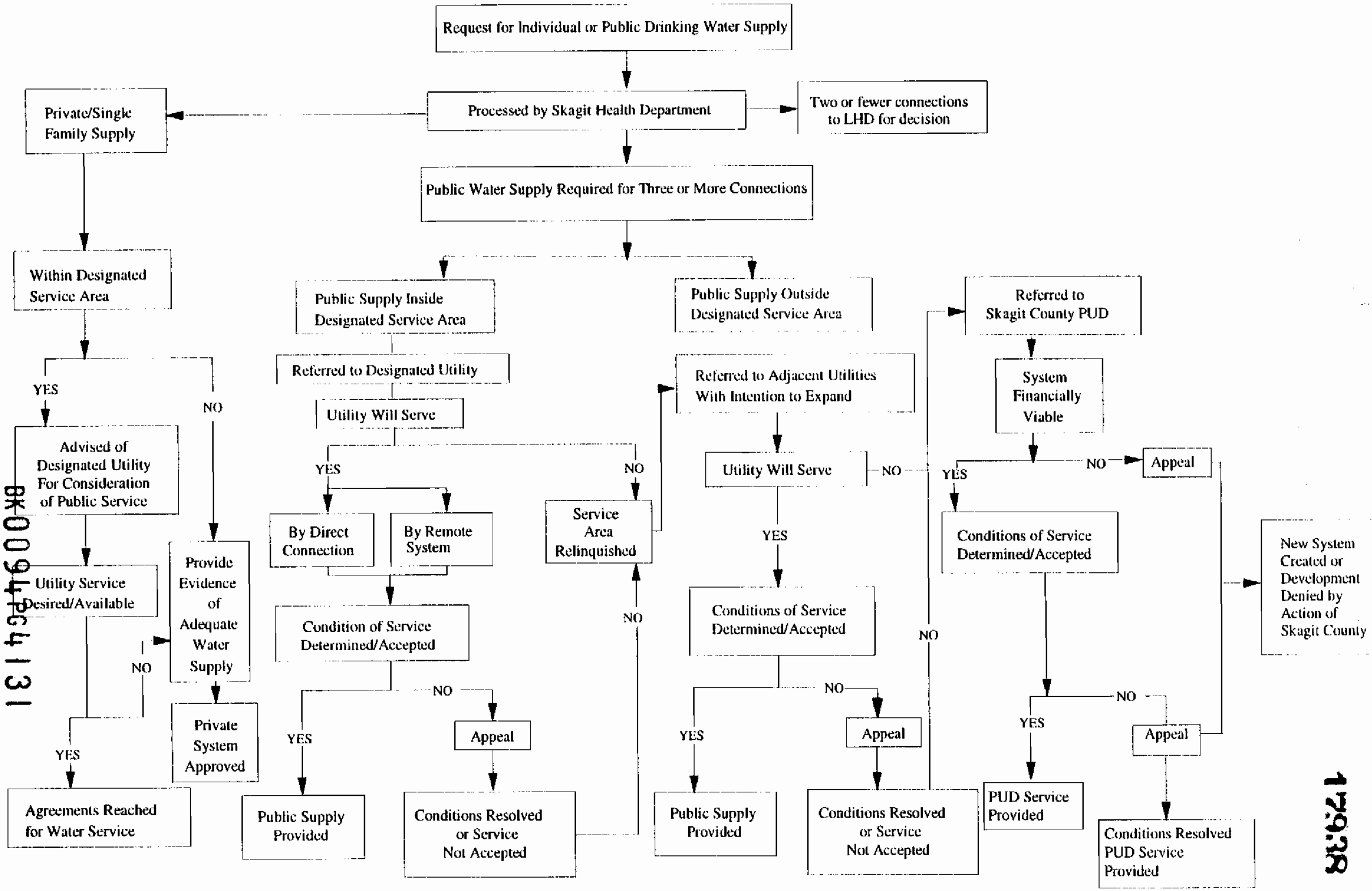
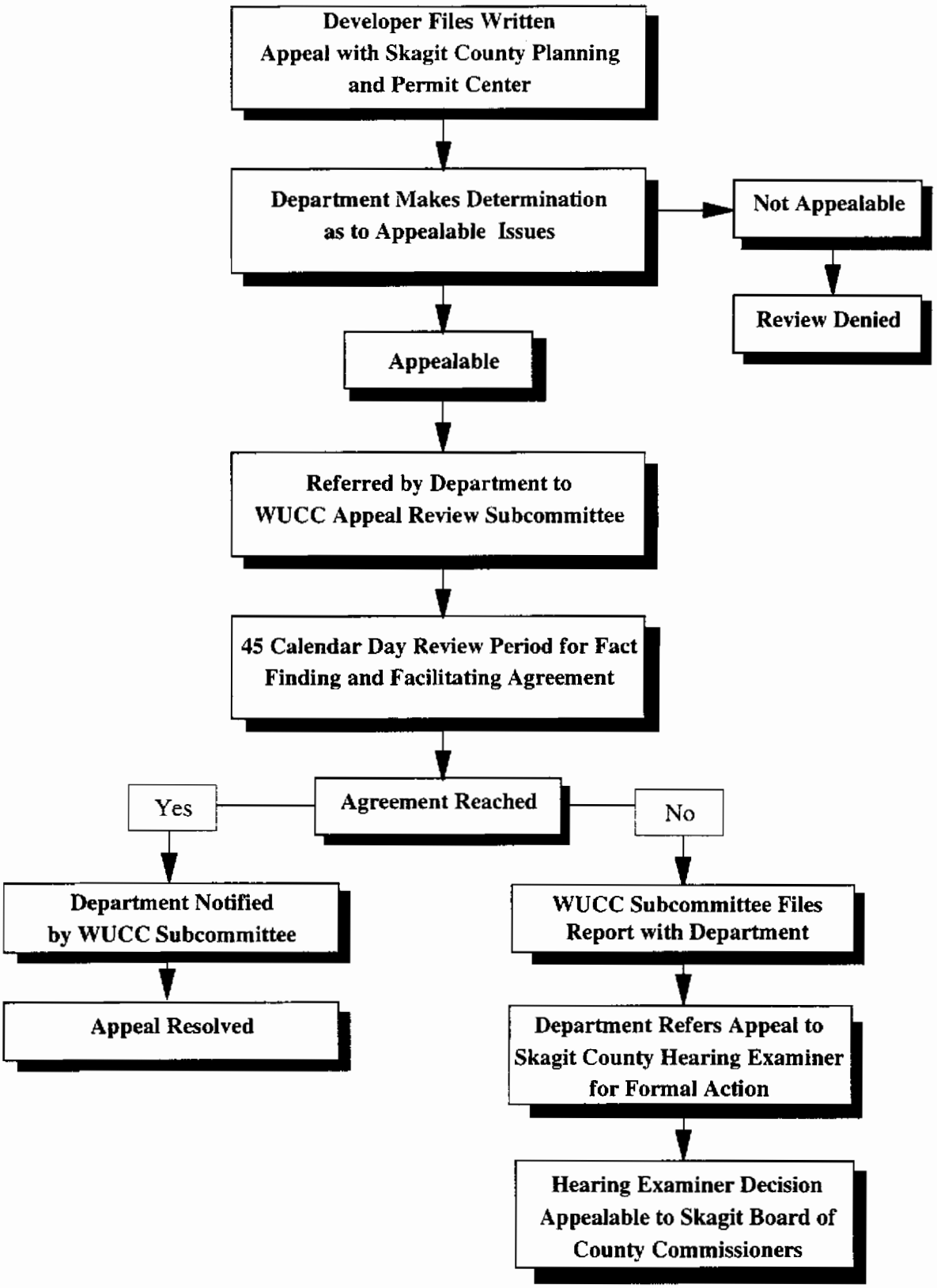


Exhibit 5-2
Appeal Process



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Section 6
Satellite System Program

6.1 Introduction

The concept of satellite systems has evolved from general guidance contained in planning handbooks published by the State Department of Health (DOH), to legislation enacted by the 1991 State Legislature. In general terms, a satellite system program is intended to address situations where small public water systems (i.e. Group B) are proposed in areas remote from the supply facilities of larger existing systems. Extension or expansion of existing facilities may not be practical in the foreseeable future. For this reason, the new system must be developed as an independent or "stand-alone" facility. These circumstances may occur either within or outside of designated service areas.

The 1991 State legislation added RCW 70.116.134 which requires DOH to adopt rules which establish criteria for designating individuals or water purveyors as qualified satellite system management agencies.

6.2 Skagit County Program

Recognizing that the Public Utility District No. 1 of Skagit County (PUD) has the authority and capability to provide water service throughout Skagit County (County), the Water Utility Coordinating Committee (WUCC) identified the PUD as the Satellite Management Agency (SMA). In this capacity, the PUD will work cooperatively with existing water utilities to coordinate service areas and service delivery to meet the requirements of State and federal laws. If an existing system does not have the resources to meet these requirements, the PUD will assist in the evaluation of transferring ownership and operation of the system to the PUD, based upon an appropriate system upgrade and financing plan. Where new service is required which cannot be provided by other existing systems, consistent with the utility service review procedure (USRP) provided in this Coordinated Water System Plan (CWSP), the PUD will provide service through system extension or establishment of a new remote system. As a condition of providing service, the PUD shall own the public water supply system.

The following PUD policies and programs are designed to meet the public water supply needs in that portion of the County not designated in the CWSP as the service area of other water supply utilities, and in those areas where existing utilities request the assistance of the PUD.

6.2.1 Urban Growth Areas - Existing and New Systems

Service Area

In accordance with the Growth Management Act (GMA), the PUD will develop a Capital Improvement Plan for those urban areas and portions of the rural area that have been designated the PUD service area. Currently, those areas include Sedro Woolley, Burlington, Mount Vernon, and La Conner urban growth areas (UGAs), rural areas adjacent to the UGAs, and a portion of Fidalgo Island. The PUD is committed to working with other water utilities, such as the City of Anacortes, to cooperatively meet the urban growth needs of Skagit County through intergovernmental agreement for supply development and system operation.

System Merger/Extension

The PUD will accept responsibility for water systems located within the PUD's designated urban service area which are proposed for receivership, following the development by the PUD of a system improvement and financing plan to merge the small system with the PUD system. The PUD will not accept ownership responsibility for the system until it has been upgraded to meet PUD urban design standards to ensure compliance with State regulatory requirements.

Urban Standards

The PUD will clearly identify its urban service standards for service extensions and system upgrades. These standards will meet, and may exceed, the CWSP minimum standards, but shall not be inconsistent with applicable comprehensive plans.

6.2.2 Non-Urban Growth Areas - Existing and New Systems

Service Area

Existing public water systems located in the Non-UGAs have been inventoried. Service areas have been identified for those systems with 100 permanent connections or more, and smaller systems indicating an intent to expand their service area. For the remaining systems, the current service area is assumed to be the future service area.

The PUD will assist the County in the evaluation of existing water systems to determine their capability to provide an "adequate water supply" as defined under Section 63 of the GMA (RCW 19.27.097). The County will refer new water service requests to the designated water system when it is determined that existing systems have the capacity and capability to meet the State and

federal Safe Drinking Water Act requirements for a designated service area and the associated projected water demand. This determination will be made by DOH, in cooperation with Skagit County Planning and Permit Center (SCPPC) and Skagit County Heath Department (SCHD).

When new service is requested in areas not specifically assigned to existing utilities through the CWSP, the County shall first refer the developer to adjacent purveyors with an approved water system plan (WSP) that provides for expansion. An existing system shall be considered "adjacent" to the proposed development if service can be provided with a service line extension not to exceed 1/2 mile in length. If service will not be provided by an adjacent utility, the developer will be referred to the PUD.

System Merger/System Extension/Remote Systems

If an existing system is unable or unwilling to extend water service to meet existing or new water service needs, the PUD will assist the property owners or County (following appropriate land use decision) in evaluating the service options by: 1) identifying requirements to upgrade the existing system; 2) establishing a stand alone remote PUD system; or, 3) extending the existing PUD system to serve the properties. New system and service requirements in the undesignated portion of the County will be the responsibility of the PUD subject to the determination of the appropriate method of service and execution of agreements. The PUD will not accept ownership or operating responsibility for an existing or new rural system until the system meets rural design standards to ensure compliance with State regulatory requirements.

Consistent with the program established for UGAs, the PUD will accept responsibility for water systems proposed for receivership within that portion of the County not included in designated service areas.

Non-Urban Growth Area Standards

Service extensions and remote systems in non-UGAs shall meet the CWSP design standards. (Note: standards will typically be based on the requirements to provide domestic/applicable-fire flow water service. The hydraulic design will be based on maintaining adequate pressure to implement a comprehensive PUD rural area water system).

6.3 Conformance With State Program

It is the intent of the WUCC that the County shall identify the PUD as the responsible agency for the County program defined herein, and the PUD shall adopt

the DOH standards for determining financial viability as part of its satellite system program.

6.4 Appeal Process Relationship

An appeal process has been established for resolution of disputes arising in implementation of the CWSP. This process is described in Section 5, including conditions under which a new public water system may be created in the non-designated area of the County. This appeal process is applicable to provisions of the Satellite System Program.

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Section 7
Water Demand Forecast

7.1 Introduction

For planning purposes, the development of projections of population growth in the study area and associated public water supply demand is essential. This Section presents an updated population forecast based on State Office of Financial Management (OFM) figures, and a water demand forecast based on updated water use assumptions. This information, together with the assessment of existing utilities ability to meet current and future water supply needs (Section 8), provides the framework for designing the coordination process required to assure future water supply requirements are met in an efficient manner.

7.2 Background and Approach

Planning for future water supply needs requires projection of demand for both near- and long-term periods. The near-term projections are generally necessary to define needed capital improvements anticipated within the next six years. Such improvements require lead time for financing, design, and construction. Long-term forecasts are necessary to quantify probable water resource requirements. Such forecasts guide the identification and sizing of long-range supply facilities, the water rights reservation process, and management of water resources necessary to meet future demands.

The long-term water use forecasting is combined with different growth rate scenarios to develop high, medium, and low population forecasts. Each of these forecasts serves as a valuable tool in the planning process. The "medium" forecast provides a "best estimate" of long-term growth based on historical and near-term events. A high forecast is used to project potential resource need while the low forecast is used to plan for revenues. Planning within the high-low range allows Skagit County (County) to develop resources accordingly without becoming financially overextended.

Population growth is the single most influencing factor in future water demand. Not only does the magnitude of future population have an impact, but the location of new population centers will greatly affect delivery of future water supplies. Therefore, population growth must be coordinated and based on approved land use plans and policies.

Water demand projections are based on existing studies, population projections, current water use data, land use patterns, and the estimated reduction in water use

resulting from water conservation. Demand forecasts are expressed as average day and peak day demand.

Data used in developing the demand forecast was obtained from OFM and Skagit County Planning and Community Development Department (SCPCD). Land use designations were provided by the County.

7.3 Reservation of Water

The Water Resources Act of 1971 (Chapter 90.54 RCW) provides that the Department of Ecology (Ecology) may reserve and set aside public water for utilization for specific purposes in the future. The priority of the reserved water right carries the date the reservation is established by Ecology. Regulations adopted by Ecology (Chapter 173-590 WAC) set forth the procedures to be followed and the requirements for petitioning for a reservation of water. A controlling condition is that a Coordinated Water System Plan (CWSP), approved by the Secretary of Health, must accompany a petition for regional water supply reservation unless an exemption is granted.

Ecology regulations require that petitions for reservation of water must be based on 50 year population and related water demand projections. For this reason, the projections developed herein extend to the year 2050.

7.4 Population Growth

The County population forecasts through the year 2020 reported herein are population forecasts reported by the OFM *1995 Washington State County Population Projections* (Table 7-1). These projections are developed using the "cohort-component" approach taking into consideration the age-sex specific rates for fertility, mortality, and migration. The reported "medium range" forecast are the figures that provided the framework for the 1995 County Growth Management Act (GMA) projections. The previous CWSP presented projection forecasts using a slightly modified "cohort-component" approach to forecast change for the County separate from the State as a whole. For this update, in light of the GMA, OFM figures have been used directly. The OFM forecast includes the years 1995 to 2020. An extended projection has been developed by extending OFM forecasts by 30 years to 2050. This was projected by consistently applying the annual growth rate estimated for 2020 over the additional 30-year period.

The population forecast is presented in three scenarios: high-, medium-, and low-series. This three-pronged approach to forecasting is provided to reflect the uncertainty associated with growth in population. A County-wide forecast is provided, as well as forecasts for selected cities (Table 7-2). The cities and figures reports are a compilation of data from OFM, 1993 CWSP, and Skagit County county-wide planning and policy.

Table 7-1
1995 OFM Population Forecasts
High, Medium, and Low Population Projections for Skagit County

	Five-Year Intervals					Single-Year Intervals									
	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
High	79,555	93,101	106,454	121,320	136,644	140,063	143,547	147,074	150,631	154,240	158,555	162,890	167,258	171,676	176,067
Medium	79,555	93,101	103,478	114,635	125,508	127,847	130,228	132,684	135,169	137,714	140,735	143,738	146,769	149,810	152,812
Low	79,555	93,101	101,617	110,552	118,853	120,656	122,496	124,344	126,201	128,074	130,376	132,680	134,983	137,298	139,560

7.5 Forecast Results

Table 7-2 shows the breakdown of projected population by urban growth area (UGA) and unincorporated areas of the County for 1995, 2000, and 2015. During this period, population in the cities is expected to grow faster than in the unincorporated areas listed. Mount Vernon is also expected to gain an increasing share of the County population.

Table 7-2
Population Growth for Select Skagit County Cities and Reservations

Area Designation	Population Year		
Urban Growth Area	**1995[a]**	**2000[a]**	**2015[b]**
Anacortes	14,252	16,612	18,300
Burlington/County	--	--	3,420
Big Lake	--	--	2,400
Burlington	4,751	5,101	7,065
Concrete	826	903	1,110
Hamilton	682	697	315
La Conner	641	632	890
Lyman	245	221	370
Mount Vernon	23,251	27,948	41,725
Sedro-Woolley	5,543	5,168	11,030
Swinomish	--	--	2,722
UGA subtotal	**50,191**	**57,283**	**89,345**
County - Unincorporated subtotal	**46,720**	**54,284**	**48,355**
Total County	**96,911**	**111,567**	**137,700**

a. As estimated in 1993 Skagit County CWSP approved population forecast (Exhibit 7-3).
b. As listed in the 1996 Skagit County County-wide Planning Policies documents (Exhibit 7-2).

Urban growth boundaries have been defined for cities within the County as part of the GMA. The goal is to direct new growth into the incorporated areas, rather than the unincorporated areas. Skagit County Planning will continue its goal for future growth to be distributed as 80 percent in incorporated areas and remaining 20 percent in unincorporated areas of the County.

From 1995-2050, natural growth rates are expected to remain the essentially constant. Growth will result from migration into the County. Therefore, the changes in growth largely reflect and change in the migration into the County.

7.5.1 Medium Population Forecast

Table 7-3 shows County-wide low, medium, and high population projections. The OFM medium forecast population for Skagit County shows annual growth decreasing to 2.0 percent by 2000 and fluctuating between 1.7 and 2.1 percent through 2050. Population is projected to be 103,478 by 2000 and 160,265 by the year 2050.

Table 7-3

Skagit County Low, Medium, and High Population Forecasts[a]

Year	Low Forecast		Medium Forecast		High Forecast	
	Population	% Growth	Population	% Growth	Population	% Growth
1990	79,555		79,555		79,555	
1995	93,101	14.5%	93,100	14.5%	93,101	14.5%
2000	101,617	8.4%	103,475	10.0%	106,454	12.5%
2005	110,552	8.1%	114,635	9.7%	121,320	12.3%
2010	118,853	7.0%	125,510	8.7%	136,644	11.2%
2011	120,656	1.5%	127,847	1.8%	140,063	2.4%
2012	122,496	1.5%	130,228	1.8%	143,547	2.4%
2013	124,344	1.5%	132,684	1.9%	147,074	2.4%
2014	126,201	1.5%	135,169	1.8%	150,631	2.4%
2015	128,074	1.5%	137,700	1.8%	154,240	2.3%
2016	130,376	1.8%	140,735	2.2%	158,555	2.7%
2017	132,680	1.7%	143,738	2.1%	162,890	2.7%
2018	134,983	1.7%	146,769	2.1%	167,258	2.6%
2019	137,298	1.7%	149,810	2.0%	171,676	2.6%
2020	139,560	1.6%	152,812	2.0%	176,067	2.5%
2030[b]	161,890	16.0%	183,374	20.0%	220,083	25.0%
2040[b]	187,792	16.0%	220,049	20.0%	275,104	25.0%
2050[b]	217,839	16.0%	264,059	20.0%	343,880	25.0%

[a] Source: Washington State Office of Financial Management
[b] Consultant projection based on OFM projected growth rate in 2020.

7.5.2 Low Population Forecast

A low forecast of population assumes that the County growth rate will drop to 1.7 by 2000 and fluctuate between 1.4 and 1.8 through 2020. This estimate lowers the population forecast significantly, with a population of 101,617 forecast for 2000 and ***146,367*** by the year 2050.

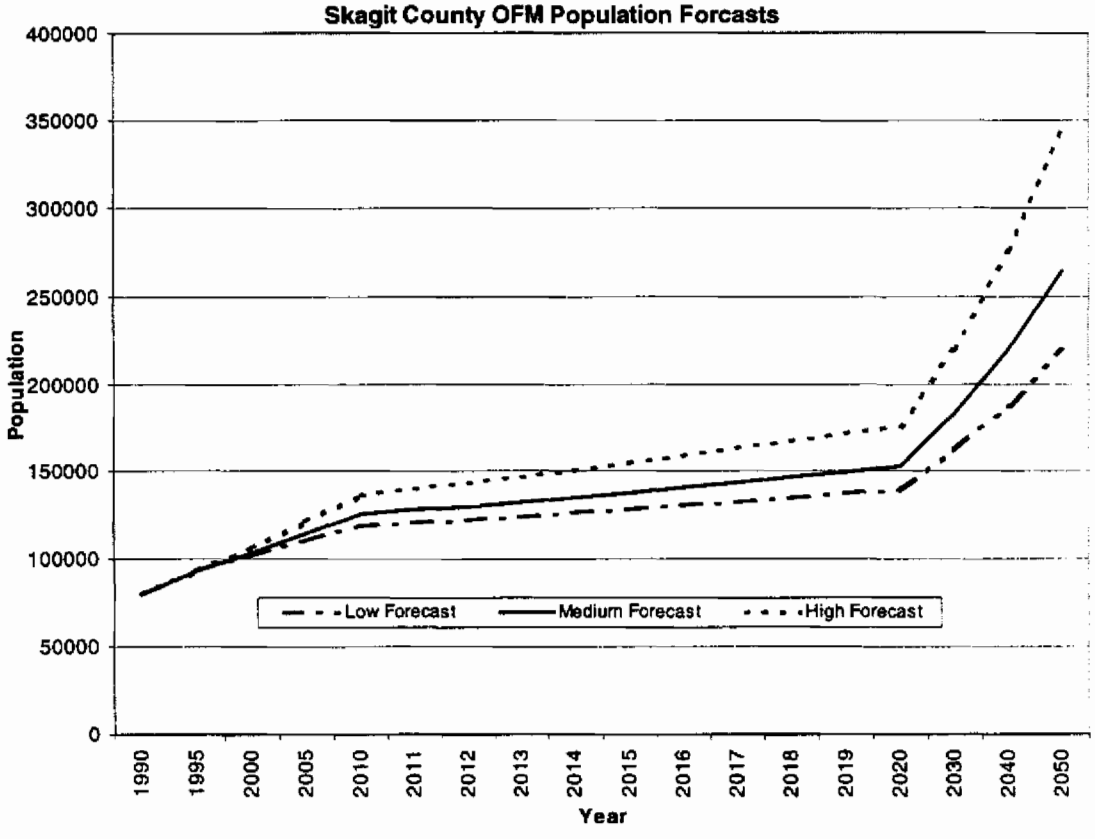
7.5.3 High Population Forecast

The high population forecast assumes continued high levels of migration into the County. This estimate assumes a growth rate of 2.2-2.6 percent through

2020. Under these assumptions, the County population forecast is 106,454 for 2000 and ***184,654*** for the year 2050.

Exhibit 7-1 graphically illustrates the high, medium, and low population forecast for Skagit County.

Exhibit 7-1
Skagit County OFM Population Forcasts



7.6 Adopted Forecast

In accordance with the GMA stipulating the use of OFM population forecasts for planning purposes, the Water Utility Coordinating Committee (WUCC) adopted the medium population forecast. Therefore, on a County-wide basis, Table 7-4 shows the population data used for CWSP study purposes.

Table 7-4
WUCC Approved County-wide Population Forecast

Year	1995	2000	2010	2020	2030	2040	2050
County Population	93,101	103,478	125,508	152,812	155,257	157,741	160,265

7.7 Urban Growth Areas

In accordance with requirements of RCW 36.70A, Skagit County and cities have developed urban growth management area (UGMA) boundaries; within which growth shall be encouraged and outside of which growth can occur only if it is not urban in nature. These areas are shown on Exhibit 7-2.

The Skagit County City/County Planning Policies Committee has set the criterion that 80 percent of future population growth in the County will occur in the UGAs. The balance, 20 percent, will take place in the remaining County area, which is assumed to be rural. To establish an estimate of future population distribution, this criteria was applied to the OFM medium population projection. Table 7-5 shows the population distribution resulting from application of the 80/20 criteria. In the 1993 CWSP, the Cities of Concrete, Hamilton, and Lyman were assumed to be rural until after 1995. All of these Cities have been designated as UGAs and are included in the UGA population counts.

Table 7-5
Distribution of Skagit County Future Growth—Urban vs. Rural

Area Designation	1995 Population[a]	1995 Population Distribution	New Growth Through 2050 Distributed Per 80/20 Criteria	2050 Population[b]	2050 Population[b] Distribution
County Total	96,911	100%	63,354	160,265	100%
UGAs	50,191	52%	50,683	100,874	63%
Unincorporated Skagit County	46,720	48%	12,670	59,391	37%

[a] 1993 CWSP approved estimate
[b] OFM Medium series population estimate

7.8 Current Water Use

The 1993 CWSP process compiled and reviewed information on per capita water consumption from a cross-section of public water systems in Skagit County and the adjoining counties of Snohomish and Whatcom. Data of particular interest was average daily use per capita and the ratio of peak day to average daily per capita use. Upon review, the WUCC approved the continued application of the water use data for this 1999 CWSP.

The representative usages adopted in this CWSP to calculate water use were:

Urban Average Day Gallons per Capita	150
Urban Peak Day Factor	2.0
Rural Average Day Gallons per Capita	100
Rural Peak Day Factor	2.6

7.9 Water Conservation

Mandatory requirements for improving efficiency in water use have been established at the State level in the Conservation Planning Requirements (CPR) administered by DOH (Appendix A). It may be expected that Ecology approval of any application for water rights permit filed by a utility in the future will be conditioned on implementation of at least a basic water conservation program.

The CPR outlines required elements for three conservation programs identified as Basic, Moderate, and Full designed to address conservation within different size utilities.

7.9.1 Program Concepts

Water demand management includes the implementation of comprehensive long-term conservation programs, short-term emergency response plans, water reuse projects, and peak flow management. The recommended concept outlines the framework for a comprehensive conservation program with recognition of the other demand management elements.

The conservation program elements should be effective and reasonable for utility implementation. Short-term regulatory or mandatory measures, more associated with drought or other emergency conditions of water shortage, are not considered an element of conservation, but rather an emergency response plan. Peak flow management, such as every other day lawn watering, can also be an integral element of an emergency response plan or system design strategy. Peak withdrawal rate can also be reduced by increasing storage capacities. Careful consideration of hourly, daily, weekly, and average annual water use characteristics is required to properly assess the impact of

conservation plans versus peak flow management. Conservation should reduce average annual use and some peak period usage. Peak flow management may reduce the withdrawal rate but may not reduce the overall average annual use rate.

Since water conservation is to be considered a supply option, the policies and program to be implemented must be defined. Reduction in water use and the period over which it occurs must be estimated. The targeted reduction must be factored into the demand forecast, and regional water supply need projections should be reduced commensurate with the anticipated water savings. The program projections should be monitored against assumptions to assess their effectiveness. The final step in the process is to include the water conservation program as a base element in the program for future water supply planning.

Drawing upon existing literature and experience, specific measures have been identified as having some potential for conserving water. The measures which were selected display a history of effectiveness, address areas of known concern, and are capable of being implemented.

The conservation measures are grouped into the three categories: (1) public education, (2) technical assistance, and (3) system measures. A fourth category of "incentives" is also identified. Elements within this fourth category are recommended for inclusion in a program of further study. These measures are listed and defined in Appendix A.

7.9.2 Recommended Program

The recommended program has been developed with activities for accomplishment assigned to the utilities and/or a regional organization such as a group of public water systems, a regional water association or Public Utility District. The program provides a recommended framework with the understanding that the level of effort or activity is dependent on the conditions specific to the utility. Where a dual role is shown for a particular activity, the utility is lead with the regional activity being one of support.

The scope of programs vary from:

- A Base Program which is a minimum program based on specific regional needs as well as expected cost benefit. This base program will be required of all public water utilities with less than 1,000 services. Since this size utility generally does not have staff that can devote time to a conservation program, the emphasis is on the regional program. Public education and technical and administrative services

could be provided in support of the smaller utilities in the base program by appropriate State and regional programs.

- A Moderate Program would be implemented by a majority of the municipal corporations (cities and districts). This program would apply to utilities with 1,000 to 25,000 services. The emphasis in this program shifts to greater utility implementation with regional support.

- A Full Program would apply to utilities having 25,000 or more services. This program is limited to the larger cities or regions in critical water areas. The program requires a considerable staff effort and possible changes in land use or building code controls for implementation of some of the program measures.

Conservation elements recommended for each level of program, and assignment of responsibility for implementation, are shown in matrix form on Appendix A.

7.9.3 Program Implementation

The CPR assigns the level of conservation program requirement based upon water supply conditions in an area and the public water system size. Water supply conditions are placed in three categories as follows:

- A Critical Area - defined as a region of the State in which Ecology's water needs assessment indicates that current water supplies are not adequate to meet all future needs.

- A Growth Area - defined as an area in which population growth is expected to be 2 percent per year or more averaged over a 5-year period.

- A Non-Critical Area - defined as a public water systems service area or region in which existing supplies are adequate to meet projected water needs.

In the near-term, Skagit County falls within the growth area category. The related requirements for program implementation are:

Number of Service Connections	Utility Program	Regional Program
>25,000	Moderate	Moderate
10-25,000	Moderate	Moderate
1,000 - 10,000	Moderate	Moderate
<1,000	Base	Moderate

It should be noted that if a public water system's residential water use data indicates either: (1) per capita demand is greater than 150 percent of the regional average; or (2) unaccounted for water exceeds 20 percent of annual use, the public water system will be required to upgrade or expand its conservation program to include the next higher level program.

Implementation of the recommended conservation program will require new program development, regional coordination, and incorporation of the program within the utility's water system plan (WSP). Full implementation and a projected reduction in demand should occur in the year 2000. Conservation effectiveness should be evaluated to ensure targets are on schedule.

In general terms, conservation measures should be pursued to the level where the cost of the measure is equal to the value of the water conserved. However, for purposes of this CWSP, measurement of the benefits of a conservation program will be based on two benchmarks:

(1) Reduction in per capita average day residential demand, with 1990 being the benchmark year.

(2) Distribution of educational materials or implementation of the various conservation program sub-elements. The program objectives will be defined by the utility in their water system/conservation plan.

An organization with public water supply management responsibilities for the entire CWSP planning area does not exist at the present time. The Public Utility District No. 1 of Skagit County (PUD) is participating in Water Conservation Coalition of Puget Sound. This is a cooperative effort by cities, water districts, regional water associations, and others in the Puget Sound Basin to develop common or complementary water conservation programs. Efforts at this time focus on public education. As a starting point for the CWSP regional program, it is recommended that the City of Anacortes and other larger utilities join in the Coalition activities either directly or through a common program coordinated by the WUCC.

7.9.4 Water Use Reduction

Based upon experience in the City of Seattle and other areas, it is estimated that implementation of the above described program within the County will result in a 10 percent reduction by 2000, and maintained in the years thereafter. This would reduce the year 2000 average day requirement for the urban area from 150 gpcd to 135 gpcd and for the rural area from 100 gpcd to 90 gpcd.

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7.10 Other Related Water Requirements

In developing the water demand projections for Skagit County utilities, three special areas require consideration. These are future industrial water requirements, expansion of service to North Whidbey Island, and potential service to North Snohomish County.

7.10.1 Industrial Requirements

The most significant industrial water users continue to be Shell Oil Company (5.06 MGD) and Texaco Oil Refinery (5.35 MGD). Both are served by the City of Anacortes. Other industrial users of the Anacortes supply system range in current use from 0.02 MGD (Norpetro) to 0.36 MGD (plywood plant).

Based upon the identified needs, the potential for a shift in industrial development away from the south Puget Sound region due to water supply shortages, the water supply resources of Skagit County, and recognizing that the CWSP forecast extends to the year 2050, the WUCC determined that an additional demand of 15.0 MGD be factored into the demand forecast. This demand was assumed to occur incrementally at the rate of 5.0 MGD each in the year 2000, 2020, and 2040.

7.10.2 North Whidbey Island/Oak Harbor

The City of Oak Harbor and the Whidbey Island Naval Air Station are currently supplied by the City of Anacortes. Water delivery averaged 2.35 MGD in 1990. The City of Anacortes, accounting for the demand in its Water Plan, assumed that Island County demands on the Anacortes system would increase in the future. It is estimated that additional demands of Island County will be 1.0 MGD (3.35 MGD total demand) in the year 2000, with an additional 1.4 MGD (4.75 MGD total demand) in 2010 through 2050.

For planning purposes herein, the WUCC recommended that the City of Anacortes' projections for Island County water service is utilized.

7.10.3 North Snohomish County/City of Stanwood

The City of Stanwood currently obtains its public water supply (including commercial and industrial) from three wells and a spring. In the 1993 CWSP, future water requirements were determined and described in the North Snohomish County CWSP adopted in 1991. A regional supply plan was developed which relied on interties with the City of Everett system. However, regional transmission was identified only for that portion of North Snohomish County generally located south of the Stillaguamish River. The

City of Stanwood was expected to continue to rely on groundwater development.

Problems have been identified with Stanwood's wells, which raise questions as to the ability of local groundwater sources to provide water of adequate quality and quantity to meet Stanwood's future needs. A regional solution is being considered through intertie with the PUD system.

For planning purposes, the future water requirements for the City of Stanwood service area were considered the same as those reported in the 1993 CWSP. These requirements are reported in Table 7-6.

Table 7-6
City of Stanwood Average and Peak Day Water Demand

Year	Avg. Day MGD	Peak Day MGD
2000	0.50	1.00
2010	0.59	1.18
2020	0.74	1.48
2030	0.90	1.80
2040	1.03	2.06
2050	1.33	2.66

These requirements are based upon a water conservation plan similar to the recommended Skagit County plan being in place in the year 2000. Therefore, the demands are comparable only to the Skagit County projections that include water conservation.

7.10.4 Agricultural Water Use

In developing this water demand forecast, the WUCC recognized that the water requirement for present and future agricultural use was a significant factor in allocating and managing the County water resources. This demand is over and above the water supply requirements identified above. However, the statute under which the CWSP is developed limits the scope of study to public water supply and directly related needs. Agricultural use is not included except as might be served (e.g., greenhouse use) through a municipal or industrial supply.

It is intended, however, that all water users in Skagit County will be documented during the development of the Skagit River Watershed Plan.

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7.11 Water Demand Projections

The population and water use data described above were applied to two scenarios to provide a range of water demand forecast for Skagit County through the year 2050. The scenarios and assumptions contained therein are as follows:

Scenario 1

- Per capita water consumption will remain constant at the current representative rates of 150 gpd for urban areas and 100 gpd for rural areas.
- Peak day to average day use ratios will remain constant at 2.0 to 1 for urban areas and 2.6 to 1 for rural areas.
- Population growth will be distributed 80 percent to urban areas and twenty percent to rural areas. Assumes approximately a 0.5% annual shift in population distribution to account for 80/20 planning criteria distribution for new growth.

Scenario 2

- Peak day to average day use factors and population growth distribution will be the same as Scenario 1.
- Per capita water consumption will be reduced to 135 gpd for urban areas and 90 gpd for rural areas through water conservation measures in year 2000 and beyond.

Results of this analysis are presented in Tables 7-7 through 7-10.

7.12 Recommended Forecast

It is recommended that the WUCC adopt the Scenario 2 forecast for CWSP study purposes. Assuming that current (1995) demands are being met by County utilities, a future additional source requirement of about 23.5 MGD (average day) and 37 MGD (peak day) exists to meet demand in 2050.

Table 7-7
Scenario 1 - Average Day Water Demand (MGD)

	1995	2000	2010	2020	2030	2040	2050
County Population	93,100	106,454	136,644	176,067	220,083	275,104	343,880
Residential - Urban	7.26	8.62	11.27	16.37	21.46	28.47	37.65
Residential - Rural	4.47	4.90	6.15	6.69	7.70	8.53	9.28
Industrial	11.00	16.00	16.00	21.00	21.00	21.00	21.00
Island County	2.35	3.35	4.75	4.75	4.75	4.75	4.75
City of Stanwood	0.5	0.5	0.59	0.74	0.9	1.03	1.33
Whatcom County Intertie*			0.79	0.79	0.79	0.79	0.79
Total	**25.58**	**33.37**	**39.55**	**50.34**	**56.60**	**64.57**	**74.81**

Table 7-8
Scenario 1 - Peak Day Demand (MGD)

	1995	2000	2010	2020	2030	2040	2050
County Population	93,100	106,454	136,644	176,067	220,083	275,104	343,880
Residential - Urban	14.52	17.25	22.55	32.75	42.92	56.95	75.31
Residential - Rural	11.62	12.73	15.99	17.40	20.03	22.17	24.14
Industrial	11.00	16.00	16.00	21.00	21.00	21.00	21.00
Island County	4.7	6.7	9.5	9.5	9.5	9.5	9.5
City of Stanwood	1.00	1.00	1.18	1.48	1.80	2.06	2.66
Whatcom County Intertie			2.05	2.05	2.05	2.05	2.05
Total MGD	**42.84**	**53.68**	**67.27**	**84.18**	**97.30**	**113.73**	**134.66**

Table 7-9
Scenario 2 - Average Day Demand (MGD)

	1995	2000	2010	2020	2030	2040	2050
County Population	93,100	106,454	136,644	176,067	220,083	275,104	343,880
Residential - Urban	6.54	7.76	10.15	14.74	19.31	25.63	33.89
Residential - Rural	4.02	4.41	5.53	6.02	6.93	7.68	8.36
Industrial	11.00	16.00	16.00	21.00	21.00	21.00	21.00
Island County	2.35	3.35	4.75	4.75	4.75	4.75	4.75
City of Stanwood	0.5	0.5	0.59	0.74	0.74	1.03	1.33
Whatcom County Intertie			0.79	0.79	0.79	0.79	0.79
Total MGD	**24.41**	**32.02**	**37.81**	**48.04**	**53.52**	**60.87**	**70.12**

Table 7-10
Scenario 2 - Peak Day Demand (MGD)

	1995	2000	2010	2020	2030	2040	2050
County Population	93,100	106,454	136,644	176,067	220,083	275,104	343,880
Residential - Urban	13.07	15.52	20.29	29.47	38.62	51.25	67.78
Residential - Rural	10.46	11.46	14.39	15.66	18.02	19.96	21.73
Industrial	11.00	16.00	16.00	21.00	21.00	21.00	21.00
Island County	4.70	6.70	9.50	9.50	9.50	9.50	9.50
City of Stanwood	1.00	1.00	1.18	1.48	1.48	2.06	2.66
Whatcom County Intertie			2.05	2.05	2.05	2.05	2.05
Total MGD	**40.23**	**50.68**	**63.41**	**79.16**	**90.68**	**105.82**	**124.72**

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Section 8 Assessment of Existing Water Supply Systems

8.1 Water System Inventory

Tables 3-1 through 3-3 provide the current inventory of public water systems in Skagit County (County). The Skagit County Health Department (SCHD) and Skagit County Planning and Permit Center (SCPPC) continue to maintain and update the inventory as needed. Following Department of Health (DOH) approval of this Coordinated Water System Plan (CWSP), all water purveyors will be required to review their Water System Plans (WSP) for accordance with the CWSP and submit to an updated WSP or indicate to SCHD that the existing WSP remains current. This process will aid SCHD in updating the Water System Inventory.

Concurrent with the compilation and analysis of water system data, service area boundaries have been revised based on the intent to expand, reduce, or restructure the service area. Through these activities, public water systems have been identified with 100 permanent connections or more, or with intentions to expand their service area. Smaller, non-expanding systems are also inventoried.

For purposes of this study, it is assumed the non-expanding systems are adequately serving the current customers. An assessment of the utility/system capability to serve expanding needs may then be limited to the expanding systems. Recognizing the large percentage of population served by the City of Anacortes and the Skagit County PUD No. 1 (PUD), and that this proportion will increase in the future due to the State Growth Management Act (GMA), a more detailed evaluation of these two larger systems is appropriate.

8.2 Future Distribution of Growth

The GMA, as reflected in the County's Comprehensive Plan, sets forth a broad strategy for addressing problems of rapid growth. High growth rate counties (such as Skagit) are required to enact comprehensive land use plans and update those plans every five years. The Comprehensive Plan contains a land use element that designates urban growth areas (UGAs). Within these areas, growth is to be encouraged. In the remaining area, growth can occur only if it is not urban in nature.

The GMA and Skagit County Comprehensive Plan requires that urban growth first occur in areas already characterized by urban growth having existing public

facilities and service capacities to serve such development. The second priority is to areas already characterized by urban growth that will be served by a combination of both existing public facilities and services and any additional needed public facilities and services that are provided by either public or private sources. Further, it is appropriate that urban government services be provided by cities, and urban government services should not be provided in non-urban areas.

Utilizing the same methodology, the population forecast for the UGAs and the balance of County (non-UGA), is shown in Table 8-1 (unconstrained by land supply). A key assumption of this forecast is that 80 percent of future population growth, as established by County-wide Planning Policies, will be directed to the UGAs.

Table 8-1
Skagit County UGA and Non-UGA High Population Projection Breakdown

	Year					
	2000	**2010**	**2020**	**2030**	**2040**	**2050**
Total Population	106,454	136,644	176,067	220,083	275,104	343,880
Total Increase	13,354*	30,190	39,423	44,016	55,021	68,776
UGA Growth (80% of total increase)	10,683	24,152	31,538	35,213	44,017	55,021
Non-UGA Growth (20% of total increase	2,671	6,038	7,885	9,803	11,004	13,755
UGA Population Distribution(Total Increase)						
Anacortes	15,203	20,275	26,899	34,293	43,536	55,090
Bayview Ridge	2,300	3,024	3,970	5,026	6,346	7,996
Big Lake	1,170	1,556	2,060	2,623	3,327	4,207
Burlington	8,170	10,826	14,295	18,168	23,009	29,061
Concrete	1,052	1,438	1,942	2,505	3,209	4,089
Hamilton	314	386	480	585	717	882
La Connor	845	1,086	1,401	1,753	2,193	2,743
Lyman	354	450	576	716	892	1,112
Mount Vernon	28,116	38,742	52,618	68,111	87,478	111,687
Sedro-Woolley	9,729	12,868	16,967	21,544	27,266	34,418
Swinomish	1,820	2,544	3,490	4,546	5,866	7,516
UGA Total	69,073	93,195	124,698	159,870	203,839	258,801
Non-UGA Total	37,380	43,448	51,367	60,212	71,264	85,078

* Increase over 1995 population (Table 7-1).

8.3 Urban Water Supply Systems

Referring to Section 3 (Water Utility Service Areas), it will be noted that public water service to the 11 UGAs will be provided by utilities as shown in Table 8-2.

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Table 8-2
UGA Water Service Providers

UGA	Service Area of		
	City of Anacortes	Skagit PUD	Other
Anacortes	X		
Bay View Ridge		X	
Big Lake		X	
Burlington		X	
Concrete			X (Concrete)
Hamilton			X (Hamilton)
La Conner	X		
Lyman			X (Lyman)
Mount Vernon		X	
Sedro Woolley		X	
Swinomish		X	
Whidbey Island	X		

Utilizing 1995 Office of Financial Management (OFM) data, the population and water demand forecasts developed in Section 7, and the distribution of population growth between urban and rural areas shown in Table 8-1; water demand forecasts for the City of Anacortes, the PUD, Hamilton, Lyman, and Concrete systems were determined. Derivation of these forecasts is shown in Tables 8-3 through 8-8.

Average day and peak day demands are broken out for ten-year periods between 2000–2050 for Anacortes, Skagit PUD, Hamilton, Lyman, and Concrete in Tables 8-7 through 8-10.

Table 8-3
Anacortes Service Area High Population Forecast[3]

	Year					
	2000	2010	2020	2030	2040	2050
UGAs[1]						
Anacortes	15,203	20,275	26,899	34,293	43,536	55,090
La Conner	845	1,086	1,401	1,753	2,193	2,743
Swinomish	1,820	2,544	3,490	4,546	5,866	7,516
Non-UGA[2]	3,738	4,344	5,136	6,021	7,126	8,507
Total	**21,606**	**28,249**	**36,926**	**46,613**	**58,721**	**73,856**

Footnotes:
(1) Whidbey Island demand not included as population dependent for purposes of CWSP.
(2) Assumes 80 percent of County growth occurs in UGAs.
(3) Assumes 10 percent of total non-UGA service is provided by Anacortes, 50 percent by PUD, and 40 percent other.

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Table 8-4
Anacortes Service Area Water Demand Forecast (excluding industrial)

Year	Population		Water Demand (MGD) [1]				Whidbey Island Demand [2]		Total Avg.	Total Peak
			Average Day		Peak Day					
	UGA	Non-UGA	UGA	Non-UGA	UGA	Non-UGA	Avg. Day	Peak Day		
2000	17,868	3,738	2.4	0.3	4.8	0.8	3.4	6.7	6.1	12.3
2010	23,905	4,344	3.2	0.4	6.4	1.0	4.8	9.5	8.4	16.9
2020	31,790	5,136	4.3	0.5	8.6	1.3	4.8	9.5	9.6	20.2
2030	40,592	6,021	5.5	0.5	11.0	1.3	4.8	9.5	10.8	21.8
2040	51,595	7,126	7.0	0.6	14.0	1.6	4.8	9.5	12.4	25.1
2050	73,856	8,507	10.0	0.8	20.0	2.1	4.8	9.5	15.6	31.6

Footnotes:
[1] Assumes 135 gpc demand for urban use and 2.0 peak factor; 90 gpc rural use and 2.6 peak factor.
[2] Table 7-8 and 7-9 total Island County demand, and 2.0 peak factor.

Table 8-5
PUD Service Area High Population Forecast

	Year					
	2000	**2010**	**2020**	**2030**	**2040**	**2050**
UGAs [1]						
Bayview Ridge	2,300	3,024	3,970	5,026	6,346	7,996
Big Lake	1,170	1,556	2,060	2,623	3,327	4,207
Burlington	8,170	10,826	14,295	18,168	23,009	29,061
Mount Vernon	28,116	38,742	52,618	68,111	87,478	111,687
Sedro-Woolley	9,729	12,868	16,967	21,544	27,266	34,418
Sub-Total	49,485	67,016	89,910	115,472	147,426	187,369
Non-UGA [2]	18,690	21,724	25,683	30,106	35,632	42,539
Total	**68,175**	**88,740**	**115,593**	**145,578**	**183,058**	**229,908**

Footnotes:
[1] Assumes 80 percent of County growth occurs in UGAs.
[2] Assumes 10 percent of total non-UGA service is provided by Anacortes 50 percent by PUD, and 40 percent other.

Table 8-6
PUD Service Area Water Demand Forecast (excluding industrial)

Year	Population		Water Demand (MGD) [1]				Water Demand (MGD)		Total Water Demand (MGD)	
			Average Day		Peak Day		Whatcom County and Stanwood [2]		Total	Total
	UGA	Non-UGA	UGA	Non-UGA	UGA	Non-UGA	Avg.	Peak	Avg.	Peak
2000	49,485	18,690	6.7	1.7	13.4	4.4	0.5	1.0	8.9	18.8
2010	67,016	21,724	9.0	1.9	18.0	4.9	1.4	3.2	12.3	26.1
2020	89,910	25,683	12.1	2.3	24.2	6.0	1.5	3.5	15.9	33.7
2030	15,472	30,106	15.6	2.7	31.2	7.0	1.5	3.5	19.8	41.7
2040	147,426	35,632	19.9	3.2	39.8	8.3	1.8	4.1	24.9	52.2
2050	187,369	42,539	25.3	3.8	50.6	9.9	2.1	4.7	31.2	65.2

Footnotes:
[1] Assumes 135 gpc demand for urban use and 2.0 peak factor; 90 gpc rural use and 2.6 peak factor.
[2] Table 7-8 and 7-9, Whatcom County and Stanwood combined demand and 2.0 peak factor.

Table 8-7
Concrete, Hamilton, and Lyman Service Area High Population Forecast

	Year					
	2000	2010	2020	2030	2040	2050
Concrete [1]	1,052	1,438	1,942	2,505	3,209	4,089
Hamilton [1]	314	386	480	585	717	882
Lyman [1]	354	450	576	716	892	1,112
Total	**1,720**	**2,274**	**2,998**	**3,806**	**4,818**	**6,083**

Footnotes:
[1] For County-wide demand purposes all water usage is considered to be at an urban level of 135 gpc.

Table 8-8
PUD Service Area Average and Peak Day Projected Water Demands (including industrial)

Use	Year											
	2000		2010		2020		2030		2040		2050	
	Avg. Day	Peak Day	Avg. Day	Peak Day	Avg. Day	Peak Day	Avg. Day	Peak Day	Avg. Day	Peak Day	Avg. Day	Peak Day
UGAs	6.7	13.4	9.0	18.0	12.1	24.2	15.6	31.2	19.9	39.8	25.3	50.6
Industrial Supply [1]	4.0	4.0	4.0	4.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
City of Stanwood and Whatcom County Intertie	0.5	1.0	1.4	3.2	1.5	3.5	1.5	3.5	1.8	4.1	2.1	4.7
Non-UGA	1.7	4.4	1.9	4.9	2.3	1.0	2.7	7.0	3.2	8.3	3.8	9.9
Total	**12.9**	**22.8**	**16.3**	**30.1**	**20.9**	**38.7**	**24.8**	**46.7**	**29.9**	**57.2**	**36.2**	**70.2**

Footnotes:
[1] Approximately 25 percent of County industrial demand served by PUD.

Table 8-9
Anacortes Service Area Average and Peak Day Projected Water Demands (including industrial)

Use	Year											
	2000		2010		2020		2030		2040		2050	
	Avg. Day	Peak Day	Avg. Day	Peak Day	Avg. Day	Peak Day	Avg. Day	Peak Day	Avg. Day	Peak Day	Avg. Day	Peak Day
UGAs	2.4	4.8	3.2	6.4	4.3	8.6	5.5	11.0	7.0	14.0	10.0	20.0
Non-UGA	0.3	0.8	0.4	1.0	0.5	1.3	0.5	1.3	0.6	1.6	0.8	2.1
Whidbey Island	3.4	6.7	4.8	9.5	4.8	9.5	4.8	9.3	4.8	9.3	4.8	9.5
Industrial Supply [1]	9.0	9.0	12.0	12.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0
Total	**15.1**	**21.3**	**20.4**	**28.9**	**25.6**	**35.4**	**26.8**	**37.8**	**28.4**	**41.1**	**31.6**	**47.6**

Footnotes:
[1] Approximately 75 percent of County industrial demand served by Anacortes.

Table 8-10
Concrete, Lyman and Hamilton Service Areas Demand Forecast [1]

Year	Year											
	2000		2010		2020		2030		2040		2050	
	Avg. Day	Peak Day	Avg. Day	Peak Day	Avg. Day	Peak Day	Avg. Day	Peak Day	Avg. Day	Peak Day	Avg. Day	Peak Day
Hamilton	0.14	0.28	0.19	0.38	0.26	0.52	0.34	0.68	0.43	0.83	0.55	1.10
0.04	0.04	0.08	0.05	1.10	0.06	0.12	0.08	0.16	0.10	0.20	0.12	0.24
Concrete	0.05	0.10	0.06	0.12	0.07	0.14	0.09	0.18	0.12	0.24	0.15	0.15

Footnotes:
[1] For purposes of CWSP all flow considered at an urban level of 135 gpc and a peaking factor of 2.0.

8.4 Rural Water Supply Systems

Of the larger and/or expanding public water systems identified, the remaining 17 are located within areas of the County currently targeted for a rural area designation. Based upon data obtained from the utilities and other sources during preparation of the CWSP, the water supply requirements are projected to be as shown in Table 8-11. These requirements are derived from the number of potential services/connections proposed by the utility and in most cases represent a foreseeable "build-out" condition. Totals include an estimate of private wells not accounted for in other utility service. Data are not available to allow a forecast of time over which the build-out will take place.

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Table 8-11
Non-UGA Utilities
Water Supply Demand

Utility	Potential		Water Demand [2] (MGD)	
	Services	Population	Avg. Day	Peak Day
Blanchard Edison Water Association	384	899	0.081	0.210
Cape Horn Maintenance Co.	590	1,381	0.124	0.323
Cedargrove on the Skagit	292	683	0.061	0.160
Del Mar Community Service	346	725	0.065	0.170
Guemes Island Water Company	150	351	0.032	0.082
Lakeside Estates	27	405	0.006	0.016
Leif Erickson Recreation Assn.	180	421	0.038	0.099
Rockport Water System	60	140	0.013	0.330
Samish Farms Water Assn.	465	1,088	0.098	0.255
Shelter Bay Community	935	2,188	0.197	0.512
Skagit County Water District No. 1	90	211	0.019	0.049
Upper Skagit Indian Tribe	70	164	0.015	0.038
Wilderness Village	110	257	0.023	0.060
Other (private wells)	4,268	9,989	0.899	2.300
Total	9,231	18,902	1.7	4.400

Assumptions:

(1) Based upon 1990 Census report of an average of 2.34 persons per housing unit in rural Skagit

(2) Assumes and average per capita demand of 90 gallons per day and a peaking factor of 2.6.

(3) Based on estimate of non-UGA population not accounted for by PUD, Anacortes or above non-UGA

8.5 Existing Facilities

Information related to 20 of the 23 systems under review is presented in Table 8-12. Sources of this data are water system comprehensive plans, DOH files, and personal contacts. Data reported includes utilities' supply sources, installed supply capacity, water treatment, fire flow, storage, and present and/or planned interties.

Data regarding the installed capacity for each source was developed in the following manner, relying on the information sources indicated above:

- The reported capacity of the pumping facilities installed at a well or other source was assumed to be the peak supply rate.
- This rate was usually provided in gallons per minute and was converted to million gallons per day (MGD).
- In instances where source development includes a water filtration plant and the capacity of the plant is the limitation on water delivery, the peak day production of the plant was assumed to be the peak installed capacity.

Although the overall data reported in Table 8-11 are a measurement of the ability of a utility to provide adequate and reliable water service, the key data element to the system assessment is the source installed capacity. This data element is used to evaluate the ability of utilities to serve expanded service areas from existing sources.

Table 8-12
Public Water System Inventory

Water System Name	Date of Comp Plan	Supply Sources	Source Installed Capacity (Peak MGD)	Water Treatment*	Fire Flow	Storage (MG)	Certified Operator	Interties	Future Expansion	Comments
Anacortes, City of	2/25/92	Skagit River	33.0 33.0	Dis., Sed., Filt., PAC, pH, FL	Yes (750-4,500 gpm)	7.00	Yes	Yes - Skagit PUD	Yes	Wholesales water to Oak Harbor, LaConner, and Skagit PUD. Water rights established on Lakes Campbell and Erie, but presently not used. Indicated source installed capacity of 33 MGD is present peak day production of pumping station on Skagit River.
Blanchard Edison Water Assn.	None	Well No. 1 Well No. 3 Well No. 4 White Wheel Creek	0.144 0.432 0.187	None	No	0.20	Yes	Yes - Skagit PUD	No	Additional services would be a result of infilling only. Skagit PUD - emergency use only.
Cape Horn Maintenance Co.	8/16/95	Well No. 2 Well No. 3	0.216 0.216 0.432	None	No	0.119	Yes	None	Yes	Future increases due to infilling of existing lots and some new areas to the southwest.
Skagit PUD - Cedar Grove	10/5/95	Well No. 1	0.432 0.432	Dis.	Yes	0.27	Yes	None	Yes	System owned and operated by Skagit PUD.
Colony Mountain Community Club	1998	Well #1	0.01	None	Pending	0.06	No	None	No	
Concrete Utilities	8/16/95	Spring	1.080 1.080	None	Yes (2.5" -70PSI)	0.10	Yes	None	Yes	Any future increase would be west of City limits. Considering adding new spring source estimated at 200 gpm.
Del Mar Community Service	1/1/95	Well Spring (Jones Canyon) Spring (Dodson Canyon)	0.036 0.016 0.027 0.079	CL CL CL	Yes	0.20	Yes	Yes - Anacortes	No	Approved for 346 services, but utility does not propose to expand.

Table 8-12 (continued)
Public Water System Inventory

Water System Name	Date of Comp Plan	Supply Sources	Source Installed Capacity (Peak MGD)	Water Treatment*	Fire Flow	Storage (MG)	Certified Operator	Interties	Future Expansion	Comments
Guemes Island Water Company	1/1/94	Well No. 1 Well No. 2 Well No. 3	0.034 0.026 0.034 0.094	None	No	0.08	No	None	Yes	Will expand service if water rights are granted by DOE.
Hamilton Water Department	8/4/95	Well No. 1	0.100 0.100	None	No	0.065	No	None	Yes	Potential 130 new services in development north of town, additional 50 by infilling. New well and storage are being designed.
La Connor Water Department	4/14/86	Anacortes	5.040 5.040	Yes (by Anacortes)	Yes	1.50	Yes	Yes - Swinomish	Yes	Additional services will be infilling within existing service area boundary, with some extension to the northeast.
Leif Erickson Rec. Assn.	None	Well No. 1	0.114 0.114	None	No	0.011	No	None	No	No plans or desire to expand service area. Additional 100,000 gallons storage proposed. About 20 connections are full time residents.
Lyman Water Department	None	Well No. 1 Well No. 2	1.008 1.008 2.016	None	Yes (250 - 1,450 gpm)	0.15	Yes	None	Yes	Would be willing to expand service to the south and surrounding city limits but no development plans are known.
Skagit PUD - Rockport	10/5/95	Well No. 1	0.144 0.144	Dis. (available)	Yes	0.060	Yes	None	Yes	System owned and operated by Skagit PUD.
Samish Farms Water Assn.	None	Skagit PUD	0.216 0.216		No	0.45	Yes	None	Yes	Would be willing to expand service, but no development plans are known.
Shelter Bay Community	1969	La Connor/ Anacortes	0.778 0.778	Yes (by Anacortes)	Yes	0.147	Yes	Yes - Swinomish	Yes	Would be willing to expand service, but no development plans are known.
Skagit PUD (Fidalgo Island)	10/5/95	Anacortes		Dis., Sed., Filt., Pac., pH, FL	Yes	0.3	Yes	Yes - Anacortes	Yes	4 interties with City of Anacortes. Transmission lines at Reservation Road, Shapiro Corners, Dewey and Deception Road.

Table 8-12 (continued)
Public Water System Inventory

Water System Name	Date of Comp Plan	Supply Sources	Source Installed Capacity (Peak MGD)	Water Treatment*	Fire Flow	Storage (MG)	Certified Operator	Interties	Future Expansion	Comments
Skagit PUD (Judy)	10/5/95	Gilligan Creek Mundt Creek Turner Creek Salmon Creek Anacortes	14.24 17.17 11.05 3.75 36.145	Disinfection Filtration pH	Yes	24.12	Yes	Yes - Anacortes, Samish Farms, Fir Island, Blanchard Edison	Yes	Installed capacities of the creek sources are diverted to Judy Reservoir. Water delivery to the transmission mains is limited by the water treatment plant which has a design capacity of 12 MGD and peak day flow capacity of 18 MGD.
Skagit County W. D. No. 1	1/27/96	Well No. 1 Well No. 2	0.108 0.181 0.289	None	Yes	0.08	No	None	Yes	Plans to expand by 20 services.
Swinomish Utility and Env. Serv. Auth.	1986	Well No. 1 Well No. 2 Well No. 3 Anacortes	0.130 0.065 0.065 0.0288 0.548	CL, FL	Yes (500 - 1,000 gpm)	0.218	Yes	Yes - Anacortes, La Connor, Shelter Bay	Yes	Projected future services estimated based on an expected increase of 235 residential equivalents. Assumed 3 residents per service. Growth along Western Coast North of Highway 20. Well No. 1 not used - high iron problem.
Upper Skagit Indian Tribe	None	Well No. 1 Well No. 2	0.065 0.079 0.144	CL, FL	Yes	0.088	No	None	Yes	
[illegible]d Village	1/29/98	Well No. 1	0.122 0.122	None	No	0	No	None	Yes	

*Water Treatment:
CL = Chlorine
FL = Fluoride
DIS = Disinfection
SED = Sedimentation
FILT = Filtration
PAC = Powdered Activated Carbon

8.6 Water Rights

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8.6.1 Analysis for Existing and Expanding Systems

Having adequate water rights is a requisite for water supply development and planning. Being able to acquire new water rights is a necessary component of new source selection and development.

Current water right information is on file with the Department of Ecology (Ecology) for the larger Group A and expanding systems. A search of individual records was not conducted for the CWSP.

The water rights as they apply to the PUD and the City of Anacortes are being documented through a 50-year Memorandum of Agreement (MOA) (Appendix G). The MOA is signed by the PUD, City of Anacortes, the County, Upper Skagit, Swinomish, and Sauk-Suiattle Tribes, Ecology, and Department of Fish and Wildlife. It sets forth the process of determining Lower Skagit River and Cultus Mountain in-stream flows in exchange for water rights in accordance with the agreed upon in-stream flow levels.

Through this Agreement, the PUD and the City of Anacortes will confirm water rights to resources to meet projected future demand. The MOA is binding. No challenge to water right will be made for a 50-year period from the date of signing and agreement to in-stream flow levels. Beyond the 50-year period, existing water rights will be protected.

8.6.2 Future Requirements

WAC 246-290-130 requires that no new, previously unapproved sources, or modification of existing sources, be approved by DOH for use as a public water supply without a water right permit, if required, issued by Ecology (a water right permit is not required for withdrawals of groundwater of 5,000 gallons per day or less, for use for single or group domestic purposes). The purpose of this requirement is to ensure that public water systems are not created or expanded without having an adequate and reliable source of supply. In the past, DOH has given approval to water system projects conditional upon obtaining a water right permit from Ecology. However, in many cases projects that had received conditional approval proceeded to construction without obtaining the water right. This has resulted in a number of existing systems potentially being without an adequate and reliable source of supply should there be problems in ultimately obtaining the water right.

DOH now places greater emphasis on assuring that a utility has adequate and proper water rights before approving plans for new and expansion of existing public water systems. Pursuant to an agreement entered between DOH and Ecology in June 1991, it is required that, prior to submittal of

drinking water supply projects to DOH for approval, the applicant must determine from Ecology whether a water right permit or change to an existing water right is required. If required, the applicant must obtain the water right permit from Ecology prior to submittal of the proposal to DOH for approval. Since current processing time for water right permits is measured by years, utilities must include water right considerations in their short- and long-term improvement plans.

8.7 Demand Analysis

8.7.1 Special Considerations

The dominant future water demands within this evaluation are obviously on the City of Anacortes and the PUD systems. For this reason, the following circumstances of the existing systems are set forth.

(1) City of Anacortes - The raw water intake/pumping station on the Skagit River is designed and constructed to provide for a maximum diversion of 55 MGD. Four low head pumps are currently installed (two constant and two variable volume) having a combined capacity of 33 MGD. Pumping bays exist for installation of two additional pumps to increase the capacity to 55 MGD.

Raw water is delivered to the filtration plant which is designed for a nominal capacity of 20 MGD and a peak capacity of 30 MGD. Critical hydraulic features of the treatment plant are designed to permit future expansion to 60 MGD.

Treated water is delivered to a 760,000 gallon clearwell where chlorination takes place. Eight, five-stage, vertical turbine pumps with a rated capacity of 3,000 gallons per minute (4.32 MGD) each, and two, twelve-stage vertical variable output turbine pumps rated at a maximum of 1,200 gallons per minute (1.728 MGD) each, pump water to the transmission lines. The two variable output pumps are "balancing" or "trim" pumps to provide flow for final filling of reservoirs. Total maximum pumping capacity of the pump header is about 38 MGD. However, based upon pipeline conditions, the peak pumping capacity is 33 MGD and the normal maximum is approximately 30 MGD.

(2) PUD - The District obtains its primary water supply from the Cultus Mountain watershed. A portion of the waters of Gilligan, Salmon, Mundt, and Turner Creeks are diverted to Judy Reservoir. This reservoir is created by two dams and currently stores 1,010 million gallons at water surface elevation 451 feet. Design and construction is currently underway to expand the impounding dams to raise water

surface elevation to 461.2 feet. Storage at this elevation would be 1,460 million gallons.

Currently, water is pumped from Judy Reservoir to the water treatment plant, which has a nominal design capacity of 12 MGD and a hydraulic peak capacity of 18 MGD. The treatment plant is designed for future expansion to 30 MGD peak flow and oversizing of pumps and piping took place during construction. Treated water flows from the treatment plants to two, 1.2 million gallon storage tanks which supply the transmission system by gravity.

8.7.2 Summary

A comparison of (1) current installed system capacity, (2) forecasted system demand for the year 2050, and (3) recorded water rights is shown in Table 8-13. All data represents peak day conditions since regional planning for future water supplies must address this need. The peak day requirement for the urban systems is the year 2050 forecasted demand. For the rural systems, the data represents full development of the potential services/connections shown in Table 8-10, plus estimated private wells. The systems have been grouped in the categories of UGA and non-UGA based upon the UGAs established by Skagit County and the cities. The data represents a summary of the analysis described in this section of the CWSP.

Table 8-13
Future Regional Demand Summary

Purveyor	Peak Day Existing Installed Capacity [1] (MGD)	Projected Peak Day Capacity	Year 2050 Peak Day Requirement[3] (MGD)	Existing Water Rights (MGD)	Water Rights per MOA [2]	Short Falls	
						Capacity	Water Rights
UGA Systems							
City of Anacortes	30.0	55.0	47.6	75.8	75.8	-	-
PUD No. 1 (Judy)	18.0	30.0	70.2	27.5	35.8	40.2	34.4
Hamilton, Lyman, and Concrete	3.2	3.2	1.5	-	-	-	-
Subtotal	51.2	88.2	119.3	103.3	111.6	-	6.2
Non-UGA Systems	6.0	6.0	4.4	4.0	4.0	0	0.4
Total	57.2	94.2	122.7	107.3	115.2	30.2	6.0

Footnotes:
[1] Installed capacity is the peak day production of the filtration plant.
[2] Of this total, 54.94 MGD (City) and 27.5 MGD (PUD) are not subject to in-stream flows.
[3] Includes industrial demands.

Although numerous assumptions have been made as to the future distribution of County population and related water demand, the system

assessment results for a total County peak day demand is consistent with the County-wide forecast developed in Section 7 (i.e., 122.5 MGD by the system assessment compared to 122.7 MGD for year 2050 population based estimate).

8.8 Conclusions

Viewing the above analysis from a regional perspective, the following conclusions are reached:

- In the aggregate, the current installed capacity of the rural systems (6 MGD) is sufficient to meet the forecasted peak day requirement at full connection development (4.4 MGD). Documented water rights (4 MGD) fall short of the projected requirements. However, each rural utility's situation is unique and must be viewed separately. Due to the distance between utilities, there is little opportunity for sharing of supply sources through system interties.
- Additional system capacity must be installed by the City of Anacortes to meet projected year 2050 peak demand of 47.6 MGD. The City has planned for this need in the design and construction of its water intake structure on the Skagit River and at the water treatment plant. Both can accommodate an expansion to 55 to 60 MGD (peak day flow) and water rights currently exist for benefit of a 55 MGD diversion.
- The PUD must also provide for additional system capacity to meet the forecasted demand upon its regional system. Here again, advanced planning has taken place. Provision has been made, and work is in progress to raise Judy Reservoir dams, water right applications have been advertised and are pending for appropriation of additional water from Cultus Mountain streams, based on the 50-Year MOA. The water treatment plant is designed and constructed to accommodate an increase in capacity to 30 MGD.
- Including the projected installed capacity of 30 MGD scheduled for 2005, the PUD shortfall by the year 2050 will be approximately 40.2 MGD on a peak day basis.
- On a regional basis, assuming the MOA agreement is implemented, water rights will be insufficient to meet year 2050 forecasted peak day needs by 6.0 MGD.
- It is the position of at least the Swinomish Tribe that nothing in the CWSP should be construed as acknowledging or constituting quantification of Tribal reserved water rights or future Tribal water needs.
- Agricultural demands are not addressed here, but should be included in the basin-wide planning performed with the Skagit-Samish Rivers Watershed Plan.

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Section 9
Regional Water Supply Strategy

9.1 Introduction

Public water supply needs within Skagit County (County) are currently met from a combination of surface and groundwater sources. As described in Section 8 (Assessment of Existing Water Supply Systems), the two largest systems (City of Anacortes and Public Utility District No. 1 of Skagit County (PUD)) will serve approximately 94 percent of the County population in 2000 and an estimated 96 percent in 2050. Both utilities have developed surface water sources. The other systems rely primarily upon groundwater development.

Only a few systems currently experience problems in developing adequate water supply. The most predominant of these problems is on Guemes Island. These shortages are primarily related to limited groundwater yields, potential for seawater intrusion into the aquifers near the perimeter of the island, and uncertainties in State groundwater policies.

On a regional basis, additional demands (over current 1995 use) of 45.7 MGD average day and 84.5 MGD peak day are forecast for the year 2050 (See Section 7, Tables 7-9 and 7-10). Expansion of treatment plant capacity to meet forecast peak day requirements will be needed for the PUD system by the year 2005 and for the City of Anacortes by the year 2010. An increase in water source capacities and related water right considerations for these systems is currently addressed through the 50-Year Memorandum of Agreement (MOA).

For areas in the eastern portion of the County which depend primarily on local groundwater supplies, water of adequate quantity and quality appears to exist, particularly in the Skagit River Valley trough. However, the groundwaters are believed to be in hydraulic continuity with the Skagit River, and future State policies for issuance of new water rights may limit future development.

This Coordinated Water System Plan (CWSP) study has shown that additional public water supplies are required to meet future County needs. This section examines the alternatives for meeting those needs and recommends a regional supply strategy.

9.2 Planning Criteria

9.2.1 Regional Water Supply Requirements

The water demand forecast developed in Section 7 examined Skagit County and adjoining area future needs under two scenarios. One scenario assumed

current levels of per capita water consumption would continue into the future. The second relied on a basic water conservation program being implemented by the year 2000, achieving a 10 percent reduction in per capita water use.

The forecast including conservation savings was adopted for purposes of this plan. This forecast identifies a regional requirement for an additional 45.7 MGD (average day) and 84.5 MGD (peak day) over current use (Tables 7-9 and 7-10). These quantities are used for regional planning purposes.

9.2.2 Source Selection

Guidance for identifying sources of supply for study purposes was provided by the Water Utility Coordinating Committee (WUCC). The selection/screening criteria adopted are as follows:

Water Quantity

- ❑ Supply should be sufficient to meet year 2050 average day needs.
- ❑ Source(s) must be developable from technical and political standpoints.
- ❑ From a geographic perspective, examine only those sources that are internal to the CWSP study area.
- ❑ Consider the conjunctive use of surface and groundwater.
- ❑ Groundwater availability in a regionally significant quantity must be on a sustained basis without producing long-term water level declines. A regionally significant quantity is defined as 2.0 MGD or more (about 1,400 gallons per minute) from one well or group of wells (well field) in close proximity.

Water Quality

- ❑ Supply sources must meet State and federal quality standards. Treatment to meet standards is to be considered, subject to economic constraints.
- ❑ New sources of supply should not degrade existing system water quality.

Efficiency

- ❑ Priority should be given to full utilization of existing systems.
- ❑ Development of existing sources should be enhanced.

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Reliability

- Sources must be capable of supplying the design flow 98 percent of the time during which water is required. This equates to a supply which falls below the prescribed value only once every 50 years.
- Source augmentation (e.g., artificial recharge, and storage) may be used to achieve supply reliability.

Environmental

- Preference should be given to supply development options having the least environmental consequences.
- Mitigation of environmental consequences shall be consistent with the State Environmental Policy Act (SEPA) and Skagit County Comprehensive Plan requirements.

9.3 Supply Sources

9.3.1 Groundwater

Recognizing in 1993 that there may be significant potential for groundwater development within the County, the firm of Pacific Groundwater Group was retained during development of 1993 CWSP, to conduct an assessment of the groundwater resources. The specific goals of this study were to:

- Estimate amounts of groundwater potentially available in the County;
- Identify preferred locations for additional development;
- Assess existing water quality and its potential effects on development; and,
- Quantify the cost and general number of wells needed for the additional development.

The final text of the report prepared at that time is included as Appendix H. A summary of the report, still considered valid for purposes of this CWSP update, follows.

Geology and Aquifers

Aquifers were defined through the review of key geologic reports and over 2,000 well logs contained in the files of the Department of Ecology (Ecology). About 250 representative logs were selected that indicated both hydrologic and geologic information. Where available, at least one representative log per

square mile was obtained. Using this information, geologic cross sections were prepared and geologic units identified.

This work disclosed that most of the County's high yield aquifers are associated with the Skagit River. They typically consist of coarse deposits of sand and gravel within the upper 200 feet of the alluvium that defines the Skagit Valley.

Potential Well Yield

Potential well yield was defined as the short-term yield that is likely available from a properly designed and constructed well, finished in the best aquifer (when more than one aquifer lies at depth) from some location within the area. This yield may not be possible with the existing wells installed in the area.

All areas are likely to contain anomalous wells that produce substantially different yields. These anomalous wells are not considered to be representative of yields that may be used in planning for regional water supply.

The highest yields are generally associated with the Skagit River Valley alluvial areas. Yields of 500 or more gpm are possible throughout much of the Valley, with yields of more than 800 gpm possible near the Marblemount area. High yields are also possible in the eastern part of the Skagit Delta area. These yields are also in the 500 gpm or more range.

A small high-yield area was also identified near Lake McMurray. Potential well yields of 500 gpm or more are possible in this area from sand and gravel probably associated with glacial outwash deposits.

Other areas in the County have estimated potential yields of 100 gpm or less. Since 100 gpm is not considered practical for a regional water supply, they are not considered further in this report.

Groundwater Quality

Groundwater quality was assessed to identify the likely water quality from locations that may be considered for regional water supply. Areas were identified where local groundwater quality was known to meet drinking water standards. Areas with wells known not to produce water meeting the standards were also identified.

Three major categories of water quality problems were considered:

- ❑ Saline water;
- ❑ Natural water contaminants, such as iron and manganese; and,
- ❑ Industrial contamination.

More recently, in 1997, the Department of Health (DOH) began full implementation of the Groundwater Under the Influence of Surface Water (GWI) aspects of the Surface Water Treatment Rule. Groundwater sources that are found to be directly influenced by surface water must meet the same treatment requirements as surface water sources. This issue was not a consideration in the 1993 Pacific Groundwater Group study, and could further limit the potential areas for groundwater development. This issue is not included in the following discussions. It would need to be evaluated for new wells in proximity to the Skagit River or other surface water bodies.

Wells with historical occurrences of excess levels of iron, manganese, and salinity (indicated by chloride concentrations) were identified based on published records and DOH water system records. Additional information on saline water was obtained from well logs from Ecology, discussion with well drillers Dean Hayes (1991) and Ken Fowler (1991), and data contained in the files of Ecology (Garland, 1991). Information on potential industrial contamination was obtained from the County Health Department (Haycox, 1991) and Ecology listings of remediation sites in the County.

Criteria were established to designate water quality problem areas. Any report of iron or manganese exceeding the secondary standards of 0.30 mg/l (iron) or 0.05 (manganese) was taken as an indication that future problems in the area were possible. Chloride concentrations of 100 mg/l were taken as an indication that saltwater intrusion (or relic seawater) was present in the area and that future development in the area may have similar problems.

Industrial contamination was considered as a potential problem. The presence of an abandoned landfill, a gas station with a leaking tank, an industrial site such as a refinery or waste transfer/processor, or an agricultural area with known problems such as EDB were all noted, even if actual groundwater contamination had not been reported.

Review of the compiled data indicated that the area east of Concrete has the preferred water quality conditions for a regional water supply. The area between Concrete and Sedro Woolley may also be acceptable. This area has fewer reported and potential water quality problems than areas further to the west.

A regional groundwater supply source developed in the area east of Concrete would be less likely to have excess iron or manganese than a source further down the Valley or in the delta. Areas with wells reporting excess levels of iron and/or manganese lie in the Skagit Delta. Some problem areas can also be found in glacial deposits in the western part of the County and on Guemes Island. Areas up-valley, east of Concrete, do not report excess iron or manganese.

A regional groundwater supply source developed in the area east of Mount Vernon would be less likely to have saltwater intrusion than other areas closer to the delta front. Most areas more than a few miles inland, away from the river, are also acceptable. Areas with wells reporting saline water are listed in the original report. As would be expected, most saltwater intrusion problems occur near the sea, either on islands or near the coast in the delta. Guemes Island indicates many wells reporting saltwater intrusion (unpublished Ecology study, Garland, 1991). Other islands (Fidalgo and Samish) also indicate some intrusion. Non-island intrusion areas are generally confined to the delta area.

Areas with potential for industrial contamination in the groundwater are generally located near population centers, which are located west of Sedro Woolley. A few abandoned landfills can be found further inland. Since these inland landfills are near small, non-industrial centers, they are unlikely to have received a significant volume of hazardous materials. These small landfills are probably not a major concern for development of a regional groundwater supply. Based on these assumptions, the preferred location to minimize potential industrial contamination is inland, east of Concrete away from the few potential problem areas.

Aquifer Recharge and Water Budget

A water budget was developed (see Appendix H) which is a first-cut estimate of the major components of the hydrologic cycle. This estimate indicates the approximate volumes of water that are flowing in and out of the County's hydrologic system through precipitation, evapotranspiration, runoff, groundwater recharge, human consumption, and natural discharge.

The water budget serves as the basis for initial planning of groundwater use. It provides a general understanding of the components of recharge, groundwater use, and natural discharge. This general understanding helps in the management of groundwater resources by indicating the relative magnitude (importance) of each component of the flow system. It cannot be used by itself as a tool for accurate long-term management of groundwater resources. The variability of the natural earth system is too great to allow for precise knowledge of the individual components of the budget to the degree required for management of the resource by water budget analysis alone.

The mass-balance principle was used in determining the water budget; i.e., water going into the system is equal to the water flowing out of the system plus or minus the change in storage of the water within the system. This situation is true at all points of the system at all times based on the principle of the conservation of mass. In the natural system, groundwater storage changes seasonally and with dry/wet year cycles. Pumping of groundwater also changes the amount of storage in the system. In this analysis, it was assumed that

long-term (multi-year) changes in the system are zero. The water budget represents an "average" year.

With the assumption that change in storage is zero (equilibrium conditions) the mass balance was calculated by assessing:

- ❑ Precipitation (a significant water input);
- ❑ Evapotranspiration (a relatively large component);
- ❑ Runoff (a relatively large component);
- ❑ Groundwater recharge (relatively small compared to precipitation); consumption via wells and springs (relatively small compared to total recharge); and,
- ❑ Unaccounted natural discharge (a major component).

The analysis indicates the total recharge to aquifers in the County is on the order of 600,000 acre-feet per year (530 MGD). This amount represents the recharge to all the aquifers in the County. The specific amounts to each zone cannot be accurately estimated from the existing data. The total water balance analysis provides an estimate of additional groundwater development that would be possible based on a 20 percent capture ratio. On a County-wide basis, an additional 100,000 acre-feet per year (about 90 MGD) may be available.

Regional Groundwater Supply Development

The existing data indicate additional groundwater supplies can best be developed in the alluvial deposits in the Skagit River Valley. High-yield aquifers are present beneath the Valley at many locations. High-yield wells appear feasible at most locations from the vicinity near Marblemount to the Skagit Delta west of Mount Vernon. The available data indicate water quality is better and well yields possibly higher in the area just east of Marblemount. Other areas between Marblemount and Concrete also appear to have good water quality but slightly lower well yields. The Valley areas further downstream near Sedro Woolley and Mount Vernon also appear to have the potential for relatively high well yields, but water quality may not be as good with more wells reporting excessive concentrations of iron, manganese, and in some areas near the coast, saline water.

A few areas outside the Skagit Valley indicated relatively large well yields such as near Lake McMurray. The limited extent of the aquifer in these areas make major development of a regional source less feasible, however. Other areas show moderate well yields, such as north of the Skagit River Valley. In these areas, a large number of wells could be installed to produce a regional supply. The costs would likely be prohibitive, making other supply areas more desirable.

Yields from properly constructed wells, finished in the more productive aquifer(s) in the Skagit Valley area, are likely to be in the 500 gpm to 800+ gpm range. Deposits of gravel and sand lying within 200 feet of ground surface allow these high individual well yields. The highest well yields appear feasible in the Marblemount area where the high-energy environment of the Skagit and Cascade Rivers allowed the deposition of the coarser grained materials. Localized high yields are also feasible further downstream, where aquifers also comprise gravel and sand deposits. Areas of silts and fine sands are also present, however, making consistent very high yields (800+ gpm) less likely.

Upland areas surrounding the Valley do not have regional water supply capability because well yields are generally low. These areas contain bedrock aquifers and only very localized and limited sand and gravel deposits. The bedrock areas typically have well yields of under 10 gpm and often much less. The sand and gravel areas may have yields that are higher, sometimes greater than 100 gpm. These yields are still below those needed for an economic regional water supply. They could be used for local supply, however.

The water budget analysis indicates 90 MGD of additional groundwater may be available for development within the County. This estimate is a "first cut" planning value. It is based on an assumed capture ratio of 20 percent. More (or less) than 20 percent of total recharge may be potentially available, depending on the economic, environmental, and social costs that society is willing to pay.

Development of the 90 MGD would require a series of wells along the Skagit River Valley. Full development would likely require 70 to 100 wells from Mount Vernon to beyond Marblemount. Such a series of wells would be needed to intercept groundwater before it discharged to the river. Some areas would require more wells than others, as yield from individual aquifers will vary, locally.

Full development of the estimated 70 to 100 wells needed to develop 90 MGD would cost about $7 million (1993 dollars). The estimated cost for these wells ranges from about $71,000 to $83,000 (1993 dollars). These costs include drilling, testing, production pump installation, engineering and construction of a small well house. They are based on a compilation of estimates provided by several well drilling firms. The estimated average well depth is 150 feet. Diameters would likely range from 12 to 16 inches, based on anticipated peak yields of 600 to 1,000 gpm. The costs for transmission lines, plumbing, and other appurtenances are not included.

Other issues that may impact well development are the Endangered Species Act (ESA), DOH wellhead protection areas, and Tribal/County coordinated management of stream flows.

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Water Right Policies

Ecology has given considerable attention to the relationship of surface and groundwater in water right activities. The term "hydraulic continuity" is used to identify the relationship and is currently defined by Ecology as:

> "The interconnection between groundwater (aquifers) and surface water sources. An aquifer is in hydraulic continuity with lakes, streams, rivers, or other surface water bodies whenever it is discharging to these water bodies. It is also in continuity if it is being recharged by the surface water. Where hydraulic continuity exists, groundwater and surface water can not be considered as independent resources. A withdrawal from one will have some effect on the other." (Ecology Draft Hydraulic Continuity Policy, May 7, 1992)

When hydraulic continuity is determined to exist, Ecology's position is that permit decisions for groundwater withdrawals must be consistent with resource management plans and protection levels established for surface waters. Therefore, since the Skagit River is the discharge point for most groundwater in the County, it is reasonable to assume that requests for appropriation of regionally significant amounts of groundwater would be evaluated as to potential effects on the aquifer and the Skagit River. Quantitatively, the continuous withdrawal of 29 MGD from an aquifer would equate to a flow of 45 cubic feet per second (cfs). Flow of the Skagit River at Mount Vernon (51-year record) averaged 16,710 cfs. The minimum discharge of 2,740 cfs occurred October 26, 1942. Assuming a direct relationship, a 29 MGD withdrawal would represent about three-tenths of one percent of the average discharge and two percent of the extreme low flow of the Skagit River. It is not known whether Ecology would consider this a significant and adverse effect that would prevent groundwater development and use.

A further (and possibly controlling) water right consideration would be the protection of instream flows in the Skagit River. State law requires that certain instream resources be protected and establishes a rule making procedure for setting instream flows. Once established, the protected flows enjoy a priority as of the date the State rule/regulation is adopted. Water rights issued after that date are then inferior to the instream flows and subject to closure to protect the flows. The 50-year MOA defines the process by which the instream flow conditions will be determined and set.

It is the position of the Swinomish Tribe that nothing in the CWSP should be construed as acknowledgments by the Tribe of any determinations which may affect future allocations of instream flows.

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9.3.2 Surface Water

Based upon the adopted planning criteria, only sources internal to the planning area (Skagit County) are to be considered for future water supply. The predominant source is obviously the Skagit River and its tributaries. Secondary sources are the Samish River and smaller systems such as the Lake Cavanaugh drainage which is tributary to the Stillaguamish River.

From a practical standpoint, the Skagit River is the surface water source of choice. The next largest stream, the Samish River, has recorded flows as low as 11 cfs, or about 7 MGD, (July 10, 1951) at the bridge crossing on old U.S. Highway 99. The Samish River and smaller streams would not have a flow reliability to support development for regional water supply.

Based upon U.S. Geological Survey published records for the period of 1940 through 1991, the flow of the Skagit River at Mount Vernon may be summarized as Table 9-1.

Table 9-1
Historical 1940–1991 Skagit River Flow at Mount Vernon

	Cubic Feet Per Second (cfs)	Million Gallons Per Day (MGD)
Mean annual discharge	16,710	10,795
Highest mean daily flow	142,000	91,732
Lowest mean daily flow	3,050	1,970
Minimum day discharge	2,740	1,770

From the standpoint of stream flow records, it appears there should be no problem in meeting the year 2050 forecasted deficit peak day flow of 37 MGD from the Skagit River. This represents two percent of the minimum flow of record. However, as noted in the preceding groundwater discussion, the State has not established instream flows on the River through its rule making process. It is through this process that a priority and quantity of right would be determined for instream resource needs. Prior to granting a reservation or appropriation of a regionally significant amount of water for public water supply use, it is assumed that the State would first establish the instream flows. Instream flow determination is currently in progress as agreed to under the 50-year MOA (Appendix G). Under the agreement the PUD and City of Anacortes will conduct in-stream flow studies in return for water rights. To a portion of the flow in excess of the agreed upon minimum in-stream levels. The reservation or appropriation will carry an inferior priority to the instream resources right. The level at which the instream right is fixed will determine the availability of water for other uses.

9.3.3 Water Conservation

The reduction in water use through water conservation is considered a supply option. For purposes of this CWSP, implementation of utility-specific and a regional conservation plan were factored into the water demand forecast. This conservation plan is described in Section 7 and is a surrogate to a new source of supply through a reduction in future demand.

9.4 Future Supply Options

9.4.1 Non-Urban Growth Areas

The process of identifying and establishing utility service areas, as described in Section 3, resulted in the recognition of many existing, noncontiguous utilities in the non-Urban Growth Areas (UGAs), which rely upon groundwater sources. New systems proposed in the non-UGA will primarily be developed by the PUD consistent with provisions of the Satellite System Program (SSP).

Based upon the results of the previously discussed 1993 CWSP groundwater assessment conducted by Pacific Groundwater Group, it is concluded that groundwater of acceptable quality and quantity is generally available for public water supply in the rural area. Problems do exist in localized areas such as Guemes Island where more detailed groundwater studies may be required.

Given these circumstances, continued groundwater development by utilities appears to be the preferred option in the non-UGA. In that portion of Skagit County west of Sedro Woolley, intertie with or service by the urban systems (City of Anacortes and PUD) should be encouraged when service is available.

9.4.2 City of Anacortes System

The current status of development and future water demand requirements for the City of Anacortes service area are described in Section 8 and summarized as Table 9-2.

Table 9-2
City of Anacortes Service Area Water Demand

	Average Day (MGD)	Peak Day (MGD)
Year 2050 Requirements	28.0	40.5
Current Installed Capacity at Treatment Plant	20.0	30.0
Scheduled Capacity Upgrade	[a]	[a]
Year 2050 (Deficit)/Surplus	(see Appendix G)	

[a] The City of Anacortes plans to upgrade production as needed to maximize water rights.

The existing raw water pumping plant on the Skagit River is designed and constructed to accommodate a peak pumping rate of about 55 MGD. Additional pumps must be installed to develop this capacity. In addition, the existing water filtration plant is designed for expansion to a peak capacity of 60 MGD.

Two State certificates of water right are issued for benefit of the raw water pumping station. The combined appropriation is approximately 55 MGD. In addition, a groundwater certificate of water right exists for the appropriation of about 21 MGD from Ranney wells no longer used by the City of Anacortes. The City has filed application with Ecology to transfer this right to the existing raw water intake on the Skagit River. The 50-year MOA will transfer the Ranney Well right to provide for diversion at existing intake addressed in Certificate No. C-709.

Based upon the above, it appears City of Anacortes water supply demands within the scope of this study can be met from the Skagit River.

9.4.3 Public Utility District No. 1 of Skagit County (PUD) System

Supply Status

The current status of supply development and the future water requirements for the non-satellite service area of the PUD system are generally described in Section 8. This examination relies upon the results of past hydrologic analysis of the watershed streams by PUD consultants using data for the years 1927 through 1962. These data indicate that a low flow critical period existed between May 1928 through November 1929 and that there have been times within this recorded period when no flow was available for diversion to Judy Reservoir from May 1 through September 30.

The relationship of the critical period flow of the source streams (Gilligan, Salmon, Turner, and Mundt Creeks), mainline collector/transmission pipeline capacity from the source streams to Judy Reservoir, and water right status pending MOA required in-stream flow levels are as follows:

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- The 42.59 CFS (27.52 MGD) appropriation from Sedro-Woolley and Ranney Wells (Certificate 1904 and 2107) and Cultus Mountain water rights are not subject to Lower Skagit in-stream flows.

- The 31.69 CFS (20.48 MGD) appropriation from Salmon, Gilligan, Turner, and Mundt Creeks are subject to Cultus Mountain in-stream flows. These flows have been established and are included as Appendix I.

- The 39.81 CFS (23.4 MGD) of pending and new water rights on Salmon, Gilligan, Turner, and Mundt Creeks. The purpose of these applications is to make full use of the hydraulic capacity of collector lines.

- All Cultus Mountain diversion will not exceed 35.8 MGD.

- Cultus Mountain instream flows included as (Appendix I) will be recognized as higher priority than: 1) existing claims and certifications; 2) pending and new water rights; and, 3) future claims and adjustments.

Based on the MOA, the PUD:

- May divert up to 35.8 MGD to Judy Reservoir from Cultus Mountain streams subject to in-streamflows.

- May transfer Ranney & Sedro-Woolley well water rights to diversion at new PUD Skagit River pumping station.

- May provide additional diversion at PUD Skagit River Pumping Station on each of the MOA listed water rights.

- May periodically divert up to 35.8 MGD from the Skagit River to Judy Reservoir as an alternate source of supply to the Cultus Mountain streams with only 8.28 subject to in-stream flows.

Future Requirements

Additional water supply will be required to meet projected PUD system needs. These needs are summarized Table 9-3.

Table 9-3
PUD No. 1 Service Area Water Demand

	Average Day (MGD)	Peak Day (MGD)
Year 2050 Requirement	39.3	79.7
Current Installed Capacity at Filtration Plant	12.0	18.0
Year 2005 Scheduled Capacity Upgrade	24	30
Year 2050 (Deficit)/Surplus	(15.3)	(49.7)

Supply Augmentation Options

Work is currently underway to enlarge the storage capacity of Judy Reservoir from the current 451 elevation to 461.2 by raising the existing dams. The increase in storage will provide an additional 3.0 MGD during the months of May through September. The work is scheduled for completion in 1999.

Several other alternatives exist for augmenting existing sources or developing new sources to meet the forecasted growth within the PUD service area as needed. These alternatives are briefly described below.

- Expansion of City of Anacortes Filtration Plant - The present river bend intertie with the City of Anacortes provides a flow of 4.5 MGD to the PUD system. The Anacortes filtration plant has a current peak day capacity of 30 MGD and is designed for expansion to 60 MGD. With this expansion, the Anacortes system could serve the growth-related needs of the PUD service area. Booster pumping may be required to serve all but two of the PUD pressure zone areas. Alternatives to pumping to the PUD system should be investigated.

- Groundwater Development – Groundwater options are addressed by the "water resources plan" prepared for the PUD by Kennedy/Jenks, 1997. This report is on file at the PUD

Comparison of Supply Options

The relative merits of the additional supply options are summarized in Table 9-4. A comparison of capital or net worth costs is outside the scope of this evaluation.

Table 9-4
PUD Resource Options

Option	Advantages	Disadvantages
1. Joint Use of Anacortes Facilities	Supply potentially available for total future needs	Complementary only to the lower (214) PUD pressure zone
	Minimum near-term capital costs	Pumping/energy cost
	Puts regional water supply program in place	Intertie water right considerations
	Maximizes use of both the Anacortes and PUD systems	
2. Groundwater Development	Supply potentially available for total future needs	Potential water quality (iron and manganese) problems
	Supply can be incrementally developed	Water right complications associated with hydraulic continuity issue
	New sources/wells can be sited in growth areas	Pumping/energy cost
	Maximizes phasing of capital costs	

9.5 Recommended Regional Water Supply Strategy

Based upon the review of supply sources described above, the following supply strategy is recommended for the rural and urban areas of the County. This strategy assumes the land use policies adopted by the County in 1996 under the Growth Management Act (GMA) will generally distribute new population growth in the 80 percent urban/20 percent rural manner described in this CWSP.

9.5.1 Supply Strategy

Non-UGA

A. Within the parameters of the 50-year MOA individual utilities and the Satellite Management Agency (SMA) should rely on groundwater or surface water development for future needs, depending on environmental and cost/benefit analyses.

B. Within the limitations of physical circumstances, utilities should seek interties for both emergency and normal operations.

C. Population growth should be served by those utilities indicating the intent to expand their service areas, and by the PUD (as the Satellite Management Agency), according to the program and policy outlined in Section 6.

UGA

A. The City of Anacortes and the PUD should be the responsible entities for serving growth in the urban areas.

B. Anacortes and the PUD should continue their Joint Operating Agreement for development of shared regional water supply facilities.

C. The PUD should continue under the 50-Year MOA to obtain approval of water right applications on the Cultus Mountain streams in an amount that allows use of the collector pipelines to full hydraulic capacity, when water is available.

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Section 10
Joint Use Facilities

10.1 Introduction

The 1977 Public Water System Coordination Act and the Water Resources Act of 1971 both recognize and encourage the joint use of public water facilities to promote regional water use efficiency and resource management. In addition, the intertie legislation of 1991 (RCW 90.03.383) reinforces this legislative policy and adds the objective of encouraging interties for the purpose of improving the reliability of public water systems.

Joint use of facilities through intergovernmental agreements is an essential component of an effective implementation program. The Coordinated Water System Plan (CWSP) is designed to further expand the joint use concept and seeks to establish a phased program to construct new transmission facilities that intertie major utilities and sources of supply within the urban area of Skagit County (County). Interties with utilities in Island County and between the Public Utility District No. 1 of Skagit County (PUD) and City of Anacortes (City) now exist, and future interties with utilities in Snohomish County are anticipated.

10.2 Joint Use Facilities

The City and the PUD now operate a number of interties between their public water supply systems.

The City and the PUD continue to operate under agreement developed under the 1993 CWSP (Appendix B) to develop a Skagit Regional Water Supply System.

The Agreement recognized the past cooperative programs of the two parties in operating reliable public water systems in Skagit County. The Agreement further established the following intent as set forth in Section 2:

- It is the intent of the parties to cooperate in the development of additional waterworks and facilities that would form a Skagit Regional Water Supply System. The City and PUD will work cooperatively in the development of additional of expanded water resources and systems for distribution within Skagit County. Absent further agreement, the City and PUD will maintain present service areas, and their customers will continue to enjoy the present level of supply and service.
- This Agreement provides a framework for development of each new joint facility. Each joint facility not specifically addressed by this

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Agreement shall be addressed by amendment to this Agreement. The specific intent of this Agreement is to make provisions for a standardized method to expand the Skagit Regional Water Supply System to meet the public water supply needs, and to establish a basis for agreement between the City and PUD for financing, ownership, construction, and operation of new joint facilities required for the Skagit Regional Water Supply System.

- ❑ It is the further intent of the parties that this agreement be incorporated into the Skagit County CWSP.

  This CWSP does establish the current framework for additional projects, projection of need and schedule, and the general guidelines for the regionally coordinated program.

  Joint use facilities may require changes in source of supply water rights. Any source of supply proposed for use as a joint facility should be carefully evaluated to determine water right implications. The existing City and PUD water rights provide for water use within their respective service areas. Extension of this use under the regional concept embodied in the Agreement will require modification of the rights as to the authorized place of use of water. The 1991 intertie legislation (see discussion in Sub-Section 11.5) provides the framework for addressing water right requirements.

Section 9 presents the recommended supply plan for the study area to the year 2050. The evaluation of all supply strategies should be undertaken with the Agreement conditions as a reference. All significant projects will require use and development of joint facilities.

The State, Tribes, and local governments entered into a 50-Year Memorandum of Agreement (MOA) regarding cooperative water resource management of the Lower Skagit River and Cultus Mountain Streams. This updated CWSP and the MOA will continue to be an integral part of the water resource planning for Skagit County.

Collectively, the CWSP, the Water Resources Act of 1971, the MOA, and the Growth Management Act (GMA) establish a program of joint study, resource management, and facility development. The City of Anacortes-PUD Agreement is consistent with the envisioned intent and all of the referenced programs.

During the life of the 1999 CWSP Skagit County will address watershed planning and coordination of all water policies with the Environmentally Sensitive Area (ESA). It is the intent of the CWSP to provide a functional plan that links all water resource planning documents. To achieve that coordination with the CWSP will be periodically reviewed for consistency with the intent of all referenced programs.

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Section 11
Plan Implementation

11.1 Introduction

The intent of the Skagit County Coordinated Water System Plan (CWSP) is to implement the various provisions of the Public Water System Coordination Act, Chapter 70.116 RCW and the County Comprehensive Plan. This Section briefly outlines the approval process for the CWSP and regional administrative actions for implementation, describes how the CWSP is routinely updated, and provides the environmental review.

11.2 Plan Approval Process

It is the responsibility of each utility to fulfill its water system planning requirements. The level of effort required is based upon the system size, the expansion plans of the utility, and the type of system ownership. Guidelines for preparing water system plans (WSP) are available from Department of Health (DOH). Completed WSPs are kept on file with DOH, Skagit County Planning and Permit Center (SCPPC), and Skagit County Health Department (SCHD) and considered to be a part of the CWSP

Preparation of the Supplemental Provisions is the responsibility of the County and the local utilities, acting through the Water Utility Coordinating Committee (WUCC). The WUCC identified local needs and gave direction to the development of the CWSP as it related to area-wide issues. Through the efforts of the WUCC and the County, the procedures, regional policies, and minimum standards have been completed for the Critical Water Supply Service Area (CWSSA).

The completed CWSP is submitted by the WUCC to the Skagit County Board of County Commissioners appointed Citizens Advisory Committee (CAC) for review and comment. After addressing CAC comments, the CWSP is submitted to Skagit County for review and to ensure there are no inconsistencies with the County's County-wide Planning Policies and the Comprehensive Plan. (See Exhibit 11-1.)

Any changes to procedures or other CWSP elements, proposed prior to the update of the CWSP, need to follow the same process for amendment as that outlined above for CWSP approval.

11.3 Water System Plan Review and Approval

The Public Water System Coordination Act and DOH implementing regulations (Chapter 246-293 WAC) require that each purveyor within the critical water supply service area prepare a WSP identifying the proposed program for compliance with and implementation of responsibilities defined in the CWSP (certain exemptions exist for non-municipally owned systems in existence as of September 21, 1977, see WAC 246-293-230). Water system plans are to be completed and submitted for review and approval by all expanding systems in Skagit County.

By statute, DOH is responsible for WSP approval. This approval authority may be delegated to the SCHD for smaller systems. The conditions of such delegation would be set forth in a formal agreement between the agencies.

The County's review must include all plans involving facilities in the unincorporated area, including municipal activities outside corporate boundaries. This review should be coordinated by the SCPPC to determine consistency of proposed actions with county land use policies and plans. When the activities and facilities of a public water purveyor are located entirely within the corporate limits of a city, the review for consistency is to be made by the city. Appropriate recommendations should then be provided to DOH or SCPPC regarding conditions of approval.

Exhibit 11-2 illustrates the procedure described above for review and approval of WSPs. Exhibit 11-3 identifies approved interties between the water systems to provide for sharing of water supplies.

In this Section of the plan, the Swinomish Tribal Planning Department will be substituted for all references to the Skagit County or DOH for purposes of review of proposed new or expanded water systems within the exterior boundaries of the Swinomish Indian Reservation. This will not preclude the Tribe, County, or State from coordinating technical review of proposed systems on the Reservation as is currently practiced.

11.4 Coordinated Water System Plan Update

In accordance with the provisions of the Public Water System Coordination Act, the CWSP shall be reviewed and updated by the WUCC, if necessary. It is recommended that all individual WSPs included within the CWSP updates and submitted for review and approval at the same time as the CWSP. A uniform approval date will allow the Regional Supplement for the CWSP and the individual WSPs to be updated on the same schedule, ensuring the use of current information among all the utilities.

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11.5 Environmental Document

The State Environmental Policy Act of 1971, Chapter 43.21C RCW, requires that all water system plans be accompanied by an appropriate environmental document. An Environmental Checklist has been prepared for the Skagit County CWSP and its recommended activities. This Checklist is included in Appendix J.

The CWSP has been prepared to establish administrative, management, and policy procedures to respond to the needs of existing and future customers in Skagit County. It is intended to address regional concerns within the County, which are not ordinarily included in each utility's WSP. Examples of those regional issues are: potentially shared facilities, regional sources of supply, procedures for reviewing and approving future water use activities, minimum design standards, designated water utility service areas, and water utility management policies.

The CWSP contents are referenced in the Checklist. It is anticipated that implementation of the individual WSPs will have both negative and positive impacts. The CWSP has been developed in accordance with Skagit County and city land use documents to reflect local land use policies and requirements. Therefore, implementation of this CWSP and the employment of sound engineering and construction practices during the implementation of each utility's WSP will minimize any adverse impacts.

A final environmental determination must be made by Skagit County prior to the submittal of the CWSP to DOH. This final determination is to be attached to or incorporated within the CWSP at the time of submittal.

Exhibit 11-1

State Regulation Relating to Local Review of Plan

WAC 246-293-290 Coordinated Water System Plan – Local Review

(1) Prior to submission of a coordinated water system plan to the department for approval, the plan shall be reviewed by the county legislative authority(ies) in the county(ies) in which the critical water supply service area is located. County review of the coordinated water system plan shall include at least one public hearing.

(2) If no comments have been received from the county legislative authority(ies) within 60 days of receipt of the coordinated water system plan, the department may consider the plan for approval.

(3) If within 60 days of receipt of the coordinated water system plan, the county legislative authority(ies) find any segment of the plan to be inconsistent with adopted land use plans, shorelines master programs, the following shall occur:

(a) The county legislative authority(ies) shall submit written description of their determination and justification supporting their determination prior to the end of the 60 day period to the department and all affected parties.

(b) The county legislative authority(ies) shall make every effort to resolve any inconsistencies within 60 days of submittal of written justification.

(c) The department may approve those portions of the coordinated water system plan found not to be inconsistent with adopted plans and policies at any time after the initial determination by the county legislative authority(ies).

(d) If after the 60 day period established for resolution of inconsistencies an inconsistency still exists, the affected parties shall each present their final recommended alternative solution to the department. The department shall then review all alternative solutions and discuss its recommendations with the county(ies) and the water utility coordinating committee. If after two years of the declaration of the critical water supply service area the inconsistencies persist, the department may deny proposals to establish or to expand any public water system facilities which affect that portion of the critical water supply service area being contested.

[Statutory Authority: RCW 43.70.040. 91-02-049 (Order 121), recodified as § 246-293-290, filed 12/27/90, effective 1/31/91. Statutory Authority: Chapter 70.116 RCW. 78-07-048 (Order 1309), § 248-56-800, filed 6/28/78.]

Exhibit 11-2
Skagit County CWSP
Water System Plan Review

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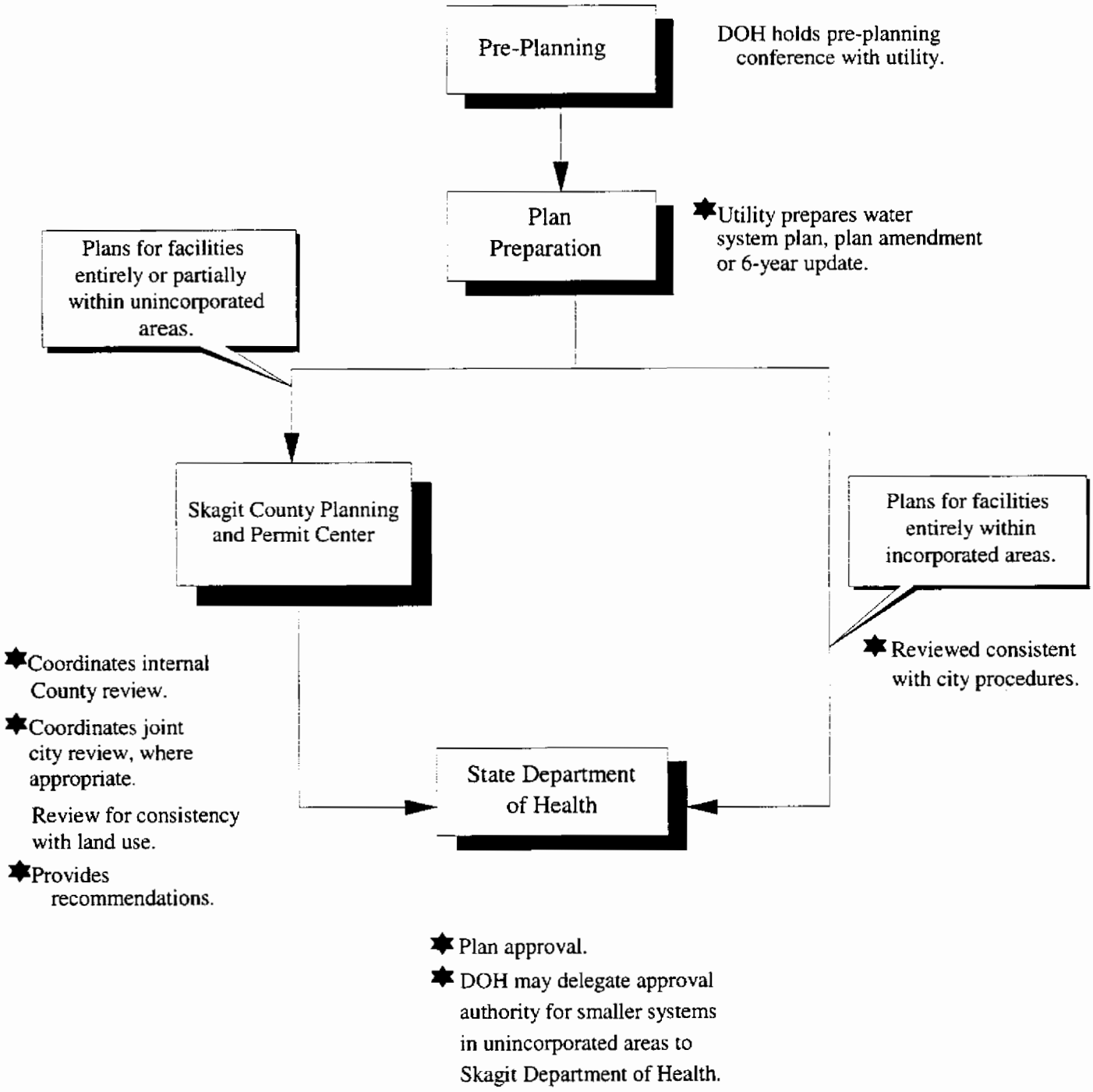

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Exhibit 11-3

Existing and Proposed Interties

Intertie	Existing[1]	Proposed	Function[2]
1. Anacortes – Oak Harbor and US Navy	X		Base
2. Anacortes – LaConner/ Shelter Bay/ Swinomish Reservation	X		Base and Emergency (Swinomish)
3. Anacortes – Skagit PUD			
a) Fidalgo Island (4 each)	X		Base
b) Fredonia	X		Base
c) Memorial Highway	X		Base
d) Avon	X		Base
e) Riverbend	X		Seasonal/Peak
4. Anacortes – Del Mar Community	X		Seasonal/Peak
5. Skagit PUD – Blanchard Edison	X		Emergency
6. Skagit PUD – Samish Farms	X		Base

Footnotes:

[1] Except for the Anacortes – Skagit PUD Riverbend facility, all interties were in existence on January 1, 1991.

[2] The function of the interties are categorized as follows for the purposes of this CWSP:

- ❑ Emergency – The connecting valve is closed except during short-term periods when water shortages exist due to emergency conditions.
- ❑ Seasonal/peak – The intertie is routinely used on an annual basis, normally during the summer, peak use period.
- ❑ Base – The intertie provides the base supply to a utility as a wholesale customer.
- ❑ Conjunctive – Two or more sources of water are utilized by the intertied utilities to improve overall system reliability, optimize system operations, and/or achieve the most efficient use of the combined resources.

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Appendix A
Conservation Planning Requirements

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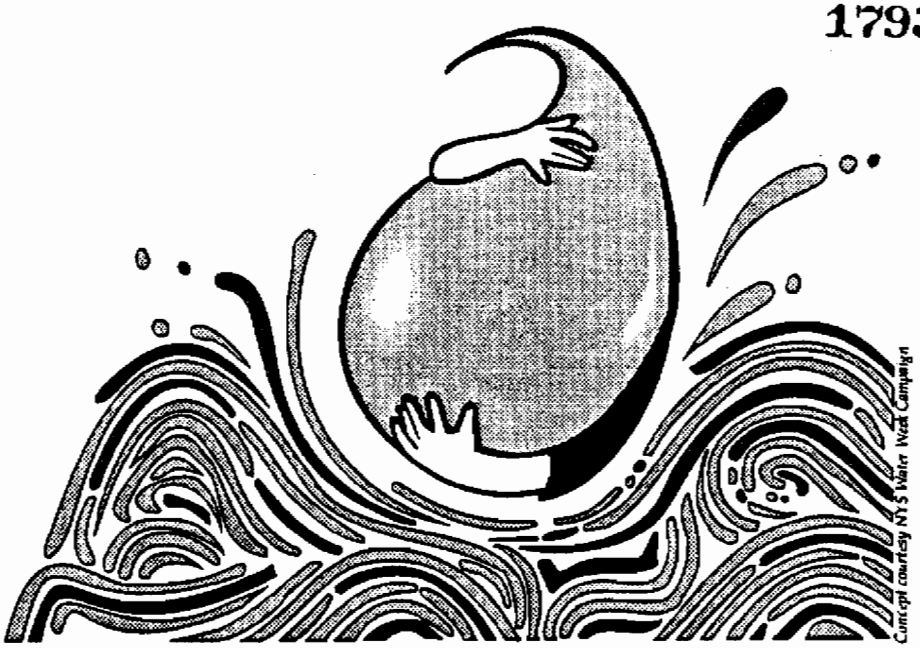

Conservation Planning Requirements

Guidelines and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Ecology Publication #94-24

Washington State Department of Health

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WASHINGTON STATE DEPARTMENT OF ECOLOGY

Washington State Department of Health

Conservation Planning Requirements

Guidelines and Requirements for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs

Written Jointly by:

Washington Water Utilities Council

Washington State Department of Health

Washington State Department of Ecology

For more information please contact the regional office of the Department of Health or Department of Ecology for your location.

March 1994

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Introduction

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This document identifies water use reporting, forecasting, and conservation program requirements for public water systems. The intent is to help water system managers understand what will be required by State agencies for review and approval of water system plans, petitions for the reservation of future water supplies, and water right applications. The term "conservation plan" as used in this document refers to the requirements for water use data collection, demand forecasting, and the conservation program. The term "conservation program" as used in this document refers to the written evaluation of recommended conservation measures and a written description of the level and schedule for implementation of the required conservation measures and those recommended measures determined to be appropriate for the system.

This document was prepared by the Department of Ecology (Ecology), Department of Health (Health), and public water systems, as represented by the Washington Water Utilities Council (WWUC). In 1989 an earlier version of this document was submitted to a range of environmental, tribal, and public water system representatives for comment. Their comments have been considered in developing this document. The text was clarified in 1993 by Ecology, Health and the WWUC to better quantify the requirements in the text and to ensure consistent interpretation.

The Conservation Planning Requirements are based on existing State statutes directing Ecology and Health to encourage water use efficiency. General mandates for implementation of water use efficiency are found in RCW 43.27A.090 (6) [*Powers and duties of the department*]; RCW 90.03.005 [*Reduction of Wasteful Practices*]; RCW 90.03.400 [*Crimes Against Water Code*]; RCW 90.44.110 [*Waste of Water Prohibited*]; RCW 90.54.020 (2) and (6) [*General Declaration of Fundamentals for Utilization and Management of Waters of the State*]; and RCW 90.54.180 [*Water Use Efficiency and Conservation Programs and Practices*]. The last of these statutes states that "increased water use efficiency should receive consideration as a potential source of water in state and local water resource planning processes." Ecology interprets these statutes and the statute governing appropriations of water through issuance of permits (RCW 90.03.290--*Appropriation Procedure*) to direct the Department to incorporate consideration of water use efficiency in the appropriation processes. Ecology interpretation regarding its authority to establish conditions on water right permits and certificates has been supported by numerous Pollution Control Hearings Board decisions. Specific directives to Health for incorporation of procedures and guidelines relating to water use efficiency in development and approval of water system plans are provided in RCW 43.20.230 [*Water Resource Planning*] and WAC 246-290-100 [*Water System Plans*].

The guidelines for conservation emphasize flexibility. The selection of measures and the criteria for the level of implementation to be achieved recognize regional differences in water supply and demand conditions. Data developed pursuant to this document may be made available to other water resource planning efforts, such as the Water Resources Data Management Task Force, Ground Water Management Areas, watershed planning, Growth Management Act planning, and the regional water resource planning process.

Regulatory Agency Review and Implementation

The Conservation Planning Requirements may be implemented, in part, by adoption of a rule as part of the Washington Administrative Code, pending development of more definitive State policies. During the period required for the Legislature to develop and adopt formal policy regarding water use data collection, demand forecasts, and conservation, the Conservation Planning Requirements provide direction to both public water systems and to the Departments of Ecology and Health. Both agencies agree that more stringent conservation measures than those defined herein may be required: 1) where regional water resource plans, pursuant to RCW 90.54.045 [*Water Resource Planning--Pilot Process*], have been, or are being developed and include more rigorous conservation standards; 2) for areas designated as critical water resource situations, pursuant to WAC 173-500-080 [*Critical Water Resource Situation Response Process*], where the intergovernmental group has developed conservation requirements more rigorous than those in the current Conservation Planning Requirements; or 3) if legislation is passed mandating additional conservation efforts.

The Conservation Planning Requirements will be incorporated in Ecology and Health policy and program documents. They will be subject to routine review and modification jointly by Ecology, Health, and interested parties, including WWUC, as data collected and program results are assessed against the overall objectives. Approval of a water conservation plan is a necessary but not sufficient condition for issuance of a water right permit by Ecology. Ecology must also consider many other factors in addition to the conservation plan. **A water conservation plan in compliance with the Conservation Planning Requirements will be required for approval of water system plans and for issuance of water right permits for public water systems by Ecology.** Approval of a conservation plan will be based upon review of all three components of the conservation plan. These components include water use data collection, demand forecasting, and the conservation program development. Conditions may be attached by Health to a water conservation plan where such a plan is part of a water system plan, and by Ecology to a water right permit where such permit requires an approval of a water conservation plan. These conditions may specify requirements for data collection, demand forecasting, or analysis of measures in a conservation program.

Health is the lead state agency regarding conservation program development and planning for public water systems. Ecology has the overall state responsibility for development and implementation of a comprehensive water conservation program that includes all water uses. Conservation plans prepared in accordance with the Conservation Planning Requirements will be reviewed and approved by Health in the water system plan, with concurrence from Ecology. In the case where no water system plan is required by Health, Ecology shall be the lead agency in reviewing and approving the conservation plan when water rights are pursued. The detail regarding agency coordination in approving conservation plans is further defined in a memorandum of understanding between the two agencies on water system plan and water right application review procedures.

The specific criteria to be used in the evaluation of the water conservation program are identified under sections **Required Measures** and **Recommended Measures and Level of Implementation**. In general, the selection and implementation of conservation measures should be determined by the cost of a measure in relation to the value of the water conserved, i.e. by the relation of benefits and costs. Implementation of approved water conservation plans by public water systems will be a condition in all water right reports of exam and all subsequent water right permits and certificates issued by Ecology for public water systems. Preparation and implementation of a water conservation plan consistent with the Conservation Planning Requirements will be a consideration in the water system plan approval process by Health. Finally, conservation plans prepared as part of Coordinated Water System Plans, Water General Plans, and other appropriate regional water resource plans should be consistent with the Conservation Planning Requirements.

Effective resource management requires responsible action on the part of citizens, the public water systems, and the local and State regulatory agencies. The citizens will be asked and required to change their water use habits and possibly to retrofit their water use devices. The public water systems are being asked to establish new operation programs, collect and report more data, and modify system design strategies to conserve water. The regulatory agencies are being asked to provide technical assistance and a timely response to submitted water system plans, projects, and proposals.

Conservation plans submitted in compliance with these guidelines for data collection, demand projections, and conservation programs will meet all regulatory requirements of Health and Ecology for water conservation plans. Additional data requests by Ecology and Health related to such plans will be limited to clarification of background information and not expanded procedures.

Conservation Plan Outline

To assure consistency of review by the Department of Health and the Department of Ecology, conservation plans shall conform to the following format (additional detail is provided later in the text). The three elements of the conservation plan may be in different sections of a water system plan, but must include the items noted below and in the text.

Water Use Data Collection Requirements. Systems must report the best currently available data on water use for the categories of use which are identified in the text.

Water Demand Forecast. A complete forecast, including an estimate of reduction of water use from implementation of water conservation measures, must be developed.

Conservation Program. Implementation of approved water conservation plans by public water systems will be a condition on all water right reports of exam and all subsequent water right permits and certificates issued by Ecology for public water systems. If the public water system has not been collecting data as required, the data which has been collected must be submitted, and collection of data will be a condition of new water rights and certificates, and will be required for future water system plan approvals. Implementation of the required conservation measures, conservation measures chosen for implementation, and data collection identified in this document will be made a condition of all new water right permits, and will be reviewed in future water system plan approvals.

Program elements:

-**Conservation Objectives**. Goals and objectives of the conservation program shall be identified. These objectives should be designed to meet the needs of the specific water system (e.g., attain maximum utilization of current supplies, reduce peak daily consumption, reduce peak monthly consumption, reduce total annual consumption, promote long term efficiency with accelerated conservation on a short term basis, reduce usage from a specific customer class, and develop public education and awareness). *Each water system will need to develop conservation objectives which logically meet its needs.*

-**Evaluation of Conservation Measures**. Public water systems must evaluate all recommended conservation measures identified in the Conservation Planning Requirements and implement those that are required, and those that meet the public water systems needs. The specific measures to be evaluated depend upon the size of the system. However, systems are encouraged to evaluate measures above the minimum requirements. The system must explain decisions not to implement measures it is required to evaluate.

Identification of Selected Conservation Activities

-**Description.** Description of conservation measures being implemented, including required measures.

-**Schedule.** Schedule of when the conservation measures will be implemented, with emphasis on the six year implementation schedule.

-**Budget.** Projected budget for each selected conservation measure. Schedule and budget information should be shown together.

-**Monitoring Requirements.** Description of how the system will monitor the success of its conservation measures (e.g., documented reduction in water usage, distribution of conservation materials, implementation of specific measures).

-**Target Water Savings Projections.** Each system will identify a percentage savings goal, based on the measures chosen for implementation, which the entire water conservation program will attempt to save. Because different systems may have already implemented different levels of conservation, and the conservation needs of each system are different, no percentage savings goal has been established in this document. This percentage savings goal will be factored into the demand forecast as identified in the demand forecasting methodology later in the text.

Relationship between Data Collection and Demand Forecasting

Various State and local government planning activities require the forecasting of future demands for public water supplies. Such forecasts often result in either applications for additional water rights or requests for Ecology to reserve a quantity of water for future water supply needs. It is important that these forecasts accurately portray the future water supply needs of an area to ensure that Ecology and Health, in making their water resources management decisions, are able to do so with the best data available.

To implement an effective demand forecasting and conservation program and to achieve the identified objectives, water use data must be assembled and a conservation program implemented as an element of projecting long-term future water demand. Many public water systems are already collecting the data, others collect only a portion of the data. Therefore, a transition period has been established during which all public water systems can collect data that will provide the necessary database for meaningful demand forecasts. The transition period will be from 1991 to 1996. If unusual weather or demand patterns occur, five years of data may not be adequate.

This document outlines the data collection needs, provides the demand projection methodology for estimating water demands, and provides for incorporating an appropriate adjustment in demand based on a recommended conservation program.

Ecology, and Health, subject to adequate resources, should develop a data management system for the data collected as a result of the program outlined in this document. Individual agency responsibility for the development, application, and maintenance of the database will be identified in a memorandum of understanding between Ecology and Health. State and local governments will jointly expand their efforts to complete the assessment of available ground and surface water supplies. Ultimately, this data will be incorporated in a more comprehensive database that will include data relating to other water uses as well.

Water Use Data Collection Requirements for Public Water Systems

The following table identifies the minimum data required to project public water systems' water demand and to provide a basis for the evaluation of the effectiveness of conservation programs. To properly evaluate trends, at least five years of continuous data is required.

For the purpose of developing plans in compliance with this document, data collection is based on the number of existing direct service connections. A public water system is not required to report water use data for service connections it supplies indirectly through another public water system, i.e., for wholesale customers. However, a wholesale supplier shall identify all public water systems to which it supplies water, i.e. all wholesale customers, and must report data on annual totals of water provided to each. Finally, wholesale suppliers are required to include demands from wholesale customers in their demand forecast, and are strongly encouraged to require their wholesale customers to gather data at a commensurate level. This will help to ensure accurate demand forecasts can be developed, and that conservation programs can be developed which can target high water uses.

Conservation plans submitted through 1996 shall contain currently available data on water use for the categories identified in the following table, and a commitment to collect such data on an ongoing basis. Conservation plans submitted after 1996 should contain five years of data on water use for the categories identified in the following table, and a commitment to continue to collect such data on an ongoing basis.

These requirements are the minimum acceptable level of data collection for the identified size of public water systems. Systems must report the best currently available data on water use for the categories of use which are identified herein. Deficiencies in water use data will be considered on a case-by-case basis. Collection of data consistent with the Conservation Planning Requirements will be a condition on all new water right permits to public water systems issued by Ecology.

All data collected will be included in the water conservation plan submitted either as a part of the Water System Plan or Water System Plan Update submitted to the Department of Health or, where a water system plan is not required, as part of a water right application. As data management systems are developed, the data may be required to be reported annually as determined by Health and/or Ecology. Data should be collected for the time periods described below in the given units of measure. As noted above, water use data will be used for the following: demand forecasting for future water needs; identification of future initiatives in water conservation; to evaluate the success of conservation programs being implemented; to assist Ecology and Health in making water resource decisions; to develop regional water use patterns; to assist public water systems in making management decisions for their systems; and for other efforts where water use data is helpful.

In the water conservation plan, report data in the units of measure given for the time periods listed under the size of the utility. When available, daily, monthly or annual totals are to be included in the plan, not averages.

Type of Data	Units of Measure	Frequency of Collection Based on Number of Direct Service Connections(1)			
		>25,000	10,001-25,000	1,000-10,000	<1,000
Source of Supply Meter Readings (separate records for each point of diversion or withdrawal) (2)	Cubic feet	Collect: Read daily but report only monthly and annual totals	Collect: Read daily but report only monthly and annual totals	Collect: Read daily but report only monthly and annual totals (3)	Collect: Monthly and annual totals
Emergency Interties-amount imported (4)	Cubic feet	Collect: Monthly total	Collect: Monthly total	Collect: Monthly total	Collect: Monthly total
Wholesale-amount purchased (4)	Cubic feet	Collect: Monthly total	Collect: Monthly total	Collect: Monthly total	Collect: Monthly total
Peak Day/ Peak Month	Cubic feet pumped from the supply sources	Collect: Each year's peak day and month totals	Collect: Each year's peak day and month totals	Collect: Each year's peak day and month totals (3)	Collect: Each year's peak month totals
Non-Revenue Water					
Unaccounted for water (6)	Cubic feet	Collect: Annual total	Collect: Annual total	Collect: Annual total	Collect: Annual total(5)
Accounted for water	Cubic feet	Collect: Annual total	Collect: Annual total	Collect: Annual total	Collect: Annual total(5)
Service Meter readings (7)					
Single-Family (8)	Total cubic feet used by this customer class	Collect: Monthly totals	Collect: Monthly totals	Collect: Monthly totals	Collect: Monthly totals(5)

Multi-Family (8)	Total cubic feet used by this customer class	Collect: Monthly totals	Collect: Monthly totals	Collect: Monthly totals	Collect: Monthly totals(5)
Commercial/ Government/ Industrial (8) keep separate records for each of the categories	Total cubic feet used by each customer class	Collect: Monthly totals	Collect: Monthly totals	Collect: Monthly totals	Collect: Monthly totals(5)
Agriculture (8)	Total cubic feet used by this customer class	Collect: Monthly totals	Collect: Monthly totals	Collect: Monthly totals	Collect: Monthly totals(5)
Emergency Interties-amount exported (4)	Cubic feet	Collect: Monthly total	Collect: Monthly total	Collect: Monthly total	Collect: Monthly total
Wholesale-amount sold (4)	Cubic feet	Collect: Monthly total	Collect: Monthly total	Collect: Monthly total	Collect: Monthly total
Population Served (9)	Estimate the number of customers and connections served in the residential classes and the number of connections served in the Commercial, Government, Industrial and Agriculture classes.	Collect: Annual totals	Collect: Annual Totals	Collect: Annual totals	Collect: Annual totals
Economic Data	Exiting water rates for each customer class.	Existing water rates	Existing water rates	Existing water rates	Existing water rates
Conservation Data (10)	Report the type of measure, the level of implementation the duration of the measure, and the date at which they were begun.	Collect:once per year	Collect: once per year	Collect: once per year	Collect: once per year

Footnotes:

(1) The number of system services is based on the number of direct retail services supplied by the water system reporting the data.

(2) Those systems which do not have source meters will be required to estimate source production. Ecology will require source meters for all new or expanding public water systems needing additional water rights.

(3) Public water systems with 1,000 to 10,000 connections located in Critical Water Supply Service Areas (CWSSA - Chapter 70.116 RCW) that have source meters are required to collect source of supply meter readings daily. If not in a CWSSA, such systems must collect or estimate source of supply water use data monthly.

(4) If the public water system purchases water or sells water to another system or systems, collect and report separate data for each seller or buyer. Also separate data should be collected and reported for each intertie.

(5) Calculation of non-revenue water and service meter usage is dependant upon staff resources and the availability of service meters in areas not in CWSSAs. If a water system is located in a CWSSA, the information will be required.

(6) Unaccounted-for water is that water which is lost through leaks, evaporation, or use that is not recorded and/or accounted for. Non-revenue water that is accounted for, such as fire protection, system flushing, and other designated uses can be estimated and should not be included in the unaccounted-for estimate. If service meters are not available, unaccounted for water will have to be estimated from records of leak detection and repair.

(7) All water systems with more than 1,000 services should have a program to meter all individual services by 1996, unless an effective demand management program that identifies water uses of all major user groups is implemented. Those public water systems which do not have service meters will be required to identify major user groups and estimate usage.

(8) If the public water system has used different classes and/or definitions for single-family; multi-family; commercial, governmental or industrial; or agricultural, it may include those definitions and/or classes in its data reporting along with the corresponding data (instead of using the definitions and classes defined herein). If different classes of users are included, the public water system must include in the water system plan or water right application, a timetable for when data will be collected for customer classes consistent with those in this table.

Data shall be collected through normal billing procedures. Monthly data may be estimated if the water system bills less frequently. For systems that bill once a year or less frequently, data must be collected at least semi-annually, once during April to September and once during October to March.

Single-Family is defined as a unit designed to house one family that has one service meter. *Multi-Family* is defined as a group of separate dwelling units served by one meter (e.g., an apartment building). A duplex that has separate meters could be considered two single family units. A single-family home that is converted to house more than one set of residents could be considered a multi-family unit if only one service meter is connected to the house and the public water system is aware that the residence is subdivided into apartments.

Boarding houses and bed and breakfast establishments should be considered commercial users.

A golf course would be considered a commercial account unless it is owned by the same public entity that operates the water system in which case it might be considered part of the government category.

An industrial account is any manufacturer of products. Water is used in the creation of something else. A commercial account is a provider of services that uses water in the provision of service or for domestic use. An example would be a retail complex or a theme park with water rides.

Agriculture is defined as water sold to a user for the irrigation of crops. The water may be of a different quality and may be delivered through a separate meter than other water supplied to the user. Most agricultural uses should be considered commercial use, such as water sold to a nursery. The agriculture category is primarily provided for water systems that also serve irrigation water through an adjunct system.

(9) Population projections for counties are available from the Office of Financial Management (OFM) every five years. OFM also has information on the average number of persons per household in multi-family and single-family housing.

(10) Conservation data is not required to be reported annually but will be used by the water system in calculating a demand forecast. It will be required in water system plans or as a part of an application for a water right.

Demand Forecasting

Public water systems are divided into four categories for the purpose of data requirements (see page 7) and three categories for identification of demand forecasting methods (see page 13). A separate category of recommended demand forecasting methods is defined for regional water system plans. The demand forecast prepared as a component of the conservation plan will contain two separate demand projections (6 year and 20 year) for both average daily demand and peak daily demand. These shall depict future usage with and without conservation savings (target water savings projections) obtained from the system's conservation program.

The following factors will be used in developing the demand forecasts consistent with the guidance on page 12:

Population

Population forecasts must include forecasts approved by the appropriate county/regional planning agency, or Washington State Office of Financial Management (OFM). Alternative forecasts may be provided to establish a potential population range of high, medium, and low and a corresponding water demand forecast range.

Water Use

Water use trends and forecasts will be based on actual water use data contained in the standardized water use data collection requirements to be followed by public water systems beginning in 1991, as referenced on page 7.

Land Use/Zoning/Capacity

Adopted local government land use and zoning plans, including plans developed under the Growth Management Act, shall be used as the basis for the trend analysis of development and water use.

Water Rates

All public water systems shall identify existing rate schedules as part of the water use data collection requirements. Those public water systems with more than 25,000 connections will also be required to incorporate this information into demand projections. Rate design and rate revenue requirement approvals are the responsibility of the public water system board, local legislative body, or the Washington State Utilities and Transportation Commission. Public water systems may be required to outline a financial viability plan to demonstrate its ability to meet system operating and regulatory requirements.

Conservation Savings

Demand forecasts shall depict both projected demand which incorporates water saved through the conservation program and demand without the conservation program. If a public water system is beginning a conservation program, but has not yet collected adequate actual water use data that would reflect reductions in per capita use, an estimated reduction in per capita water use and a period over which it occurs, based on conservation measures selected for implementation in the conservation plan shall be utilized in the demand forecasts. The forecasted reduction in demand due to conservation should be monitored against actual water use data to assess its validity, with appropriate adjustments made to future projections as actual water use data becomes available. Water rights issued by Ecology will be based on demand projections which incorporate conservation savings. Where a water system plan is required, the conservation savings and demand projections identified in the water system plan will be used to determine the system's demand projections and water savings for the purpose of issuing water rights.

Demand Forecasting Methods for Public Water Systems

Public water systems shall use one of the following methods to forecast future public water supply demands, depending on the size of the system. For the purpose of this section, the system size is determined by the total number of services served by a water system, including direct service connections and service connections served by wholesale customers. Demand forecasts shall include demands of wholesale customers.

Systems with > 25,000 Services

The systems in this category will prepare, at a minimum, demand forecast for at least four customer classes (Single-Family, Multi-Family, Commercial/Governmental/ Industrial, and Agricultural). Each class shall factor in use, rates, land use zoning, population, conservation and other factors determined to be appropriate by the public water system. The water use projections should be based on actual data that reflects both existing trends and trends adjusted for changes in land use and implementation of conservation programs. Background on assumptions and methods used shall be provided.

Systems with 10,001 to 25,000 Services

The systems in this category will prepare, at a minimum, demand forecast for at least four customer classes (Single-Family, Multi-Family, Commercial/Governmental/ Industrial, and Agricultural). Each class shall factor in use, land use zoning, population, conservation and other factors determined to be appropriate by the public water system. The water use projections should be based on actual data that reflects both existing trends and trends adjusted for changes in land use and implementation of conservation programs. Background on assumptions and methods used shall be provided.

Systems with 10,000 or Fewer Services

The forecast for this category will be based, at a minimum, on projected population, land use zoning, conservation, documented per capita water use and other documented non residential water use, and other factors determined to be appropriate by the public water system using a trend analysis. The water use projections should be based on actual data that reflects both existing trends and trends adjusted for changes in land use and implementation of conservation programs.

Regional Water System Plan

The demand forecasts in coordinated water system plans, water general plans and other regional water plans should be based on the same methods required of systems of 10,000 or fewer services. If the regional plan is intended to meet the requirements for individual systems within the region, it should be done to a level commensurate to the size of all systems relying upon the regional forecast to meet requirements.

Conservation Program

Water conservation programs are composed of demand side strategies and supply side strategies. Demand side strategies are those which lessen demand (e.g., a shower head and toilet retrofit program). Supply side strategies are those which supply demand from an alternative source or improve system efficiency, but in which demand is not actually reduced (e.g., water reuse and use of non-potable water sources - including exempt wells - satisfies existing demand with an alternative source). Both strategies allow water systems the ability to supply more users with a fixed amount of supply.

Water demand management includes the implementation of comprehensive long-term conservation programs, short-term emergency response plans, and peak use management. In considering measures in a demand side strategy for water conservation, it is necessary to distinguish a permanent reduction in average per capita demand from a temporary reduction in demand resulting from short-term or mandatory measures. Short-term regulatory or mandatory measures more associated with drought or other emergency conditions of water shortage are not considered elements of conservation. Instead they are elements of an emergency response plan, which result in reduced use and a corresponding reduction in service by the public water system.

Peak flow management, such as use of impoundments to capture excess flows for use as a supply, or operational programs such as every other day lawn watering, can be an integral measure of an emergency response plan, a conservation plan, or a supply strategy.

Since water conservation is to be considered in future demand forecasts, conservation measures must be defined, described and projected reductions in water use (target water savings) resulting from such measures must be estimated. The program projections should be monitored against actual water use to assess their validity, with appropriate adjustments made to future projections.

All water systems with more than 1,000 service connections should have a program to meter all individual services by 1996, unless an effective demand management program that identifies water uses of all major user groups is implemented.

Required Measures

As a minimum, the Conservation Planning Requirements require implementation of two measures. Source meter installation will be required for all new or expanding public water systems needing additional water rights. Additional metering may be required, consistent with provisions for data collection identified on page 7. Program promotion, as described on page 24, will be required in all water conservation programs. Additionally, all water conservation programs shall consider the benefits and costs of installing individual service meters and implementing conservation rate structures, as defined on page 25. If a public water system's water use data indicates that unaccounted-for water is greater than 20 percent,

the water conservation program for the system will be required to include implementation of a program to detect and repair leaks, evaluate and repair meters if the meters are not properly functioning, or correct other system operation problems which may be causing the problem.

Recommended Measures and Level of Implementation

The policy of the State of Washington is for all water users to use water efficiently. The goal of the conservation program described in this document is to ensure that all public water systems are implementing conservation programs to a level where they are achieving benefits by 1996.

The conservation measures are grouped into four categories:

1) public education
2) technical assistance
3) system measures
4) incentives/other measures.

For each size category of public water system a set of recommended measures is identified: a set for small systems (systems with fewer than 1,000 services); a set for medium systems (systems with 1,000 to 25,000 services); and, a set for large systems (systems of 25,001 or more services).

Regional planning organizations are encouraged to consider conservation measures as shown in the chart on page 23. However, no requirement exists in the Conservation Planning Requirements for development of a conservation plan in regional water plans. The regional planning organization can fulfill some of the conservation requirements for individual systems in their planning area. Individual water systems can either use existing regional water resource planning organizations (e.g., regional water associations), or can pool resources to develop and implement region wide conservation efforts for some or all of the measures in their individual program. If a system can demonstrate that a regional planning organization is performing conservation measures in the conservation program for the individual system, that system will not be required to duplicate those measures; provided, the benefits to the individual system from the regional effort equal or exceed the benefits which could reasonably be expected from implementation of the measures by the individual system (also see Requirements For Wholesalers and Purveyors, page 19).

As indicated above, program promotion will be required for all public water systems. Source meters will be required for all systems requesting new water rights. In addition, all public water systems, regardless of size, will be required to consider the benefits and costs of installation of service meters and implementation of conservation rate structures (as required in RCW 43.20.235). Public water systems will be required to evaluate all of the recommended conservation measures identified for their specific size category to determine whether to implement the recommended measures. They must also determine the appropriate

level of implementation for selected measures. This evaluation of recommended conservation measures should reflect considerations specific to the public water system, including the cost of service, cost of new supply sources, competing demands for water, and unique conservation opportunities. Systems are encouraged to evaluate, and implement where appropriate, conservation measures above the minimum required in the Conservation Planning Requirements. The selection and level of implementation of conservation measures should be determined by the cost of a measure in relation to the value of the water conserved, i.e. by the relation of benefits and costs.

The Departments of Health and Ecology recognize that public water systems must focus their conservation programs, and that under some circumstances not all measures which meet the benefit-cost criterion can be pursued concurrently. However, new water right permits will not be granted until the public water system can document through the water conservation plan that all measures identified in these Conservation Planning Requirements for that size system have been evaluated and those which are cost effective have been scheduled for implementation. Any water right application being sought shall incorporate the implementation of these measures. Implementation of conservation measures identified in the conservation plan will be a condition of all new water right permits, and prior to certification the measures must be implemented.

In the evaluation of conservation measures public water systems will be required to explain and justify both the selection of measures and the level of implementation provided for in their water conservation programs. This explanation should be narrative and non-quantitative, but may be supplemented by technical quantitative analysis. It should reflect considerations specific to the public water system, as identified above. In the absence of clear evidence to the contrary, estimates of the value of conserved water and of costs and benefits will not be challenged.

Implementation of the approved conservation program will require new program development, regional coordination, and incorporation of the program within the water system plan. The transition period of 1991 to 1996 will provide time for identification and implementation of the program. The projected reduction in demand from conservation should begin to be recognized prior to 1996. This transition period is necessary to allow both public education and a high percentage of the users to modify existing facilities to incorporate water saving devices. Beginning in 1996, evaluation of conservation plans by Ecology and Health will include evaluation of implementation of conservation plans developed under the Conservation Planning Requirements.

Program Evaluation

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Three factors will be considered in determining acceptable implementation of conservation programs.

1. Reduction in per capita average day residential demand and documented non-residential water savings. The initial year shall be 1991, with adjustments to reflect previously implemented conservation programs.

2. Evidence of cost-effective approach by the water system to conservation (i.e., implementation of all measures which provide water from conservation at or below the cost of new supply).

3. Distribution of materials or achievement of other objectives identified in the conservation program. This factor is to be used where documentation of savings is not feasible (e.g., education efforts). The program objectives will be defined by the public water systems in their water system and conservation plan.

Conservation Program Requirements for Wholesale Suppliers and Wholesale Customers

A coordinated conservation program will be required for all public water systems in a wholesale supplier / wholesale customer relationship. Both the wholesale supplier and wholesale customer should state clearly in their water system plans who is responsible for each element of the conservation program. This conservation program constitutes a regional conservation program for all systems in this wholesale supplier/customer relationship.

All wholesale customers must be included in the regional conservation program. A wholesale customer may choose to have its conservation program developed and implemented by the wholesale supplier. Alternatively, a wholesale customer may develop and implement its own conservation program. The third option is for the wholesale customer to prepare and implement some elements in its conservation program and to have the wholesale supplier prepare and implement the remaining elements in the program.

The regional conservation program may be prepared and implemented by the wholesale supplier for its direct customers and for all wholesale customers. Alternatively, it may be composed of the separate conservation programs prepared and implemented by the wholesale supplier and by each separate wholesale customer. The third alternative is for the regional conservation program to be composed of the separate conservation programs prepared and implemented by the wholesale supplier and by the wholesale supplier and the wholesale customer jointly. The regional conservation program may be a combination of these alternatives.

The conservation program for the wholesale supplier and the conservation programs of all wholesale customers shall be based on the total number of direct and indirect customers dependent on the wholesale supplier for water.

Wholesale suppliers will encourage the cooperation of their wholesale customers in the development and implementation of the regional program.

The wholesale supplier, working with the wholesale customers it serves, shall calculate the value of potential conservation based upon the value of such conservation to the wholesale supplier's regional service area.

All wholesale customers which choose to prepare and implement some or all elements of a conservation program independently of the wholesale supplier shall use the value of potential conservation established for the regional service area by the wholesale supplier. They shall also assume the economies of scale of the supplier's program in the evaluation of potential conservation measures.

Wholesale suppliers are not responsible for the preparation and implementation of those elements in a conservation program which a wholesale customer chooses to prepare and implement on its own.

Future water rights will be conditioned on preparation and implementation of a conservation program consistent with the Conservation Planning Requirements for the direct customers of the wholesale supplier and for those elements of a conservation program which the wholesale customers choose to have prepared and implemented by the wholesale supplier.

Preparation and implementation of the regional conservation program shall be enforced through the water system plan approval process of Health. Preparation and implementation of the conservation program of the wholesale supplier and of those elements of the conservation program of the wholesale customer that are prepared and implemented by the wholesale supplier will also be enforced through conditions on future water rights.

Satellite Management - Requirements for Systems Under Satellite Management

Many public water systems are owned, operated or managed by a satellite management agency. As noted above, the conservation plan consists of three primary components: the conservation program; data collection; and demand forecasting. The requirements for each of these components are listed below.

Conservation Programs Systems under satellite management must complete conservation programs according to the number of connections for each individual system. The total number owned, operated or managed by the satellite management agency is not relevant. However, satellite management agencies are strongly encouraged to develop conservation plans commensurate to the total number of services managed. A single conservation program may be prepared for all systems under the satellite management agency.

Data Collection Systems under satellite management must collect data according to the number of connections for each individual system. The total number managed is not relevant. Systems have the option of gathering data commensurate to the number of total services under satellite management.

Demand Forecasts Systems under satellite management must develop demand forecasts according to the number of connections for each individual system. The total number managed is not relevant. Again, systems have the option of developing demand forecasts for each system owned, operated or managed based upon the total number of services under the control of the satellite agency.

Water Reuse

In addition to the specific measure requiring evaluation of water reuse, all public water systems will incorporate within their water system plans an inventory of major potential sources and uses for reclaimed water. This inventory is not part of the conservation program regarding water reuse which is required for large systems. The inventory shall include the following potential sources at a minimum:

- Fish hatcheries
- Storm water impoundments
- Sewage treatment plant effluent
- Industrial/commercial process or cooling water

And the following potential uses or users:

- Industries
- Nurseries
- Golf courses and other landscape irrigators
- Artificial recharge of aquifers
- Parks and parkways
- Agricultural irrigation
- Flushing of sanitary sewers
- Street cleaning, dust control, and other washing applications
- Fire protection
- Other appropriate uses

RECOMMENDED WATER CONSERVATION PROGRAM FOR PUBLIC WATER SYSTEMS

MEASURES		PUBLIC WATER SYSTEMS			
		LARGE	MEDIUM	SMALL	REGION
A.	Public Education				
	1. School Outreach	X			X
	2. Speakers Bureau	X			X
	3. Program Promotion (implementation required)	X	X	X	X
	4. Theme Shows and Fairs	X			X
B.	Technical Assistance				
	1. Purveyor Assistance	X	X		X
	2. Customer Assistance	X	X		X
	3. Technical Studies	X			X
	4. Bill Showing Consumption History	X	X		
C.	System Measures				
	1. Source Meters (required if requesting water rights)	X	X	X	X
	2. Service Meters	X	X	X	X
	3. Unaccounted Water/Leak Detection	X	X		X
D.	Incentives/Other Measures				
	1. Single-Family/Multi-Family Kits	X	X		X
	2. Nurseries/Agriculture	X	X		X
	3. Landscape Management/Playfields - Xeriscaping	X	X		X
	4. Conservation Pricing	X	X	X	X
	5. Utility Financed Retrofit	X			X
	6. Seasonal Demand Management	X			X
	7. Recycling/Reuse	X			X

Definitions:

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Large System Measures — Would apply to utilities having 25,001 or more services. This program requires a considerable staff effort and possible changes in land use or building code controls for implementation of some of the program measures.

Medium System Measures — Would be implemented by a majority of the municipal public water systems and water districts. This program applies to utilities with 1,000 to 25,000 services.

Small System Measures — Is a minimum program. This small system program will be required of all public water systems with fewer than 1,000 services, which must prepare a water system plan or obtain water rights.

Regional System Measures — Regional conservation plans may be developed in conjunction with these guidelines. However, no requirement exists in these guidelines for the development of a conservation plan in regional water plans. Regional planning organizations can develop conservation plans which meet the needs of individual water systems as noted in these guidelines.

DEFINITION OF CONSERVATION MEASURES FOR PUBLIC WATER SYSTEMS

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The following conservation measures must be evaluated and/or implemented as required in the text. For purposes of the conservation program, measures are defined as follows:

A. PUBLIC EDUCATION

1. School Outreach - Education programs targeted to increase awareness of local water resources and encourage water conservation practices. Activities can include school presentations, preparation of curriculum material, and tours of water system facilities.

2. Speakers Bureau - Seeking speaking opportunities and making speakers available to a wide cross-section of services, community, and other groups. Provide speakers with audio and visual aids for presentations. Focus on increasing public awareness of water resource and conservation issues.

3. Program Promotion - Publicize the need for water conservation through television and radio public service announcements, news articles, public water systems bill inserts, or other means. This includes promoting efficient indoor and outdoor water usage, distribution of Ecology/Health conservation brochures or other printed material, informing customers, builders and contractors of new plumbing code regulations requiring efficient plumbing fixtures, and other efforts.

4. Theme Shows and Fairs - Prepare a portable display on water conservation and selected written material. Staff this display at local area theme shows and fairs.

B. TECHNICAL ASSISTANCE

1. Purveyor Assistance - Assistance from wholesale suppliers to aide wholesale customers in developing and implementing conservation programs tailored to their needs, and in carrying out the wholesale suppliers conservation program.

2. Customer Assistance - Provide assistance and information to customers which facilitates water conservation.

3. Technical Studies - Studies would be designed and conducted by the public water system and/or regional organization. Study objective would be to collect data and research new technology to develop programs which would produce measurable water savings. Study areas might include residential flow metering, lawn watering practices, and commercial/industrial water use patterns.

4. Bill Showing Consumption History - Billings would show percentage increase/decrease in water use over the same period from the previous year.

C. SYSTEM MEASURES

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1. Source Meters - Install master source meters for all sources. Maintain periodic meter testing and repair program.

2. Service Meters - Install individual service meters for all water users. Maintain periodic meter testing and repair program.

3. Unaccounted Water/Leak Detection - Conduct a regular and systematic program of finding and repairing leaks in system mains and laterals. This includes on-site testing using computer-assisted leak detection equipment on water distribution mains, valves, services, and meters.

D. INCENTIVES/OTHER MEASURES

1. Single-Family/Multi-Family Kits - Distribute kits containing easily installed water saving devices to single-family residential homes and the owners and managers of apartment buildings and condominiums. Devices in kits could include shower flow restrictors, toilet tank water displacement devices, leak detection dye tablets, informational brochures, and other materials.

2. Nurseries/Agriculture - Encourage and/or require the application of current technology to water use practices of large agriculture/irrigation operations. Examples include nurseries and commercial agriculture. Moisture sensors, flow timers, low volume sprinklers, drip irrigation, weather monitoring, and other practices to increase irrigation efficiency could be installed.

3. Landscape Management/Playfields - Xeriscaping - Promote low water demand landscaping in all retail customer classes (private, public, commercial, industrial, etc.). Work with local nurseries to ensure the availability of plants that achieve this objective.

4. Conservation Pricing - Implement rate design techniques to provide economic incentives to conserve water. Rate setting is the responsibility of the public water system.

5. Utility Financed Retrofit - Install water efficient fixtures in existing residences and commercial/industrial facilities by: (a) providing fixtures at no cost, (b) giving a rebate for consumer purchased fixtures, or (c) arranging for suppliers to provide fixtures at a reduced price.

6. Seasonal Demand Management - Implement measures aimed at controlling peak seasonal demand. This may include use of seasonal rate structures, distributing lawn watering calendars, promoting public awareness on ways to curb peak day water demand, etc. This measure may be combined with the program promotion if materials are distributed.

7. Recycling/Reuse - Examine opportunities for water reuse and recycling as an approach to providing additional water. This includes identification of potential sources of reclaimed water, identification of potential users (i.e., landscape uses, major industrial users, etc.), and contracting for delivery of reclaimed water. Potential program areas include:

- Use of public water systems reclaimed wastewater for the irrigation of public green spaces, industrial cooling, and power plant cooling.
- On-site wastewater treatment and recycling of effluent for non-potable uses in commercial buildings.
- Utilization of gray water for non-potable uses.

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Appendix B
City of Anacortes and PUD
1993 Joint Use Agreement

CITY OF ANACORTES AND PUBLIC UTILITY DISTRICT NO. 1 OF SKAGIT COUNTY AGREEMENT REGARDING SKAGIT REGIONAL WATER SUPPLY SYSTEM

THIS AGREEMENT is entered into by the City of Anacortes (City) and Public Utility District No. 1 of Skagit County, Washington (PUD) for the continuation of reliable public water systems within Skagit County.

Section 1. RECITALS.

1.1 The City and PUD are parties to a Water Supply Agreement dated April 1, 1989, and last amended April 1, 1992 (Supply Agreement). The Supply Agreement provides, in part, for:

1.1.1 Connection of the public water systems of City and PUD;

1.1.2 Supply of water by City to PUD for use throughout PUD's existing service area;

1.1.3 Rates and charges for service by City to PUD; and

1.1.4 Other matters affecting the rights and responsibilities in operation and maintenance of the City and PUD water supply systems.

1.2 An adequate and safe water supply for Skagit County is necessary to current and future residents, and vital to the comprehensive plans of City, County and other local governments.

1.3 The State of Washington (State), County, tribes and public water purveyors have participated in the past preparation, maintenance and revision of a Coordinated Water System Plan (CWSP) for Fidalgo Island. The initial CWSP was prepared in 1985, and was revised in 1993 for the entire County. The CWSP is a management plan and program under Chapter 70.116 RCW and Chapter 246-293 WAC.

1.4 Cooperative development, operation and maintenance of waterworks and facilities minimizes costs and is in the best interest of the citizens of the County.

1.5 The CWSP identifies current and future needs of local governments in Skagit County, and the process for establishing a cooperative regional water supply system.

1.6 City and PUD have the necessary water rights and facilities, as identified in the CWSP, with capability and capacity to meet public water supply needs of Skagit County. However, there is a need to plan for additional water supply for Skagit County. The City and PUD have maintained interties between their systems prior to and after January 1, 1991. Further interties to facilitate development of the regional water supply system may be necessary in the future.

1.7 City and PUD acknowledge their rights and obligations under the Growth Management Act to coordinate land use and water supply planning.

1.8 City and PUD recognize the benefits of a regional water system that allows the conjunctive use of surface and groundwater and better manages and protects the area's water resources.

1.9 This Agreement Regarding Skagit Regional Water Supply System (Agreement) provides for the cooperation of City and PUD in the development of regional solutions for long range water supply needs for the fifty-year planning period (through 2040).

Section 2. INTENT.

2.1 It is the intent of the parties to cooperate in the development of additional waterworks and facilities that would form a Skagit Regional Water Supply System. The City and PUD will work cooperatively in the development of additional or expanded water resources and systems for distribution within Skagit County. Absent further agreement, the City and PUD will maintain present service areas, and their customers will continue to enjoy the present level of supply and service.

2.2 This Agreement provides a framework for development of each new joint facility. Each joint facility not specifically addressed by this Agreement shall be addressed by amendment to this Agreement. The specific intent of this Agreement is to make provisions for a standardized method to expand the Skagit Regional Water Supply System to meet the public water supply needs, and to establish a basis for agreement between the City and PUD for financing, ownership, construction and operation of new joint facilities required for the Skagit Regional Water Supply System.

2.3 It is the further intent of the parties that this agreement be incorporated into the Skagit County CWSP.

Section 3. REGIONAL WATER SYSTEM AND SERVICE AREA.

3.1 "Skagit Regional Water Supply System" (System) shall mean:

3.1.1 Those facilities of the City and PUD supplying water to the service area of the Skagit Regional Water Supply System.

3.2 "Service area of the Skagit Regional Supply System" shall mean the City's and PUD's Designated Water Supply Service Areas identified in the CWSP.

If it is in the best interests of both parties to change their present service areas, they may do so by mutual agreement and by amendment to this Agreement, all subject to applicable CWSP process.

3.3 "Facilities" and "Waterworks" shall mean those designated intake, treatment, pumping, storage, transmission and distribution plants or systems within the City and PUD public water systems as specifically identified in this Agreement or amendments hereto.

Section 4. WATER SUPPLY - CAPACITY RIGHTS.

4.1 Capacity Rights. Each party shall retain its existing capacity rights in the Regional Water Supply System. Each party may, by mutual agreement, purchase regional capacity in planned improvements to the Regional Water Supply System. Any changes in these capacity rights shall be recognized by an amendment to this Agreement.

Any intertie agreement developed pursuant to this Agreement shall provide for a change of point or place of use only, and not a transfer or relinquishment of rights of the holder.

4.2 Additional Agreement Parties. Other agencies may purchase water or contract for other rights from the Regional Water Supply System, or become a party to this Agreement for future projects, by mutual agreement of the City and PUD.

4.3 Wholesaling Water. The City or PUD may wholesale water delivered through the Regional Water Supply System transmission system to areas outside of the City and PUD's respective Service Areas, so long as the other party's capacity rights are not negatively impacted.

4.4 Additional Facilities. Projected needs will be identified by both parties based on the party's designated service areas. As five or more years may be needed to bring major new capabilities on-line, five-year and ten-year forecasts are required, and must be updated whenever either party becomes aware of any significant change in the forecast demand. These will be discussed jointly as they arise, and reviewed at a Semiannual Meeting between City and PUD.

Planning for additional facilities will commence, unless otherwise agreed to in writing, no later than the date at which any party's demand reaches 85 percent of that party's capacity rights or when the five-year forecast exceeds the capacity. A schedule acceptable to both will be agreed upon to provide sufficient lead time for construction and expansion of the required facilities, and be incorporated as part of the necessary amendment to this Agreement.

4.5 Quality. The objective of the parties is to maintain the quality of the water in the Regional Water Supply System at or above the quality required by State or Federal drinking water standards. The City and PUD staff will meet periodically to exchange information and to help ensure that water quality and operational issues are addressed. The results of these meetings will be reviewed at a Semiannual Meeting.

4.6 Financing. Financing plans for specific projects are to be addressed by amendments to this Agreement, or by separate agreement of the parties to the project. Financial participation in existing and additional facilities may, by mutual agreement, be based on each party's projected need for each facility, and may be based on designated capacity rights.

4.7 Further Agreement Regarding Capacity Rights. The actual, five-year, and ten-year projected water needs of each party will be reviewed at a Semiannual Meeting. It is recognized that a party may have water capacity in excess of projected immediate needs. In the event a party is unable to meet its needs either solely or by joint facility development, the parties agree to meet and negotiate regarding lease rights, further water sales, or other methods to address System demands. Terms shall be on a mutually agreed basis that will cover the costs and investment of the party in facilities or rights covered by such further agreement. These costs may be included as a fixed and/or a variable charge on the water actually used. This further agreement shall terminate upon availability of capacity from additional facilities unless agreed upon by the parties in a further agreement or an amendment to this Agreement.

4.8 Cost of Service Charge. The parties will by mutual agreement establish rates and charges for System facilities. In establishing rates and charges, the parties will consider capital costs, fixed and variable operating costs, minimum fixed

charges, in lieu municipal service charges, and variable costs based on quantity of water delivered.

4.8.1 Capital Cost. Those costs incurred for Capacity Rights and planned capital expenses. Capital Costs are allocated based on designated capacity and may be financed by any lawful basis. The minimum cost will include an allocation for renewal and replacement based on designated capacity rights and the design life of joint facilities.

4.8.2 Fixed or Minimum Operating Cost. The cost of labor, supervision, utilities, services, taxes, insurance and all other expenses required to operate and maintain the system other than those items included under Variable Operating Cost.

4.8.3 Variable Operating Cost. Those costs directly proportionate to the volume of water produced, including chemicals, electric power, and other costs required to meet customer and System needs.

4.8.4 In Lieu Services. Those charges, imposed in lieu of municipal utility taxes, to provide for general governmental services. In lieu service charges shall be applied at a level not to exceed 5% to fixed and variable operating costs and to capital costs. However, if the PUD finances its share of the capital costs set out in a capital improvement program no in lieu tax will be charged to the PUD for this portion of the capital improvement program.

4.8.5 Accounting.

4.8.5.1 The capital cost System facilities shall include the cost of construction, and be documented in accordance with an accredited accounting system mutually acceptable to the parties.

4.8.5.2 Fixed and variable operating costs for System shall include costs as recorded and documented in accordance with the accounting that are directly attributable to the operation and maintenance of the System. The City and PUD will continue separate accounting for operation and maintenance costs for the facilities for which they are responsible. A standardized accounting procedure will be developed as far as practical to assess and credit cost among systems and record the net exchange of water on a monthly basis. Carry-over of credit for water delivered by either party may be allowed under mutually agreed conditions. However, all credits must be balanced by the end of a contract year.

4.8.5.3 Debt service for each party shall be addressed in financing plans for specific projects. See Section 4.6.

4.8.6 Billing. The parties will mutually agree on a method for accounts, billing and collection.

Section 5. ADMINISTRATIVE, LEGAL AND OTHER PROVISIONS.

5.1 Meetings.

5.1.1 The parties will hold joint meetings to review the status of this Agreement, Agreement amendments, further or associated agreements, as well as other issues of mutual interest or concern.

5.1.2 At least two joint meetings shall be held semiannually (Semiannual Meeting), to be scheduled by mutual agreement in the last week of March and September of each year. The purpose of the Semiannual Meetings are to review past activity and to propose efforts that may lead to further amendments to this Agreement. All forecasts of requirements will be reviewed at the meetings. The City and the PUD shall have representatives of their management and legislative authority attend the Semiannual Meetings. These will generally include the Mayor and one or more City Council Members, the General Manager and one or more PUD Commissioners. If other agencies become parties to this Agreement, they will provide for attendance of similarly qualified officials at the Semiannual Meetings.

5.2 Staff and Reporting. The coordination of this Agreement will be performed by the regular staff of the parties, with the addition of any non-staff people either party may care to include. These people will interchange information as often by meeting, teleconference, or other means they may choose. The purpose is to keep the joint projects moving forward in an efficient, cost-effective manner and to prevent any accumulation of misunderstanding. A monthly progress report shall be prepared by the party most active at that time and edited by the other until both are satisfied. Any further details will be included in amendments to the Agreement or in further agreements.

5.3 Schedule. At their first meeting, the staff of both parties involved in the coordination will prepare and publish a schedule and plan to facilitate the day-by-day operation of this Agreement. They may modify their schedule and plan as they wish within the limits of this Agreement, as long as both parties agree and publish the revised schedule and plan. Their work shall be reviewed at a Semiannual Meeting.

5.4 Other Efforts. Other means of recognizing and dealing with joint problems may be developed by mutual amendment.

5.5 Term. This Agreement shall remain in full force until the earlier of termination by mutual agreement, or adoption of a revised CWSP. Any party may request amendment to this Agreement at any time. Re-negotiation of this Agreement may be requested by any party for consideration at a Semiannual Meeting.

5.6 No Third Party Beneficiaries. The Agreement is for the benefit of the City and PUD only, to provide a framework for the development of System facilities. There are no third-party beneficiaries to this Agreement.

5.7 Compliance - Permits - Authority. Facilities that may be developed under this Agreement may be subject to preexisting rights, permits or approvals of the parties. Nothing in this Agreement constitutes a waiver of either party's rights, permits or authority to water, water use, or utility facilities. However, by this Agreement the parties reaffirm their commitment to the process for public water system coordination and planning.

Section 6. SUPPLY AGREEMENT.

6.1 The Supply Agreement shall remain in force and effect until such time as amended or modified pursuant to amendment to this Agreement or other agreement. In the event of conflict, the Supply Agreement shall govern and be preemptive of terms in this Agreement.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed by their proper Officers on the 27th day of April, 199 3.

City of Anacortes

L.S.

By: _____

Attest:

By: _____
City Clerk

Approved As to Form:

By: _____
City Attorney

Public Utility District No. 1 of Skagit County

_____
Lee D. Bode, Commission President

_____
Al Littlefield, Commission Vice President

_____
Jones Atterberry, Commission Secretary

Attest:

_____
James P. Kirkpatrick, General Manager

Appendix C
Evolving and Current
DOH Guidelines for CWSP and SMA

Appendix C
Engrossed Second Substitute Senate Bill 5448
E2SSB 5448 (CWSP Sections) Interpretation
Public Water System Coordination Act Revisions by SSB 5448

Section	Change	Interpretation
70.116.050 (1)	Each purveyor within the boundaries of a critical water supply service area shall develop a water system plan for the purveyor's future service area if such a plan has not already been developed: PROVIDED, That non-municipally owned public water systems are exempt from the planning requirements of this chapter, except for the establishment of service area boundaries if they ~~(a) Were in existence as of September 21, 1977; and (b)~~ have no plans for water service beyond their existing service area ~~and; (c) meet minimum quality and pressure design criteria established by the state board of health:...~~	• Deletes the exemption for non-municipally owned public water systems in existence as of September 21, 1977 that meet minimum quality and pressure design criteria.
70.116.050 (2)	After the boundaries of a critical water supply service area have been established pursuant to RCW 70.116.040, the committee established in RCW 70.116.040 shall participate in the development of a coordinated water system plan for the designated area. Such a Plan shall incorporate all water system plans developed pursuant to subsection (1) of this section. The plan shall provide for maximum integration and coordination of public water system facilities consistent with the protection and enhancement of the public health and well being. Decisions of the committee shall be by majority vote of those present at meetings of the committee.	• Old interpretation was that decisions had to be made by a majority vote of the entire committee. This was changed to require that decisions could be made by a majority vote of those present at the meetings of the committee.
70.116.050 (3) (f) (g)	(f) Include satellite system management requirements consistent with RCW 70.116.134. (g) Include policies and procedures that generally address failing water systems for which counties may become responsible under RCW 43.70.195.	New Subsections • Required that SMA provision be addressed in the CWSP. • Required that policies and procedures addressing failing water systems be addressed in the CWSP.
70.116.050 (6)	The committee established in RCW 70.116.040 may develop and utilize a mechanism for addressing disputes that arise in the development of the coordinated water system plan.	New Subsection (replaced old subsection (6) which is now subsection (7) • Allowed the WUC to develop and utilize a dispute resolution process during the development of the CWSP.
70.116.050 (7)	Prior to the submission of a coordinated water system plan to the secretary for approval ~~of the design of the proposed facilities~~ pursuant to RCW	Subsection was moved from (6) to (7)

	70.116.060, ~~the plan shall be reviewed for consistency with subsection (4) of this section by~~ the legislative authorities of the counties in which the critical water supply service area is located shall hold a public hearing thereon and shall determine the plan's consistency with subsection (4) of this section....	• Deleted the specific direction for DOH to approve "design of the proposed facilities." (Since may aspects of the plan are policy or process related) • Expanded the county consistency review process from inter office to include a public hearing.
70.116.060 (2)	The secretary shall review the coordinated water system plan and, to the extent the plan is consistent with the requirements of this chapter and regulations adopted hereunder, shall approve the plan, provided that the secretary shall not approve those portions of a coordinated water system plan ~~which~~ that fail to meet the requirements for future service area boundaries until any boundary dispute is resolved as set forth in RCW 70.116.070.	• Limits DOH approval of the plan to those portions of the plan which are consistent with RCW 70.116. • Allows DOH not to approve parts of the CWSP related to areas of dispute.
70.116.060 (3)(b)	No other purveyor shall establish a public water system within the area covered by the plan, unless the ~~secretary~~ local legislative authority determines that existing purveyors are unable to provide the service in a timely and reasonable manner, pursuant to guidelines developed by the secretary. An existing purveyor is unable to provide the service in a timely manner if the water cannot be provided to an applicant for water within one hundred twenty days unless specified otherwise by the local legislative authority. If such a determination is made, the ~~secretary may~~ local legislative authority shall require the new public water system to be constructed in accordance with the construction standards and specifications embodied in the coordinated water system plan approved for the area. The service area boundaries in the coordinated plan for the affected utilities shall be revised to reflect the decision of the local legislative authority.	• Puts burden of determining timely and reasonable upon the County. • Requires DOH to develop timely and reasonable guidance. • Defines timely and reasonable as the purveyor being able to provide water within 120 days unless specified otherwise the County. • Puts the burden on the County to require the design of new public water systems to meet the requirements of the CWSP. • Allows for Counties to make boundary changes when a new system is developed.
70.116.060 (5)	The affected legislative authorities may develop and utilize a mechanism for addressing disputes that arise in the implementation of the coordinated water system plan after the plan has been approved by the secretary.	New Subsection • Allows counties to develop and utilize a dispute resolution process for addressing disputes that arise in the implementation of the CWSP, once the CWSP has been approved.
70.116.060 (6)	After adoption of the initial coordinated water system plan, the local legislative authority or the secretary may determine that the plan should be updated or revised. The legislative authority may initiate an update at any time, but the secretary may initiate an update no more frequently than once every five years. The update may encompass all or a portion of the plan, with the	New subsection • Once the CWSP is adopted, the County or DOH may require update.

	scope of the update to be determined by the secretary and the legislative authority. The process for the update shall be the one prescribed in RCW 70.116.050.	• The County may require update at any time, DOH can only require update no more than once every 5 years. • The update may address all or a portion of the CWSP. • The update must follow the process found in RCW 70.116.050.
70.116.060 (7)	The provisions of subsection (3) of this section shall not apply in any county for which a coordinated water system plan has not been approved under subsection (2) of this section.	New subsection • The rules of subsection 3 of this section do not apply in areas where a CWSP has not been approved by DOH.
70.116.060 (8)	If the secretary initiates an update or revision of a coordinated water system plan, the state shall pay for the cost of updating or revising the plan.	New subsection • If DOH requires an update of the CWSP, DOH must pay the cost of updating the CWSP.
70.116.070 (1)	The proposed service area boundaries of public water systems within the critical water supply service area that are required to submit water system plans under this chapter shall ~~be determined by written agreement among the purveyors and with the approval of the appropriate legislative authority. Failure of the legislative authority to file with the secretary objections to the proposed service area boundaries within sixty days of receipt of the proposed boundary agreement may be construed as approval of the agreement.~~ identified in the system's plan. The local legislative authority, or its planning department or other designee, shall review the proposed boundaries to determine whether the proposed boundaries of one or more systems overlap. The boundaries determined by the local legislative authority not to overlap shall be incorporated into the coordinated water system plan. Where any overlap exists, the local legislative authority may attempt to resolve the conflict through procedures established under RCW 70.116.060 (5)	• Foregoes the requirement for systems to sign written agreements between purveyors and approved by the County. Requires that systems propose a service area boundary in their WSP and for the County to determine if those proposed boundaries overlap. If the boundaries do not overlap, requires the County to incorporate them into the CWSP.
70.116.070 (2)	~~If no service area boundary agreement has been established within a reasonable period of time, of if the legislative authority has filed with the secretary objections in writing as provided in subsection (1) of this section~~ Any final decision by a local legislative authority regarding overlapping service areas, or any unresolved disputes regarding service area boundaries, may be appealed or referred to the secretary in writing for resolution. After receipt of an appeal or referral, the secretary shall hold a public hearing	• Allows appeal of the County's decision on overlapping boundaries to be appealed to DOH. The request for appeal must be in writing. • Eliminates the need to notify all purveyors of the dispute. Allows DOH to notify only those

	thereon. The secretary shall provide notice of the hearing by certified mail to each purveyor ~~providing service in the critical water supply service area~~ involved in the dispute to each county legislative authority having jurisdiction in the area and to the public....	purveyors involved in the dispute.

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Appendix D
Water System Plan Contents Checklist

SMALL WATER SYSTEM PLAN CONTENTS

Water system plans may be required for public water systems with less than 1,000 service connections (WAC 246-290-100). Please consult Department of Health (DOH) staff for specific plan requirements for your water system.

The following outline is intended to provide a summary of key elements that should be addressed in small water system plans for utilities subject to Federal Drinking Water requirements. In general, the larger the system the more complex the water system plan will be. The plan should be developed for a 20 year planning period with identification of specific improvements and a financial program for the first 6 years. For additional information about each of the elements in this outline, refer to Planning Handbook for Water System Plans; Interim Guidelines for Public Water System Regarding Water Use Forecasting Methodology, and Conservation Programs; and Financial Viability Program for Small Water Systems.

I. Description of Water System

- A. Identification of Water System Ownership & Management
- B. History of Water System Development
- C. Map and Description of Existing Service Area
- D. Description of existing facilities including map and pressure zones
- E. Future Service Area Map and Agreement (If Required)
- F. Identification of Service Area Policies

II. Basic Planning Data

- A. Existing Population and Current Number of Service Connections
- B. Water Usage by Customer class including peak day, peak month, total annual production, and unaccounted water
- C. Future Population and Service Connection Projections based on Growth Management Act and County Projections
- D. Existing and Future Land Use Considerations

III. System Analysis

A. Identification of Water System Design Criteria

B. Evaluation of Existing System

1. Source

2. Storage

3. Hydraulics

4. Fire Flow

5. Treatment

6. Water Rights

C. Water Quality Analysis

1. History of monitoring and test results

2. Analysis of Safe Drinking Water Act Requirements

D. Summary of Facility and O&M System Deficiencies related to growth and replacement

IV. Improvement Program

A. Identification of Improvements including Justification (20 years)

B. Improvement Schedule (6 years)

V. Financial Program (6 years)

A. Identification of cost of improvements

B. Identification of Annual Operation and Maintenance Expenses

C. Revenue Plan for all expenses

D. Approved Financial Viability Test (Investor Owned Utilities should contact DOH and UTC for specific requirement)

E. Discussion of Water Rates including proposed increases and rate structure

VI. Water Conservation Program

A. Identification of Goals and Objectives of Water conservation Program

B. Description of Water Conservation Public Education Program

C. Description of Other Water Conservation Measures Being Implemented

D. Estimated savings attributed to conservation (incorporated into Water Demand Projection)

VII. Operation and Maintenance Program

A. Name, Phone numbers, and responsibilities of person(s) involved in water system operation (Including who is certified and at what level)

B. Description of Routine Operation Procedures

C. Description of Water Quality Sampling Procedures including response when sample results exceed state standards

D. Description of Emergency Response Procedure

E. Identification of most vulnerable facilities

VIII. Relationship With Other Plans

A. Compatibility with other related plans including adjacent water systems, land use plans, and water resource planning efforts

B. Compatibility with Regional Supplement of Coordinated Water System Plan

C. County Response on compatibility with land use plans and growth policies

NOTE: Water System Plans need to be prepared by a professional engineer (WAC 246-290-240)

APPENDIX

COMPLETE PLAN 17938

PLAN CONTENT CHECKLIST

The following checklist summarizes the topics which are discussed in each section of this handbook. It is intended to function as a checklist for the utility, assuring that key topics are in the draft water system plan. DSHS will use this checklist during the plan review process. Another copy of this checklist is included at the end of the handbook so it can be torn out for easy reference.

Section	Topic
☐ Future Service Area	
Map of Existing Service Area	☐
Criteria for Future Service Area	☐
Map of Future Service Area	☐
Explanation of Boundaries Shown on Map	☐
☐ Service Area Characteristics	
History of Growth and Water Service	☐
Inventory and Summary of Related Plans	☐
Geography of the Service Area	☐
Other Items Affecting the Service Area	☐
☐ Service Area Policies	
Summary of Applicable Policies	☐
Discussion on Effect of Applicable Policies	☐
☐ Future Growth	
Existing Land Use Patterns	☐
Map of Future Land Use Patterns	☐
Methodology and/or Source of Land Use Projections	☐
Population Forecasts	☐
Methodology and/or Source of Population Forecasts	☐
Map of Future Population Distribution	☐
☐ Future Water Demand	
Amount of Water Used by Category	☐
Evaluation of Existing Water Use	☐
Conservation	☐
Assumptions for Future Water Demand Calculations	☐

- [ ] Future Water Demand Projections
- [ ] Justification of Future Water Demand
- [ ] Map Showing High Demand Areas

- [ ] Performance and Design Criteria
  - [ ] List of Applicable Criteria
  - [ ] How Criteria will be Applied

- [ ] Inventory of Existing System
  - [ ] List of Facilities in Each Grouping
  - [ ] Functions and Relationships of Facilities
  - [ ] Evaluation of Effectiveness of Facilities
  - [ ] Relationship of Groupings
  - [ ] Evaluation of Recent Improvements
  - [ ] Map of Facilities and Pressure Zones

- [ ] Fireflow
  - [ ] Identification of Standards
  - [ ] Source of Fireflow Standards
  - [ ] Map of Development Classifications (or the Utility's Own Categories)
  - [ ] Summary of Future Fireflow Needs

- [ ] Hydraulic Analysis
  - [ ] Methodology and/or Description of Program
  - [ ] Pressure Limitations and Justification
  - [ ] Description of Scenarios
  - [ ] How Input Data was Derived
  - [ ] Summary of Results

- [ ] Water Resources
  - [ ] Description and Evaluation of Existing Source
  - [ ] Inventory and Summary of Water Resource Studies
  - [ ] Evaluation of Potential for Contamination
  - [ ] Water Rights Assessment (Chart)

- [ ] Water Quality
  - [ ] Assessment of Source Water Quality
  - [ ] Assessment of Distribution System Water Quality
  - [ ] How Identified Problems will be Addressed

- [ ] Summary of System Deficiencies
  - [ ] List of Documented Deficiencies
  - [ ] Discussion of Deficiencies not Previously Documented

- [ ] Identification of Improvements
  - [ ] List of Alternative Packages
  - [ ] Evaluation Criteria
  - [ ] Assessment of Alternatives
  - [ ] Description and Justification of Selected Alternatives
  - [ ] Map of Improvements
- [ ] Scheduling of Improvements
  - [ ] Five-Year Definite Schedule
  - [ ] Schedule for Remaining System Needs
  - [ ] Improvement Program (Chart)
- [ ] Financial Program
  - [ ] Past and Present Financial Status
  - [ ] Available Revenue Sources
  - [ ] Allocation of Revenue Sources
  - [ ] Ability to Secure Needed Revenue
  - [ ] Assessment of Impact Upon Rates
- [ ] Operations Program
  - [ ] Organizational Chart
  - [ ] Responsibilities of Positions
  - [ ] Certification Status
  - [ ] Identification of System Components
  - [ ] Routine Operation
  - [ ] Preventive Maintenance Program
  - [ ] Inventory of Chemicals, Equipment and Supplies
  - [ ] Sampling Procedure
  - [ ] Violation Response Procedure
  - [ ] Emergency Call-up List
  - [ ] Vulnerability Analysis
  - [ ] Contingency Plans
  - [ ] Cross-Connection Control Program
- [ ] Miscellaneous Supportive Documents
  - [ ] Environmental Impact Statement or Determination of Non-Significance
  - [ ] Satellite System Management Program
  - [ ] Text of Appropriate Agreements
  - [ ] Response from Affected Entities
  - [ ] Standard Construction Specifications (Chart)
  - [ ] Watershed Control Program

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Appendix E
Group B Public Water System Guideline

Appendix E
Group B Public Water Systems[1] Guideline

Basic Information – Group B Public Water Systems are currently regulated under WAC 246-291 and Skagit County Code 12.48. Additionally, in compliance with WAC 173-160 all Group B water system applicants must have the well site inspected and approved prior to drilling. The developer is assisted by the County Health department in meeting and understanding the necessary requirements of health and safety standards in compliance with State and Federal laws. For the purpose of maintaining accurate records and provide the necessary information for new systems, the Group B Water Systems Workbook must be completed. Section 1 of the workbook (Public Water System Approval) is to be completed prior to source development.

The Public Water System Coordination Act provides for Coordinated Water System Plans (CWSP) for areas designated as critical water supply areas and generally prohibits the development of new independent systems where an existing system is available to provide water service. The Skagit County Health Department will assist in identifying which utility to contact and encourages the developer to consider these alternatives in lieu of developing *independent* systems.

***delete* (Outside of the critical water supply areas, new independent systems may be developed provided that the water is obtain from a protected ground water source.)

**(add) All of Skagit County is included in a critical water supply area. PUD is recognized as the Satellite Management Agency (SMA) and is to provide water service to new developments in the County. New developments are designed and constructed consistent with PUD minimum standards and ownership is transferred to the PUD. PUD shall make a policy statement and establish criteria to use for determining feasibility and when satellite service verses extension is appropriate.*

**(add) New systems must be owned or operated by a DOH approved SMA where available. No new system may be created without SMA management unless the system has been determined to have good management and financial resources. (WAC 246-291-140) Limitations on land uses and development densities are to be considered in designated low flow stream corridors where necessary to limit ground water withdrawal and protect stream flows in compliance with Comprehensive Planning objective 10 that influences the use of water resources and is consistent with the existing character of the environment.*

[1] Source – Department of Health "Guideline for Group Public Water System Approval" – July 1994 (additions and/or corrections appear in italics)

Ownership and Management – Owners (Developers) of a Group B water system are to attach a statement of responsibility for costs of construction and maintenance and repairs to the application. A users agreement is to be included with information regarding easements, distribution lines and also should specify each customer's exact share of water available and meter requirements. Owners are to use legal and binding covenants to protect property from activities that could contaminate public water sources. *A "Notice to Future Property Owners" is attached and information recorded on property titles.*

Water Source Information –*(*add) A safe and reliable drinking water supply is of fundamental importance to our health and well being.)* As water is considered a public resource, a "water right permit" is required for all appropriations of public water as specified by the State Water Code. Exceptions are made for single or group domestic use provided the water used shall not exceed 5,000 gallons per day principally to single family dwellings (most Group B systems). In western Washington, the State will not require a water right permit in most cases serving six or fewer connections.

**(add) Skagit County Health Department shall enforce all county, state and federal laws regarding potable water and further address groundwater protection in its septic system, well head protection and the installation of water systems in compliance with GMA and County goals, policies and position. (CP 10.6)*

Sanitary Control Zone – Prior to drilling the well, site inspection and approval is required in compliance with WAC 173-160. Drinking Water Regulations require that public water sources be surrounded by a 100-foot sanitary control zone in which activities that could contaminate the water source are not allowed. *In addition, an inventory of potential sources of contamination within a 600-foot radius of the well must be completed.*

Group B Water System Design – The first consideration and potential limiting factor is the capacity of the well. *(delete – The purpose of this section of the workbook is to assist in the design of a small public water system to help size and select pumps, distribution lines, storage tanks and pressure tanks.)* The well must be capable of supplying enough water to meet the state peak *(delete – estimated daily)* demand for the number of connections in the system and the design rate cannot exceed the well capacity. *Capacity specifies the design of a small public water system size, pumps, distribution lines, storage and pressure tanks.* A copy of the Department of Ecology "Water Well Report" *(delete – the well log, which the Department of Ecology requires all well drillers to submit)* is included with the application for all new systems.

Establishing well and pump capacity is critical. Totalizing source meters are required on all new sources to accurately measure quantity of water produced to meet health and safety standards and to comply with water right requirements.

Water quality tests also must be included with the application for Group B water systems (WAC 246-291). Prohibited practices include cross connection of any portion or segment of the water system with any other source without prior written approval of appropriate governmental agency. Skagit County Health Department Code 12.48.130 specifies that a Group B public water system will be designed by a professional engineer (P.E.) unless the owner of the proposed system can demonstrate that he has expertise and plans to reside at and operate said system. Secondly, the system must consist of a simple well and pressure tank with one pressure zone and not provide treatment or have hydraulic requirements.

Fire low requirements vary. *(delete – and may be prohibited in some areas and required in others).* For more information consult with the local county fire marshal *(delete – or code enforcement official.)* When fire flow is required, a professional engineer must be retained to perform a hydraulic analysis and design storage facilities. Restaurants, small businesses, churches, schools, government agencies, and resorts are examples of small public water systems with their own unique design needs.

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Appendix F
Model Agreement - Maintenance of Hydrants

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APPENDIX F
Fire Control Facility
Maintenance and Testing Responsibilities

Fire District/Water Utility Agreement

This Agreement entered into between (Fire Department/District) and (Water Utility) is for the purpose of providing for proper installation, operation, and maintenance of permanent fire protection facilities associated with public water systems and installed in the following described location:

(Fire District Boundary and/or Utility Future Service Area Boundary – Description of reference to attached map)

It is hereby agreed that the tasks itemized below will be carried out in a responsible manner by the assigned party and at the specified frequency.

	Task	Responsible Party	Frequency
1.	Inspection of new facility*	Both	Time of construction
2.	Location of hydrants*	Both	Time of construction
3.	Review of installation and type of hydrant, ports, and valves	Fire	Annual
4.	Install and check reflectorized location if used	Fire	Annual
5.	Hydrant and private fire system testing		
	a. Flow and pressure testing of hydrant	Both	Annual
	b. Operation of tee valve	Utility	Annual
	c. Private/building fire system (wet & dry)	Fire	Annual
6.	Clearing vegetation, brush for visibility/snow	Fire	Annual
7.	Mechanical repair and maintenance (except private property)	Utility	As needed
8.	Submit annual report regarding fault hydrants, flow, tests, etc.	Both	As needed
9.	Painting and coding hydrants	Fire	As needed

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10.	Number and color code of hydrants	Both	Time of construction
11.	Water utility's personnel to be notified when hydrants are used for fire fighting training, or testing purposes	Fire	As needed
12.	Communications (emergency, alert system, etc.)	Both	As needed
13.	Backflow prevention/hydrant use/mutual aid	Both	As needed
14.	Estimate volume and time of use of hydrants and provide monthly report to utility	Fire	Monthly

It is agreed that the Utility shall notify the Fire Department/District, in advance, before any changes are made to hydrant installation or relocation and the Fire Department/District shall notify the Utility in advance of any testing of fire hydrants.

_____ _____

Fire Chief or Commissioner Date

_____ _____

Water Utility Date

Receipt Acknowledged By:

_____

Skagit County Fire Marshal
(applicable only to unincorporated areas)

* *In unincorporated areas, the responsible fire official is the County Fire Marshal.*

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Appendix G
1996 Memorandum of Agreement Regarding Skagit River

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MEMORANDUM OF AGREEMENT REGARDING UTILIZATION OF SKAGIT RIVER BASIN WATER RESOURCES FOR INSTREAM AND OUT OF STREAM PURPOSES

I. PURPOSE OF AGREEMENT

A. To ensure the establishment of instream flows to protect fisheries resources, and the mitigation of any interference with such established flows;

B. To provide a mechanism for the coordinated management of water resources in areas described by the Skagit County Coordinated Water System Plan, Regional Supplement, July 1993 ("CWSP") to meet the out-of-stream needs of the Swinomish Indian Tribal Community, Upper Skagit River Tribe, and Sauk-Suiattle Indian Tribe (collectively "the Tribes"), local governments, and public water purveyors within Skagit County;

C. To avoid litigation or adjudication of water resources within the Skagit River Basin between the Parties to this Agreement;

D. To assist in expediting the Department of Ecology's water right decision-making within the CWSP service area;

E. To modify the CWSP to conform to this Agreement and to incorporate this Agreement into the City of Anacortes' and Public Utility District No. 1 of Skagit County's Joint Operating Agreement.

II. PARTIES TO THIS AGREEMENT ("THE PARTIES")

City of Anacortes ("the City")
Public Utility District No. 1 of Skagit County ("PUD")
Skagit County ("the County")
Upper Skagit Indian Tribe
Swinomish Indian Tribal Community
Sauk-Suiattle Indian Tribe
(collectively "the Tribes")
Washington State
Department of Ecology ("Ecology")
Department of Fish and Wildlife ("WDFW")

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III. DEFINITIONS

A. Instream Flow - The quantity of flow necessary to maintain sufficient water in a stream to support in harvestable numbers the natural production of food and game fish.

B. Established or establishing instream flows - Instream flows that are established by rule and thus enforceable by law.

C. Out-of-Stream Use - The quantity of water identified for withdrawal from the Skagit River and its tributaries, or from groundwater in continuity with the Skagit River or its tributaries, for use by the City, PUD, and Tribes.

D. Effective Date and Term of Agreement - The Effective Date of this Agreement shall be when the last Party has signed the Agreement and shall continue for 50 years from the effective date.

E. Claims or Adjustments - Existing, recorded, pending, and proposed new water right documents consisting of registered claims, certificates, permits, applications, and proposed changes to such documents related to place of use, point of diversion, and/or authorized instantaneous and annual quantities of water, all of which are specifically identified in Sections IV.B.1.a, IV.B.1.b (1), and IV.C.1.a-d of this MOA.

F. Skagit River Basin - The water resource basin as generally defined by the State of Washington Water Resource Inventory Areas 3 and 4.

G. CWSP - Skagit County Coordinated Water System Plan, Regional Supplement (July 1993).

H. Lower Skagit River Instream Flows - Established instream flows for the segment of the Skagit River below the Skagit River PUD Pipeline Crossing east of Sedro Woolley ("PUD Pipeline Crossing") measured at the existing USGS Station 12200500, near Mt. Vernon.

I. Future claims or adjustments - any claims or adjustments not specifically identified in this MOA.

J. Cultus Mountain Streams Instream Flows - Established instream flows for the Salmon, Turner, Mundt, and Gilligan Creeks located in the general Cultus Mountain area.

K. Ecology Low-Flow Streams: Those streams on Ecology's Surface Water Source Limited (SWSL) list that have been identified to have limitations in available supply as a result of fisheries concerns.

IV. AGREEMENTS

A. The Tribes agree to the following, conditioned upon the other Parties meeting their obligations as outlined in this Agreement, which includes establishing Lower Skagit River Instream Flows as defined in this Agreement, and as jointly or individually recommended by the parties, within the time period established in subsections IV.B.2.c. and IV.C.2.c., unless such time period is extended in the manner described in such sections.

1. To not challenge any Skagit River Basin water rights claims or adjustments, made by the City or PUD within 50 years from the effective date of this Agreement, as long as such claims or adjustments are consistent with this Agreement. An inconsistent claim or adjustment would include, but not be limited to, claims or adjustments other than specifically identified in this Agreement as not subject to Lower Skagit River Instream Flows that in any way interfere with established instream flows.

2. That established Lower Skagit River Instream Flows will constitute the full instream flow agreed to by the Parties for 50 years from the effective date of this Agreement;

3. That any challenges made by the Tribes after the 50-year period of this Agreement will be made only against future claims or adjustments by the City or PUD that are additional to those identified in Sections IV.B.1.a, IV.B.1.b(1), and IV.C.1.a, b, c, and d of this Agreement;

4. To collaborate with the Parties to secure adequate flows for instream and out-of-stream uses for areas identified in the CWSP;

5. To work towards establishing satellite systems as defined in the CWSP with the objectives of reducing groundwater or surface water withdrawals that adversely impact Skagit River Basin Instream Flows, improving water use efficiency, and providing public water delivery to existing and planned communities in Skagit County. A primary objective is to reduce the use of exempt wells in those areas of the County experiencing inadequate instream flows that may be occurring as a result of groundwater withdrawal;

6. To seek funding sources to: contribute towards the development and implementation of long-term watershed management programs; develop a coordinated water delivery system throughout the CWSP service area; and achieve the objectives of this Agreement.

B. The City of Anacortes agrees to the following:

1. The following certificates presently held, pending water right applications, and future claims or adjustments to water rights will be recognized and put to use by the City in accordance with the relative order of priorities set forth below.

   a. City Water Rights Not Subject to Lower Skagit River Instream Flows: 85 cubic feet per second (cfs) (54.94 mgd) as comprised in the following:

      (1) Certificate #C-709 (2/14/1963) which provides 70 cfs (45.24 million gallons per day or mgd) for the "area served by the City of Anacortes Water Supply System".

      (2) Certificate #C-1161 (7/2/1930) which provides 15 cfs (9.70 mgd) for the "City of Anacortes." This Agreement provides for a change in the point of diversion under this right downstream

approximately 1,500 feet to coincide with the existing intake for Certificate #C-709.

b. City water rights subject to Lower Skagit River Instream Flows developed as a condition of this Agreement:

(1) Certificate #C-3959 (9/13/1954) which provides 32.30 cfs (20.88 mgd). This Agreement provides for a change in the point of diversion of Certificate #C-3959 from the original "Ranney Well" Skagit River bed subsurface diversion to coincide with the existing intake for Certificate #C-709.

(2) The following may be subject to results of state-of-the-art instream flow studies, regardless of the date of the application: 1) future rights acquired by the City in excess of those specified in Section IV.B.1.b(1) above for service to parties within or outside the service areas as defined in the CWSP; and 2) future claims or adjustments.

2. The City will participate in identifying instream flow needs through an IFIM instream flow study process. The City and PUD, with consultation from the Tribes, will fund and contract for the IFIM studies, which will apply only to the segment of the Skagit River described in subsection III.H.

a. The City, PUD, and any other parties that desire to assist with financing, will fund and contract for the necessary studies to establish Lower Skagit River Instream Flows. The Tribes and WDFW will provide the fisheries and fisheries habitat management criteria for input into the IFIM study and recommended Skagit River Instream Flows.

b. The Parties to this Agreement will jointly develop the recommended instream flows using the Water Resources Forum process (Instream Flow Policy Working Draft, 8th Draft, Revised May 19, 1993) as a guide. The Tribal IFIM study input criteria will be limited to fisheries and fisheries habitat management and will not include other instream objectives. The Parties will utilize all appropriate methods to establish an agreed upon instream flow for managing the Skagit River below the PUD Pipeline Crossing, including mediation.

c. Schedule.

(1) The City agrees that the following events must occur within two years of the effective date of this Agreement: 1) the necessary Lower Skagit River instream flow studies are completed; 2) the City, PUD, and Tribes agree on the recommended instream flows; and 3) the City, PUD, and Tribes submit jointly recommended instream flows to Ecology, or, if these parties cannot agree in writing, submit the differing recommendations for Lower Skagit River Instream Flows to Ecology for its decision as to what to include in the rule proposal. This two-year schedule may only be

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extended by written agreement of the City, PUD, and Tribes. If these parties cannot agree to an extension, the City shall take all necessary actions to ensure that changes to existing water rights documents identified in section IV.B.1. shall not remain or become effective as further described in subsection (3) below. The City may then remove any commitment of water service to the Tribal Reservations identified in subsection IV.B.(3) except as required under a separate contract.

(2) Upon receipt of either the joint or differing recommendations described in subsections IV.B.2.c. and IV.C.2.c., Ecology shall immediately file a Preproposal Statement of Inquiry Code Revision (CR) 101, indicating its intention to adopt the Cultus Mountain Instream Flows and Lower Skagit River Instream Flows. Ecology shall seek to complete formal rulemaking by filing a CR 102 within eighteen (18) months of its receipt of the joint recommendation or deferment described in IV.B.2.c(1) and IV.C.2.c(1), with a goal of adopting final rules within two years of its receipt.

(3) If Lower Skagit River Instream Flows have not been established by the end of two years following Ecology's receipt of the recommendations described in subsection (1), the City, PUD, and Tribes may extend the deadline only by written agreement. If the City, PUD, and Tribes cannot agree to an extension, the City shall immediately request Ecology to rescind any water right change action submitted to Ecology since the Agreement became effective, even if Ecology has taken final action. The City may immediately reapply for the change. The intent of this provision is to secure the Tribes' right to challenge these changes in the event that Lower Skagit River Instream Flows are not established within the specified schedule.

d. In the event that Ecology approves the changes referred to in subsection IV.B.2.c(3) above, the City shall ensure that any water rights documents issued by Ecology that purport to effectuate these changes shall be expressly and clearly conditioned to require compliance with this Agreement. Regardless of whether or not Ecology so conditions the document(s), the City shall, by its own authority, enforce the conditions of this Agreement when using these water rights.

e. The City may, at its option, negotiate with upstream Skagit River dam operators for release of flows to maintain the agreed upon flow levels downstream from the PUD Pipeline Crossing.

3. To guarantee in perpetuity to the Swinomish Indian Tribal Community for non-discriminatory use by all residents within the Swinomish Indian Reservation a water quantity of 2.8 million gallons per day based on demands identified annually and projected for five and twenty years by the Swinomish Indian Tribal Community and based on amendment to the existing wholesale contract with the

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Swinomish Tribe. Government-owned and operated uses will be subject to conservation and curtailment programs for both the Reservation and off-Reservation water uses as outlined in Exhibit A, which is incorporated herein. Government-owned and operated economic development on the Reservation, such as the Tribe's marina, gaming facilities, hotels, and similar facilities will be considered services that generate governmental revenue and will receive the second highest priority after residential domestic use. Similar government-owned and operated commercial services within the City's and PUD's service area will receive the same status.

4. The City, including its Public Works Department, agrees not to provide any water service to users or property located within the Swinomish Indian Reservation without the prior written approval of the Swinomish Indian Tribal Community.

5. To assist Ecology in adopting Lower Skagit River Instream Flow rules within the time period set forth in subsection IV.B.2.c..

6. To actively support and provide input at both a policy and technical level to County officials regarding implementation of Section 63 of the Growth Management Act, such that building permits will only be issued if there is an adequate supply of potable water that can be withdrawn from groundwater without adversely impacting instream flows, other than as agreed herein.

7. To actively seek amendment of the CWSP and adoption of County ordinances that: a) require, in lieu of individual wells, connection of new individual/single family homes to public water systems where the proposed development is within the designated service area of existing utilities and timely and reasonable service is available; and b) limits the use of the 5,000 gallons per day exemption in those areas of the County experiencing inadequate Skagit River Basin Instream Flows that may be occurring as a result of groundwater withdrawals.

8. To seek funding sources to contribute: towards the development and implementation of long-term watershed management programs; towards the development of a coordinated water delivery system throughout the CWSP service area; and towards achieving the objectives of this Agreement. This provision does not supersede or in any way affect the City's financial commitment as set forth in Section IV. B.2.

C. The PUD agrees to the following:

1. The following certificates presently held, pending and new water right applications, and future claims or adjustments to water rights will be recognized and put to use by the PUD in accordance with the relative order of priorities set forth below.

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a. PUD water rights subject to established Cultus Mountain Instream Flows, but not subject to established Lower Skagit River Instream Flows.

Document No.	Priority Date	Source	Maximum Appropriation cfs	mgd
Claim 9332	Pre-1917	Salmon Creek	1.80	1.16
Certificate 411	10/10/1929	Gilligan Creek	1.50	0.97
Certificate 724	10/30/1963	Gilligan Creek	7.39	4.77
Claim 9333	Pre-1917	Turner Creek	4.30	2.78
Certificate 739	10/30/1963	Turner Creek	6.20	4.01
Certificate 26	9/28/1917	Mundt Creek	2.50	1.62
Certificate 737	10/30/1963	Mundt Creek	8.00	5.17
Certificate 8738	1/16/94	Judy Reservoir	Storage	Storage
Certificate R-673	4/24/1963	Judy Reservoir	Storage	Storage
		Subtotal	31.69	20.48

b. PUD water rights not subject to established Lower Skagit River Instream Flows.

Document No.	Priority Date	Source	Maximum Appropriation cfs	mgd
Certificate 1904	3/26/1953	Sedro Woolley Well	2.00	1.29
Certificate 2107	5/12/1954	Ranney Well	8.90	5.75
Cultus Mountain Water Rights (See Section IV.C. 1 (a))			31.69	20.48
			42.59	27.52

c. Pending and new PUD Cultus Mountain water right applications subject to Cultus Mountain and Lower Skagit River Instream Flows.

The purpose of these pending and new applications is to make full use of the hydraulic capacity of existing collector lines. When the rights listed below are combined with rights Cultus Mountain streams listed in subsections a and b above, the total diversion will not exceed 35.8 mgd.

Document No.	Priority Date	Source	Maximum Appropriation cfs	mgd
18219 (pending)		Salmon Creek	4.00	2.59
25129 (pending)		Gilligan Creek	13.15	8.50
New		Turner Creek	6.60	4.27
New		Mundt Creek	16.06	10.38

d. New application partially not subject to Skagit River Instream Flows for proposed Skagit River pumping plant delivering water to Judy Reservoir.

The PUD's combined capacity of the gravity collector lines that presently supply Judy Reservoir is 55.39 cfs/35.80 mgd. The PUD is dependent on the ability to withdraw water from the streams, river, or combination of river and streams in the amount of 55.39 cfs/35.80 mgd when available. A new application for a water right will be filed on the Skagit River in the amount of 12.80 cfs/8.28 mgd. This application for 12.80 cfs/8.28 mgd, when combined with the water rights listed in subsection IV.C.1.a above (31.69 cfs/20.48 mgd) with the new point of diversion on the Skagit River and the existing Sedro-Woolley Well (2.0 cfs/1.29 mgd) and Ranny Well (8.90 cfs/5.75 mgd), both of which are to be transferred to the new pumping station, will result in a total water right of 55.39 cfs/35.80 mgd. Of this amount, 42.59 cfs/27.52 mgd is not subject to Lower Skagit River Instream Flows, and the remainder is subject to such flows.

e. The instream flows being developed on the Cultus Mountain streams through the completion of an IFIM Study will be recognized as a higher priority than the Cultus Mountain stream: 1) certificates and claims listed in Section IV.C.1.a; 2) pending and new water rights applications listed in Section IV.C.1.c.; and 3) future claims and adjustments.

f. Based on this Agreement, the PUD:

(1) will manage the Cultus Mountain supply to meet the jointly agreed upon Cultus Mountain Instream Flows;

(2) may periodically divert up to 35.80 mgd from the Cultus Mountain streams into Judy Reservoir subject to the Cultus Mountain Instream Flows;

(3) may provide for an additional point of diversion at the PUD Skagit River Pumping Station on each of the water rights listed in subsection IV.C.1.a above;

(4) may transfer the Ranney Well and Sedro Woolley well water right points of diversion to the new PUD Skagit River pumping station; and

(5) may periodically divert a maximum of 35.80 mgd from the Skagit River into Judy Reservoir as an alternate source of supply to the Cultus Mountain system as explained above, with 27.52 mgd of this amount not subject to Skagit River Instream Flows and 8.28 mgd subject to Skagit River Instream Flows; and/or.

(6) The PUD will continue investigations regarding instream flow needs on Salmon, Mundt, Gilligan, and Turner Creeks. Upon completion of these investigations and establishment of instream flows, the PUD will ensure the retroactive application of the instream flows to existing and pending PUD water rights related to Cultus Mountain streams. As a condition of this subordination of water rights, the PUD may: (1) utilize the full hydraulic

capacity of the existing collector lines to Judy Reservoir when water is available in excess of instream flow needs as outlined in IV.C.1.c above, and (2) provide a substitute and augmented supply from the Skagit River to meet the reductions that occur as a result of curtailment of withdrawals from Cultus Mountain streams due to instream flow needs.

g. The Agreement provides for changes to the water right documents identified in Section IV.C.1 herein as an element of this Agreement.

h. Those future claims or adjustments acquired by the PUD for service to parties within or outside the service areas defined in the CWSP, may be subject to results of state-of-the-art instream flow studies.

2. The PUD will participate in identifying instream flow needs through an IFIM instream flow study process. The City and PUD, with consultation from the Tribes, will fund and contract for the IFIM studies, which will apply only to the segment of the Skagit River described in subsection III.H.

a. The City, PUD, and any other parties that desire to assist with financing will fund and contract for the necessary studies to establish Lower Skagit River Instream Flows. The Tribe and WDFW will provide the fisheries and fisheries habitat management criteria for input into the IFIM Study and recommended Lower Skagit River Instream Flows.

b. The Parties will jointly develop the recommended instream flows using the Water Resources Forum process (Instream Flow Policy Working Draft, 8th Draft, Revised May 19, 1993) as a guide. The Tribal IFIM study input criteria will be limited to fisheries and fisheries habitat management and will not include other instream objectives. The Parties will utilize all appropriate methods to establish an agreed upon instream flow for managing the Skagit River below the PUD Pipeline Crossing, including mediation.

c. Schedules.

(1) The PUD agrees that the following events must occur within two years of the effective date of this Agreement: 1) the necessary Skagit River instream flow studies are completed; 2) the City, PUD, and Tribes agree on the recommended instream flows; and 3) the City, PUD, and Tribes submit jointly recommended instream flows to Ecology, or, if these parties cannot agree, in writing submit differing recommendations for Lower Skagit River Instream Flows to Ecology for its decision as to what to include in the rule proposal. This two-year schedule may only be extended by written agreement of the City, PUD, and Tribes. If these parties cannot agree to an extension, the PUD shall take all necessary actions to ensure that changes to existing water rights documents identified in section IV.C.1. shall not remain or become effective as further described in subsection (3) below.

The PUD may then remove any commitment of water service to the Tribal Reservations identified in subsection IV.C.(3) except as required under a separate contract.

(2) Upon receipt of either the joint or differing recommendations described in subsections IV.B.2.c. and IV.C.2.c. Ecology shall immediately file a Preproposal Statement of Inquiry (CR 101), indicating its intent to adopt Cultus Mountain Instream Flows and Lower Skagit River Instream Flows. Ecology shall seek to complete formal rulemaking by filing a CR 102 within eighteen (18) months of its receipt of the joint recommendation or deferment described in IV.B.2.c(1) and IV.C.2.c (1), with a goal of adopting final rules within two years of its receipt.

(3) If Lower Skagit River Instream Flows have not been established by the end of two years following Ecology's receipt of the recommendations described in subsection (1), the City, PUD, and Tribes may extend the deadline only by written agreement. If the City, PUD, and Tribes cannot agree to an extension, the PUD shall immediately request Ecology to rescind any water right change action that is submitted to Ecology since the Agreement became effective even if Ecology has taken final action. The City may immediately reapply for the change. The intent of this provision is to secure the Tribes' right to challenge these changes in the event that Lower Skagit River instream flows are not established within the specified schedule.

d. In the event that Ecology approves the changes referred to in subsection IV.C.2.c(3) above, the PUD shall ensure that any water rights documents issued by Ecology that purport to effecturate these changes shall be expressly and clearly conditioned to require compliance with this Agreement. Regardless of whether Ecology so conditions the document(s), the PUD shall, by its own authority, enforce the conditions of this Agreement when using these water rights.

e. The PUD may, at its option, negotiate with upstream Skagit River dam operators for release of flows to maintain the agreed upon flow levels downstream from the PUD Pipeline Crossing.

3. To guarantee in perpetuity to the Upper Skagit Indian Tribal Community for non-discriminatory use by all residents within the Bow Hill Indian lands and the Upper Skagit Indian Reservation a water quantity of 0.75 mgd based on demands identified annually and projected for five and twenty years by the Upper Skagit Indian Tribal Community and based on amendment to the existing wholesale contract with the Upper Skagit Tribal Community. Government-owned and operated uses will be subject to conservation and curtailment programs for both the Reservation and off-Reservation water uses as outlined in Exhibit A, which is incorporated herein. Government-owned and operated economic development on the Reservation, such as the Tribe's gaming facilities, hotels, and similar facilities,

will be considered services that generate governmental revenue and will receive the second highest priority after residential domestic use. Similar government-owned and operated commercial services within the City's and PUD's service area will receive the same status.

4. The PUD agrees not to provide any water service to users or property located within the Swinomish Indian Reservation without prior written approval of the Swinomish Indian Tribal Community The PUD agrees not to provide any water service to users or property located on Upper Skagit Reservations or other Indian Lands at Bow Hill without the prior written approval of the Upper Skagit Indian Tribe.

5. To assist Ecology in the adoption of instream flow rules for the Lower Skagit River and Cultus Mountain streams within the time period set forth in subsection IV.C.2.c. of this Agreement.

6. To actively support and provide input at both a policy and technical level to County officials regarding implementation of Section 63 of the Growth Management Act, such that building permits will only be issued if there is an adequate potable supply of water that can be withdrawn from groundwater without impacting instream flows;

7. To actively seek amendment of the CWSP and adoption of County ordinances that require, in lieu of individual wells, connection of new individual/single family homes to public water systems where the proposed development is within the designated service area of existing utilities and timely and reasonable service is available. Also, to limit the use of the 5,000 gallons per day exemption in those areas of the County experiencing inadequate Skagit River Basin Instream Flows that may be occurring as a result of groundwater withdrawals.

8. To seek funding sources to contribute: towards the development and implementation of long-term watershed management programs; towards the development of a coordinated water delivery system throughout the CWSP service area; and towards achieving the objectives of this Agreement. This provision does not supersede or in any way affect the PUD's financial commitment as set forth in Section IV.C.2.

D. The County agrees to the following:

1. To implement Section 63 of the Growth Management Act, such that building permits will only be issued if the parcel is served by a public water system or if there is an adequate supply of potable water that can be withdrawn from groundwater without adversely impacting Skagit River Basin Instream Flows, other than as agreed herein;

2. To actively work with all parties to address the 5000 gallon permit exemption for all public water systems and for all individual water systems in those portions of Skagit County that are impacted by inadequate Skagit River Instream Flows that may be occurring as a result of surface or groundwater diversions. Skagit County

reserves the right to allow exempt wells for single family systems in the Skagit River Basin above the PUD Pipeline Crossing.

3. To seek amendment of the CWSP and related County implementing ordinances to require connection of new individual/single family homes to public water systems to achieve conservation of resources where the proposed development is within the designated service area of existing utilities and timely and reasonable service is available.

4. To assist Ecology in establishing instream flow rules for the Skagit River below the PUD Sedro Woolley Pipeline Crossing, with the goal of establishment within four years from the effective date of this Agreement.

5. To seek the goals of; (1) providing certainty and stability for water supplies for citizens of Skagit County; (2) to secure adequate streamflow for Ecology designated Low Flow Streams during critical periods to meet fisheries needs; (3) to encourage public water suppliers to provide water from the mainstem of the Skagit River for water users near Ecology Low Flow Streams where withdrawals may have direct impacts on in-stream resources; and (4) to evaluate, jointly with other parties, streams for possible designation by Ecology as Low-Flow Streams.

E. Ecology agrees to the following:

1. To process any City or PUD requests for changes identified in this Agreement, and to expressly and clearly condition any documents effectuating changes to existing rights to require compliance with this Agreement. Ecology agrees to seek to the extent possible, to enact all necessary rule and water right changes necessary to implement this Agreement;

2. Upon receipt of either the joint or differing recommendations described in subsections IV.B.2.c. (1) and IV.C.2.c.(1), Ecology shall immediately file a Preproposal Statement of Inquiry (CR 101), indicating its intent to adopt Cultus Mountain Instream Flows and Lower Skagit River Instream Flows. Ecology shall seek to complete formal rulemaking by filing a CR 102 within eighteen (18) months of its receipt of the joint recommendation or deferment described in IV.B.2.c(1) and IV.C.2.c (1), with a goal of adopting final rules within two years of its receipt; and

3. Until the adoption of Lower Skagit River and Cultus Mountain Instream Flows provides a framework for determining the availability of water for future appropriations, no final decisions will be made on any water right permit applications within that portion of the Skagit River Basin which lies within WRIA3 which could affect or be affected by those instream flows.

4. In signing this Agreement, Ecology is only obligated to take those actions set forth in this section and is not obligated by or agreeing to any other specific provisions of this Memorandum of Agreement.

F. The Department of Fish and Wildlife agrees to the following:

1. The Tribe and WDFW will provide the fisheries and fisheries habitat management criteria for input into the IFIM study and recommended Lower Skagit River Instream Flows.

2. WDFW will make a recommendation regarding the adequacy of the jointly developed recommended instream flow for Lower Skagit River Instream Flows to Ecology. WDFW's recommendation decision will be based upon the jointly developed recommendations consistency with the fisheries and fisheries habitat management criteria.

3. In the event that the parties cannot reach an agreement on jointly developed recommended instream flow for Lower Skagit River Instream Flows, WDFW will make a recommendation regarding the differing recommendations for Lower Skagit River Instream Flows to Ecology.

4. WDFW will provide appropriate technical support for developing recommended instream flows for the Cultus Mountain Streams.

5. WDFW is in no way obligated or bound by any other provision of the Memorandum of Agreement, except as outlined in the above four items.

G. All Parties agree to the following:

1. That the long term objective is to develop a comprehensive watershed management plan for the Skagit River Basin designed to manage the use of the water resources to meet both instream and out of stream objectives defined by the City, PUD and Tribes.

   a. To collaborate in investigating all alternatives so as to secure adequate flows to meet instream needs for portions of the Skagit River upstream from the PUD pipeline crossing at Sedro Woolley and out-of-stream needs within the surface areas defined within the CWSP. The Parties will establish a Skagit River Flow Management Committee (SRFMC) comprised, at a minimum, of representatives of signatories to this Agreement. This Committee will investigate alternatives towards securing adequate flows to meet instream and out-of-stream needs, design a study process for the Skagit River, and develop a management and monitoring plan to this end. The Parties anticipate completion of a management plan over a period of two to five years.

   b. To actively attempt to establish by rule, within a period beginning on the effective date of this Agreement and extending for five years, instream flows for the entire Skagit River Basin and its tributaries. The Parties agree to develop funding mechanisms to contribute to investigations that will establish these flows.

2. To reach agreement prior to expanding service areas beyond those identified in the CWSP. Such agreement will be based on evaluations of additional needs existing at the time, and after considering additional needs that may exist after the 50-year term of this Agreement. If the Parties cannot agree, then they may not seek or approve any changes relating to water quantity associated with the expansions of service areas for a period of 50 years from the effective date of this Agreement.

3. A work plan and budget for implementing this Agreement will be developed by the City and PUD in draft form within 60 days of the effective date of this Agreement. An adopted work plan and budget will be prepared by the City and PUD within six months of the effective date of this Agreement.

4. The Skagit River Flow Management Committee (SRFMC) shall be responsible for identifying and recommending studies and management responses, and in guiding the development, review, and approval of Skagit River Watershed Management strategies for the signators to this Agreement related to activities that have a measurable impact on the flow in the Skagit River while taking into consideration previously settled hydroelectric agreements. The objective of the instream flow studies is to establish a recommended flow upstream of the Sedro Woolley pipeline crossing for use in the SRFMC Management Plan. The signators to this Agreement agree to establish written response plans based on monthly climatic and flow criteria to help establish an appropriate management response as generally described below.

5. The parties recognize that there is a possibility that the City's 54.94 mgd and the PUD's 27.52 mgd recognized in this agreement as not subject to the Lower Skagit River Instream Flows may reduce Skagit River flows below the established flows. The attached Water Shortage Response Plan is incorporated by reference into this Agreement, and will be implemented in the event that this occurs.

6. No rights, claims, and adjustments identified in this agreement can be confirmed through this Agreement. Confirmation can only be done through an adjudicative process.

7. WDFW is in no way obligated or bound by any other provision of the Memorandum of Agreement, except as outlined in section IV.F.

V. GENERAL PROVISIONS

A. Duration. The term of this Agreement is 50 years from its effective date. The Agreement may only be amended or modified during the 50-year term by mutual written agreement of all signatories. The Agreement will extend beyond 50 years if all parties agree.

B. Severability. If any provision of this Agreement, or the application thereof to any person or circumstance, is found to be invalid or unenforceable, the remainder of the provisions of this Agreement, or the application of such provision to persons or circumstances other than those as to which it is found to be invalid or unenforceable, as the case may be, shall not be affected thereby.

C. Dispute Resolution. If a dispute arises between two or more parties concerning any provision of this Agreement, or application thereof, any such disputing party may send a written request to the other parties requesting a meeting, to be scheduled within 15 days of the parties' receipt of the request. The parties shall then meet together to discuss the dispute and attempt resolution.

D. Enforcement.

1. Between the City, PUD, and Tribes:

a) Notice of Failure. If any party(ies) ("Notifying Party") believes that another party (ies) is in violation of this Agreement or that a violation is threatened, the Notifying Party shall give written notice ("Notice") to the allegedly violating party (ies) of such violation and demand corrective action sufficient to cure the violation.

b) Failure to Respond. If the allegedly violating party (ies):

1. Fails to cure the violation within 30 days after receipt of the Notice; or

2. Under circumstances where the violation cannot be reasonably cured within the 30-day period, fails to begin curing such violation within the 30-day period; or

3. Fails to continue diligently curing such violation until it is finally cured; the Notifying Party may bring an action as provided in subsection c. of this Section.

c) Actions. The Notifying Party may bring an action at law or in equity in a court of competent jurisdiction: to enforce the terms of this Agreement; to enjoin the violation by temporary or permanent injunction; to recover any damages to which it may be entitled for violation of the terms of this Agreement; and to require restoration of resources (which includes, but is not limited to, water and fisheries) to the condition that existed prior to any such injury.

d) Nature of Remedy. The Notifying Party's rights under this Section apply equally in the event of actual or threatened violations of the terms of this Agreement. The Notifying Party may be entitled to injunctive relief in addition to such other relief, including specific performance of this Agreement, without the necessity of proving either actual damages or the inadequacy of otherwise available legal remedies. The remedies described in this paragraph shall be cumulative and shall be in addition to all remedies now or hereafter existing in law or in equity.

e) Enforcement Discretion. Enforcement of the terms of this Agreement shall be at the discretion of each Party entitled to performance, and any forbearance by such party to exercise its rights under this Agreement in the event of any breach of any terms of this Agreement by another party

shall not be deemed or construed to be a waiver, laches, or estoppel of such rights. No delay or omission by a party in the exercise of any right or remedy upon breach shall impair such rights or remedy or be construed as waiver, laches, or estoppel.

2. By the City, PUD, and/or Tribes against Ecology.

a) The City, PUD, and Tribes agree to together take action to ensure, by all appropriate legal means necessary, that Ecology;

1) Does not take final action on any water rights-related applications, claims, or adjustments, submitted by any person or entity, in or in any way affecting the Skagit River basin, whether or not the person or entity is subject to this Agreement, until after Lower Skagit River and Cultus Mountain Instream Flows are established, other than those applications specifically set forth in Section IV E.1 of this Agreement; and

2) Acts expediently to establish Lower Skagit River and Cultus Mountain Instream Flows in order to meet the schedule established in this Agreement.

E. Rights Against Non-Parties. As to non-Parties to this Agreement, the Tribes, by signing this Agreement, in no way diminish, relinquish, or waive their respective legal rights, including but not limited to federal reserved water rights and treaty rights, in any administrative or judicial forum at any time.

F. Successors and Assigns. This Agreement shall be binding on the Parties and on their successors in interest and assigns.

G. No Third Party Beneficiaries. No third party is intended to, or shall have, any rights under this Agreement. The Parties intend that this Agreement be strictly between themselves, and therefore, only the Parties have any right to enforce this Agreement or any provision of this Agreement.

H. No Release of Third Parties. This Agreement is not intended by the Parties to act, nor shall it act, to release any third parties not named herein from any claims or liabilities whatsoever.

I. The parties recognize that there are significant and material considerations not specifically set forth in the Agreement that make the relationship of the parties hereto unique. Because of the unique situation herein, it is the express intent and purpose of the parties that this Agreement not be viewed nor provide precedent beyond the express scope and purpose herein. Therefore, it is agreed between the parties that they will not use this Agreement as precedent outside the Agreement nor should anyone not a party hereto attempt to use the Agreement as precedent against any of the parties.

J. Headings Not Controlling. The headings in this Agreement are for convenience and reference only, and are not part of this Agreement, and in no way amplify, define, limit, or describe the scope or intent of this Agreement.

Attachments: Exhibit A - Water Shortage Response Plan, 7 pages

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SIGNED:

N. Dean Maxwell Date: 9-9-96
Dean Maxwell
Mayor, City of Anacortes

James P. Kirkpatrick Date: 9-25-96
James P. Kirkpatrick
General Manager
Public Utility District #1 of Skagit County

_____ Date: _____
Ted W. Anderson, Chair
Skagit County Commissioner

Robert R. Hart Date: 12/23/96
Robert R. Hart
Skagit County Commissioner

O. Harvey Wolden Date: 12/23/96
O. Harvey Wolden
Skagit County Commissioner

Floyd Williams Date: 9/16/96
Floyd Williams
Chairman, Upper Skagit Indian Tribe

Wa Walton Date: 9-12-96
Wa Walton
Robert Joe, Sr., Chairman
Swinomish Indian Tribal Senate

James D Roberts Date: 9-19-96
James Delano Roberts
Chairman, Sauk-Suiattle Indian Tribe

Mary Riveland Date: 9-26-96
Mary Riveland
Director, Department of Ecology

Bernard Shanks Date: 9/1/96
Bernard Shanks
Director, Department of Fish & Wildlife

BK0094PG4263

August 22, 1996

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EXHIBIT A
WATER SHORTAGE RESPONSE PLAN
to the
MEMORANDUM OF AGREEMENT
REGARDING UTILIZATION OF SKAGIT RIVER BASIN
WATER RESOURCES FOR INSTREAM AND OUT OF STREAM PURPOSES

I. PURPOSE OF THIS EXHIBIT

The purpose of this Exhibit is to outline a plan of action by the City, the PUD, and their customers, to reduce the possible impact the City and PUD diversions may have on the recommended Instream Flows for the Lower Skagit River.

II. DEFINITIONS

For the purpose of this Agreement, the following shall mean:

A. Commercial/Industrial Customers: Includes, but is not limited to, manufacturing, food processing, restaurant, sales, service, farm operations.

B. Discretionary Water Use: Water use which is not required for business operations or for general health and safety of the user; usually pertains to outside water use during warmer periods of the year (lawn/flower watering, car washing, washing driveways/sidewalks, etc.).

C. Governmental Customers: Governmental entities, including, but not limited to: Water-related and other City facility operations in the case of the City; water-related facility operations in the case of the PUD; gaming and other fund-raising operations in the case of the Tribes; schools, parks, administrative operations in the case of other governmental agencies.

D. Irrigation Use: the application of water to promote botanical development, whether at a residence or a commercial business.

E. Public Service Announcement (PSA): a media advertisement intended to inform the public in general, whether through television, newspaper or radio mediums.

F. PUD Pipeline Crossing: The location in Sec. 29, Twp. 35N., Rge.5 E.W.M., where the PUD water transmission main crosses the Skagit River. For purposes of determining Skagit River flows at this location, flows measured and recorded at the U.S. Geological Survey Gaging Station No. 12200500 (Skagit River near Mount Vernon) will be utilized.

G. Residential Customers: Single family or multifamily domestic water users.

H. Wholesale Customer: A customer who resells the water for commercial/industrial or residential use.

III. ACTION PLAN

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The City and PUD will monitor the flow in the Skagit River at the PUD Pipeline Crossing. If the flow in the Skagit River is projected to fall below the State Department of Ecology Instream Flow Level, the City and PUD will initiate the Response Plan as outlined in the following matrix.

Each Action Level indicated in the matrix outlines specific actions by the City and PUD depending on the anticipated low flow condition in the Skagit River. The durations indicated in the matrix are the anticipated period of the specified flow condition. The duration for an action level will start when the Skagit River flows drop low enough to first meet that Action Level's definition and stop when the flows increase to no longer meet that definition; a higher Action Level can start and stop as needed, and the duration of the lower Action Level will still be calculated based on its original start date.

ACTION LEVEL	DURATION		
	1 to 2 Days	3 to 14 Days	15 Days or More
I Alert Phase	Action I.1	Action I.2	Action I.3
II Management Phase	Action II.1	Action II.2	Action II.3

A. ACTION LEVELS

The Skagit River Flow Management Committee (SRFMC) will meet in May of each year to review the projected stream flows and to identify possible management strategies to meet the collective water needs of the participants. The SRFMC will also outline the proposed Water Response Plan based on the guidelines outlined in this document and for the two Action Levels.

1. Throughout Action Levels I and II as defined below, the City and PUD will coordinate the execution of the following:

   a) Monitor water supply forecasts provided by State and federal agencies and dam operators. Stream flow projections identified in sections III.4.2 and III.4.3 of this Response Plan shall be based on these forecasts.

   b) Establish and maintain regular communications with upstream dam operators in the Skagit River Basin to track planned water releases, with the explicit motive of increasing releases to help maintain minimum Lower Skagit River Instream Flows. Monitor the current operating rule curves used for up-ramping and down-ramping for each dam and establish communications and protocol for those

situations when the City and PUD may request additional releases to augment projected deficiencies below the PUD Pipeline Crossing.

The upstream dam operators will be asked to determine the level of flow augmentation they can provide and to document their intent to provide such flow augmentation, or to provide timely notice if they cannot deliver such augmentation.

c) Establish and maintain regular communications with the Tribes' fisheries manager(s) regarding actual Skagit River flows relative to Lower Skagit River Instream Flows; and seek to coordinate water withdrawal patterns of the City and the PUD with projected fish passage patterns.

2. Action Level I, Alert Phase. Applies when flow in the Skagit River is projected to reach the Lower Skagit River Instream Flow level plus 20 percent or at an alternative level defined at the annual SRFMC meeting and as measured at the PUD Pipeline Crossing in Sedro-Wooley.

The City and the PUD will execute the following action(s) during the Alert Phase for the duration of the action level indicated:

a) Action I.1 (1 to 2-day duration):

(1) No change in water withdrawal/treatment plant operations.

(2) The PUD will evaluate the flow conditions in their Cultus Mountain project for the period(s) of low flow and will implement a program to maximize storage in Judy Reservoir. The PUD will also use peaking flows from up- and down-ramping at the upstream dams in the Skagit River to keep Judy Reservoir full.

(3) On behalf of the SRFMC, outline the route of flows from the upstream Skagit River dams downstream to the PUD pipeline crossing using the upstream dam operating rule curves, projected flows from the intervening areas, historical records of streamflows at the upstream gaging stations, and standard routing procedures.

(4) Prepare PSA #1[1].

b) Action I.2 (3 to 14 days duration):

[1] Seek voluntary 10 percent water use reduction in peak day use.

(1) No change in water withdrawal/treatment plant operations.

(2) The PUD will continue its program to maximize storage in Judy Reservoir.

(3) Promote a program of voluntary water use reduction by all City and PUD water customers, with a goal of ten percent (10%) reduction in peak day demand.

(4) Issue PSA #1 to newspaper and radio media requesting voluntary reduction of discretionary use of water.

(5) In conjunction with the Tribes, monitor and evaluate critical elements of the Lower Skagit River Instream Flows against planned and projected fisheries and habitat management plans for the period(s) of projected low flow. Elements of the Lower Skagit River Instream Flow to be evaluated include: the projected timing of use and passage of fish through the reach of the Skagit River downstream of the PUD river crossing; a comparison of routed flows (provided by the City and PUD) with flows required by the Instream Flow; and the effects of the routed flows on habitat conditions existing or projected to exist during the low flow period(s). Results of the Lower Skagit River Instream Flow critical elements monitoring and evaluation will be provided by the City and PUD.

(6) The City and PUD will develop/refine a "Contingency Plan of Operation" for the period(s) of low flow using: the routed flows from the upstream reaches of the Skagit River; maximized storage in Judy Reservoir; results from the Instream Flow monitoring and evaluation assessment; estimates of water savings from voluntary water use reduction program(s); and weather and water supply forecasts for the Skagit River Basin. The "Contingency Plan of Operation" will provide for conjunctive use of the PUD's Cultus Mountain Project and the City's and PUD's Skagit River facilities. The "Contingency Plan of Operation" will optimize the PUD's use of water from Judy Reservoir during periods when demands exceed available withdrawals from the City's and PUD's Skagit River facilities and the PUD's Cultus Mountain project due to established instream flows on those water courses.

c) Action I.3 (15 days or more duration):

(1) No change in water withdrawal/treatment plant operations.

(2) The PUD will continue its program to maximize storage in Judy Reservoir.

(3) Continue a program of voluntary water use reduction by all City and PUD water customers, with a goal of ten percent (10%) reduction in peak day demand.

(4) Continue to refine the "Contingency Plan of Operations" based on additional streamflow information and City and PUD customer demand information.

(5) Continue PSA #1 by newspaper and radio media.

3. Action Level II, Management Phase. Applies when flow in the Skagit River falls below the established Lower Skagit River Instream Flow levels, measured at the PUD Pipeline Crossing in Sedro-Wooley and continues until the flows either meet or exceed the regulated instream flow levels.

The City and the PUD will execute the following action(s) during the Management Phase for the duration of the action level indicated:

a) Action II.1 (1 to 2 day duration):

(1) Limit water withdrawals to quantities exempt (125.59 cfs/82.46 mgd) from Lower Skagit River Instream Flows.

(2) The PUD will continue its program to maximize storage in Judy Reservoir.

(3) Implement the "Contingency Plan of Operation". Continue to refine the "Contingency Plan of Operation" based on additional streamflow information and City and PUD customer demand information.

(4) Notify the upstream Skagit River dam operators of the downstream flow situation and seek additional releases, if possible, if the situation continues.

(5) Continue PSA #1 by newspaper and radio media.

(6) Prepare PSA #2[2] with a program to voluntarily reduce water demand to meet instream flows.

[2] Mandatory restrictions for discretionary exterior water use to limit diversion to 125.59 cfs/82.46 mgd.

b) Action II.2 (3 to 14 day duration):

(1) Limit water withdrawals to quantities exempt (125.59 cfs/82.46 mgd) from Lower Skagit River Instream Flows and seek voluntary reduction in demand.

(2) The PUD will continue its program to maximize storage in Judy Reservoir.

(3) Continue implementation of the "Contingency Plan of Operation". Continue to refine the "Contingency Plan of Operation" based on additional streamflow information and City and PUD customer demand information.

(4) Request the upstream Skagit River dam operators to commence additional releases. Such additional releases should be timed to realize the effect of the release at the PUD Pipeline Crossing at the time of projected deficient streamflow. The City and PUD will base their request(s) on established routing procedures.

(5) Issue PSA #2 to newspaper and radio media.

c) Action II.3 (15 days or more duration):

(1) Limit water withdrawals to quantities exempt (125.59 cfs/82.46 mgd) from Lower Skagit River Instream Flows and peek voluntary reduction in demand to meet instream flows.

(2) The PUD will continue its program to maximize storage in Judy Reservoir.

(3) Continue implementation of the "Contingency Plan of Operation". Continue to refine the "Contingency Plan of Operation" based on additional streamflow information and City and PUD customer demand information.

(4) Continue to request the upstream Skagit River dam operator to continue additional releases.

(5) Continue PSA #2 by newspaper and radio media.

PUBLIC SERVICE ANNOUNCEMENTS
(Subjects Only)

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PSA #1 Alert Phase

- ☐ Seek voluntary 10 percent water use reduction with a focus on discretionary outside use of water.

PSA #2 Management Phase

- ☐ Mandatory restrictions for discretionary exterior water use to limit diversion to 125.59 cfs/82.46 mgd and voluntary reduction in demand to seek to meet the instream flows. The voluntary reduction program may include the following:

  - Restriction on commercial/industrial/residential irrigation.
  - Reduction in peak day water use by all commercial/industrial customers, including restaurants, on the City and PUD systems.
  - Reduction in peak day water use by all residential customers on the City and PUD systems.

- ☐ As the City and PUD demand approaches the out of stream diversion limit of 125.59 during low flow conditions, the use reduction program will include:

  - Mandatory restriction of governmental/commercial/industrial/residential irrigation activities from City and PUD systems, including farms.
  - Prohibition of car washing operations at commercial/residential sites.
  - Reduction in peak day water use by all commercial/industrial customers, including restaurants, on the City and PUD systems.

Reduction in peak day water use by all residential customers on the City and PUD systems.

Appendix H
Groundwater Resource Assessment, 1991

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DRAFT

GROUNDWATER RESOURCE ASSESSMENT
COORDINATED WATER SYSTEMS PLAN
SKAGIT COUNTY, WASHINGTON

AUGUST 10, 1991

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DRAFT
Groundwater Resource Assessment
Coordinated Water System Plan
Skagit County, Washington

Prepared for:
Economic and Engineering Services

Prepared by:
Pacific Groundwater Group

August 10, 1991

JU9007

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1.0 INTRODUCTION

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This report presents the results of our assessment of the groundwater resources of Skagit County for use in the Comprehensive Water Supply Plan (CWSP). The purpose of the assessment was to provide an overview of the groundwater resources of the county with respect to regional water supply development.

The project area consisted of almost all of Skagit County (Exhibit 1-1). The mountainous areas east of Marblemount were not considered as little groundwater development is expected in this area. The smaller and less developed islands of the county were also not considered. Regional development is not considered viable in these areas.

The specific goals of this study were to:

- Estimate amounts of groundwater potentially available in the county,
- Identify preferred locations for additional development,
- Assess existing water quality and its potential effects on development, and
- Quantify the cost and general number of wells needed for the additional development.

This goal was met through an evaluation of existing data on the geology, hydrology, climate and water use in the county.

The amount of water needed for a regional water supply depends in part on the amounts generally available in the area. For the purposes of this project, well yields of at least 500 gpm (gallons per minute) and well-field yields of at least 1 to 2 mgd (million gallons per day) were considered necessary for a regional water supply in the main parts of the county. Supplies of this magnitude are not available on the islands (such as Guemes or Fidalgo) and smaller yields may be considered for an island-wide supply. In the case of Fidalgo, supplies can be (and are) readily brought in from outside areas and smaller well field yields need not be considered. On Guemes, smaller well-field yields may be considered, as a pipe line from the mainland is less practical.

The report is divided into eight chapters. Chapter 1 is this introduction. Chapter 2 is a summary of major findings and conclusions. Chapter 3 presents the geology and major aquifers of the county. Chapter 4 discusses potential well yields in various areas. Chapter 5 reviews existing information on water quality. Chapter 6 presents aquifer recharge and water budget analyses. Chapter 7 discusses development of additional groundwater. The report is concluded with Chapter 8, a list of references. Pertinent Exhibits are included at the end of each chapter.

This report was prepared under subcontract to Economic and Engineering Services, inc. (EES) for use in their engineering evaluation for Skagit County's Comprehensive Water Supply Plan. It was authorized by Mr. Robert Wubbena through subcontract work order 4-121, signed November 27, 1990.

This report has been prepared for the exclusive use of Skagit County and their consultant EES, for specific application to the referenced project, according to hydrogeological practices generally accepted at the time. No other warranty, expressed or implied, is made.

2.0 SUMMARY OF FINDINGS AND CONCLUSIONS

- Approximately 100 mgd (million gallons per day) of additional groundwater may be available in Skagit County, based on a mass balance analysis and an estimated capture ratio of 20 percent of total groundwater flow. An estimated 20 to 25 mgd may be feasible from a well field completed in the Marblemount area.

- Development of this 100 mgd would require approximately 70 to 100 wells and an expenditure of about $7 million. This cost does not include transmission lines, pumping stations and any costs outside of those required to install and develop the wells themselves.

- Regional supply aquifers are located beneath the Skagit Valley in alluvial deposits of gravel and sand lying within 200 feet of ground surface.

- The aquifers capable of regional supply are located near the Skagit River. Water pumped from these aquifers eventually reduces flow in the Skagit River. Full development of 100 mgd could reduce the flow of the Skagit by 1 percent (compared to average flow) to 3 percent (compared to low flows occurring 1 percent of the time).

- Reduction of Skagit flow does not appear to be a regulatory issue at this time as in-stream protection flows have not been established. Future requirements on Skagit flow could affect groundwater development in the basin.

- Well yields of 500 gpm to 800+ gpm appear locally feasible from properly designed and completed wells within the most productive aquifers in the valley. The highest yields (800+ gpm) appear to be found in the Marblemount vicinity. Slightly lower yields (500 gpm) are available from many other areas throughout the Skagit Valley.

- Deep aquifers (greater than 500 feet below ground surface) have not been identified in the valley or delta area. Most aquifers lie within 200 feet of surface. In the delta area, they appear to be underlain by several hundred feet of clay.

- Areas outside of the valley are generally much less productive. An exception is the Lake McMurray area where potential well yields in excess of 500 gpm are reported. Other glaciated areas have potential well yields of 100 gpm or less. Bedrock upland areas generally have well yields in the range of a few gallons per minute.

- Water quality in the regional supply aquifer areas is generally good. Excess concentrations of iron and manganese are relatively common in the Skagit Delta area. Excessive levels of iron and manganese are also reported in valley aquifers between Mt. Vernon and Concrete.

- Saline water has been reported in several locations in western Skagit County. The source of the salinity is typically salt water intrusion induced by pumping. Relic sea water left from the time of aquifer deposition may account for some of the salinity.

- Potential aquifer contamination from human sources are generally confined to the more populated western part of the county. A few abandoned landfills should be considered if a regional groundwater supply is developed in the eastern part of the county.

3.0 GEOLOGY AND AQUIFERS

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3.1 Background and Overview

This chapter reviews and characterizes the geology and aquifers of the county. The purpose of the geologic characterization is to set the stage of the definition of aquifers and groundwater flow. The geology of an area is first described in order to define the positions and properties of the aquifers (water bearing zones through which groundwater flows) and the aquitards (low-permeability zone that restrict groundwater flow).

Aquifers are defined to show where groundwater is available and provide information that is required for assessment of potential well yields, aquifer yields, groundwater flow paths, recharge-discharge relationships and contamination assessment. Understanding the position and extent of the various aquifers in the county is needed to assess the existing groundwater situation and to plan for development of additional groundwater.

Aquifer definition plays a major role in assessing potential well yield. An aquifer comprising a thick and extensive gravel deposit allows a higher well yield than an aquifer that is thin, bounded (cut-off on one or more sides by low permeability material), or consisting of fractures in bedrock. An aquifer bounded near a well produces less water over the long term compared to a well completed in an areally extensive aquifer of otherwise similar nature.

3.2 Methods and Assumptions

The geology of the County was assessed based on a review of key geologic reports and construction of geologic cross sections through various portions of the county.

The key geologic reports included:

- Water in the Skagit Basin (Drost and Lombard, 1978),
- Preliminary Report on the Ground-Water Resources of Southwestern Skagit County (Sceva, 1950),
- Water Resources of the Swinomish Indian Reservation, (Drost, 1979),
- Bedrock Geology of the Port Townsend 30- by 60- Minute Quadrangle (Whetton, et al, 1988), and
- Surficial Geologic Map of the Port Townsend 30- by 60- Minute Quadrangle (Pessl et al, 1989).

These reports are the main references on the geology of the county. They represent the best overview of the geology at this time. No one map or report covers the geology of the entire county in detail. The Geologic Map of Washington, Northwest Portion (planned for release in 1995) will provide an overview, when completed.

Additional reports on San Juan and Island County were also reviewed and used in the interpretation of county geology. Many of the surficial deposits in Island County are similar to those of the glaciated portions of Skagit County while many of the bedrock units in the islands of Skagit County are similar to those in San Juan County.

After compiling the geologic reports, over 2000 well logs contained in the files of the Department of Ecology were reviewed. About 250 representative logs were obtained for our files. Logs were selected that indicated both hydrologic and geologic information. Were available, at least one representative log per square mile was obtained.

Geologic cross sections were then prepared for six transects of the county. These sections show the subsurface geology along the cross section line. Geologic units were interpreted from the drillers descriptions of the subsurface materials, based on geologic unit names in the various reports discussed above.

Because the sections lines cross almost the entire county from north to south, some are 20 miles or more long. Since wells are typically less than 200 feet in depth, presenting the subsurface conditions along the entire section in this report was not possible without excessive vertical exaggeration. The excessive exaggeration does not meaningfully demonstrate subsurface geology. Portions of the sections are presented, instead, to eliminate this problem. Each of these presented sections indicates the subsurface conditions over a smaller, representative area. The entire sections were used in our analysis, however.

3.3 Geologic Assessment Results

Most of the county's high-yield aquifers are associated with the Skagit River. They typically consist of coarse deposits of sand and gravel within the upper 200 feet of the alluvium that defines the Skagit Valley. Much of the area beneath the valley floor contains buried channels of sand and gravel from the meandering Skagit (Exhibits 3-2, 3-3, 3-4 and 3-7). The areas with the coarsest deposits appear to lie in the Marblemount area where the high energy environment of the river deposited gravels and coarse sand. The valley areas between Marblemount and Mt. Vernon (Exhibits 3-4 and 3-7) are also underlain by coarse deposits of sand and gravel. Aquifers in these areas are also highly productive.

The sand and gravel aquifers in the county are generally discontinuous. A sequence of deposits representative of one geologic unit is defined as an aquifer zone if a large number of higher-permeability deposits are contained within it. The Skagit River valley alluvium exemplifies an aquifer zone.

The eastern portions of the Skagit Delta are also underlain by sand and gravel aquifers (Exhibit 3-3). These aquifers were deposited as the Skagit emptied into a saltwater bay between what is now Mt. Vernon and Fidalgo Island. Sand and gravel was deposited where the river flowed into the "sea[1]." These deposits formed high-yield aquifers. Fine sand, silt and clay were deposited away from the delta front in the western portion of today's Skagit Delta (the lowland areas east of the Swinomish upland, Fidalgo Island, Bayview Ridge, etc.) These deposits formed aquitards or local low-yield aquifers.

No wells are known to penetrate the entire sequence of the alluvium in the delta area. Consequently, the extent, thickness, and potential for deep, high-yield aquifers is not well known. One well in the Mt. Vernon area was drilled to a depth of 500 feet penetrating 154 feet of clay beneath the sand and gravel aquifer zone. It is not known what lies at greater depths.

Sand and gravel aquifers are also found in some parts of the glaciated lowland areas (Exhibits 3-5 and 3-6) in the western part of the county (generally under 400 to 500 feet elevation) and along terraces associated with the Skagit River valley (Exhibit 3-7). Streams and rivers associated with advancing and retreating glaciers deposited sand and gravel that form aquifers within these areas.

Generally, the deposits are less extensive and/or finer-grained that the aquifers associated with the Skagit. One known exception lies south of Lake McMurray where gravel aquifers were identified in several well logs. Other non-bedrock areas are underlain by occasional deposits of sand. These were identified in the southwest part of the county near I-5, Guemes Island (Exhibit 3-1), the Swinomish Upland, the area directly east of Mt. Vernon, and the lower elevation areas near Alger and the Skagit Speedway.

Much of the upland portion of the county comprises bedrock with little or no cover by glacial or non-glacial deposits. Wells in these areas produce small quantities of water (generally not enough for more than one household) from fractures in bedrock. Since these are insufficient for regional water supply use, bedrock aquifers are not discussed further in this report.

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[1] In this report the term "sea" is used for all the salt water bodies lying along the western part of the county. "Sea" includes: bays, sounds, inlets, passes, channels, etc.

4.0 Potential Well Yield

4.1 Background and Overview

This chapter reviews potential well yield from various aquifer zones in the county. Potential well yield is defined as the short term yield that is likely available from a properly designed and constructed well, finished in the best aquifer (when more than one aquifer lie at depth) from some location within the area. This yield may not be possible with the existing wells installed in the area. They may be too small, finished in a different aquifer, or improperly designed or finished for high yield.

The purpose of the potential well yield analysis was to define the probable yield for a "good" well within a given area. This yield would be used for planning development of regional groundwater supplies. Not all wells finished in a region of defined potential well yield will have the indicated yield. Some will be less and some more. The listed potential yield is the short-term pumping rate that is likely from some wells within the area.

4.2 Methods and Assumptions

The potential yields for some 200 wells were evaluated based on information in the USGS database compiled for their Skagit River Basin project, and well logs collected from the Department of Ecology for the geologic analysis (discussed above). Only wells with all of the parameters needed for the analysis were considered. The parameters needed include:

- General well location (latitude-longitude coordinates, state plane coordinates, or well number that indicates location to the nearest 1/4-1/4 section),
- Pumping rate during a well test,
- Drawdown in water level caused by pumping at the given rate over an indicated time period,
- Static water level during a non-pumping period, and
- Aquifer or well screen depth.

The potential well yield was calculated using the specific capacity method. The equation used was:

$$Qp = 2/3*SC*AD$$

where:

Qp = estimated potential yield over a pumping period of a few weeks continuous pumping (gpm)

SC = specific capacity of the well (pumping rate divided by drawdown in feet) (gpm/ft)

AD = Available drawdown (the distance between the static water level and the well screen or open section of the well (ft)

The 2/3 factor accounts for decreasing specific capacity that results from:

- o pumping longer than the short-term test (from which the calculation data were derived), and
- o variations in water level that occur over time.

Some wells may be capable of actual short-term yields (on the order of a day or so of continuous pumping) that are larger than the calculated values as the 2/3 represents a "safety factor" to help account for hydraulic boundaries in the aquifer that cannot be assessed from the limited pumping data.

Four sets of potential yields analyses were made. The first was based entirely on wells in the USGS database. Several hundred wells are in the database but only 99 wells had all the information required to calculate potential well yield. It is not known how wells were selected for inclusion in the database.

The second set of analyses was based on wells used in the construction of the five, mainland, north-south cross section lines (discussed above). A total of 41 wells were used in these sections but only 34 had all the data required for the analysis.

A similar set of analyses was conducted for Guemes Island. Data for this analysis was obtained from the files of Dave Garland (1991) for his unpublished report on water quality on the island. A total of 42 wells were assembled in the file, 38 of which had the required data for a potential yield analysis.

The final set of analyses was conducted for areas identified through the geologic assessment as containing sand and gravel aquifers. Well logs in our files for these areas with sufficient data were used in the assessment.

Actual well yield was also considered, when listed on Ecology Water Rights printout. Wells with instantaneous water rights of greater than 300 gpm or more were assumed to have short-term potential yields of 500 gpm or more. Experience has shown that many wells

have installed capacities that are less than their maximum. Smaller installed capacities often reflect the owners water use needs, rather than the aquifers maximum potential.

4.3 Well Yield Assessment Results

Exhibit 1-1 shows estimated potential yields throughout the county. The map shows anticipated yields from "good" wells within the area, finished in the highest yield aquifer below the site, over the short term. All areas are likely to contain anomalous wells that produce substantially different yields. These are not representative of yields that may be used in planning for regional water supply.

The highest yields are generally associated with the Skagit River Valley alluvial areas. Yields of 500 or more gpm are possible throughout much of the valley, with yields of more than 800 gpm possible near the Marblemount area. High yields are also possible in the eastern part of the Skagit Delta area. These yields are also in the 500 gpm or more range.

A small high-yield area was also identified near Lake McMurray. Potential well yields of 500 gpm or more are possible in this area from sand and gravel probably associated with glacial outwash deposits.

Other areas in the county have estimated potential yields of 100 gpm or less. These areas are shown in Exhibit 1-1. Since 100 gpm is not considered practical for a regional water supply, they are not considered further in this report.

The median and mean potential well yields for the USGS, cross section and Guemes Island analyses are listed in Appendix Tables AT-1 and AT-2. The tables indicate a median yield of about 40 gpm for the mainland, non-bedrock portions of the county. The mean yield is substantially higher, about 200 gpm. The higher value is the result of very high-yield wells used in the analyses that shifts the mean toward a higher value. Bedrock wells are not listed but typically have yields on the order of 1 to 2 gpm.

Guemes Island potential yields are also included in Appendix Table AT-2. The median and mean values are considerably less than those of the non-bedrock mainland areas. A median of around 7 gpm and a mean of around 40 gpm were calculated. The much lower values are the result of the finer grained aquifers in the glacial-interglacial deposits compared to the coarser sand and gravel of the Skagit Alluvium.

5.0 GROUNDWATER QUALITY

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5.1 Background and Overview

This chapter reviews groundwater quality in various parts of the county. Groundwater quality was assessed to identify the likely water quality from locations that may be considered for regional water supply. Areas were identified where groundwater quality was known to meet drinking water standards. Areas with wells known not to produce water meeting the standards were also identified.

Three major categories of water quality problems were considered in our analysis:

- Saline water,
- Natural water contaminants as such as iron and manganese, and
- Industrial contamination.

Saline water is often results from pumping an aquifer that lies near a body of sea water. Such saltwater intrusion is common along many parts of coastal Washington, including parts of Skagit County. Saltwater water intrusion can occur because an individual well (or a group of a few wells) are pumping at rates that are too high. Saltwater intrusion can often be reduced in this situation by: reducing consumption and therefore the pumping rate at the well, replacing the well with another at an inland location, or using several wells pumping at lower rates to replace one well pumping at a higher rate.

Saltwater intrusion can also result because an entire area or region is over-pumped in relationship to natural groundwater recharge. Moving wells inland or reducing the pumping rate at one well by replacing it with several is unlikely to reduce the intrusion problem. The only solution is an overall reduction of pumping from the entire area.

Saline water can also occur in areas without significant well pumping. It may occur in aquifers containing relic sea water originating from the time of deposition. Natural groundwater flow in the area is too slow to purge the saline water with recharged fresh water or the nature. In this situation, there is no practical solution to the saline water problem. A different source or expensive treatment would be needed.

In either type of saline water problem area, new, high capacity wells are likely to be affected. Such areas are excluded from consideration as targets for a regional groundwater supply.

Iron and manganese are common "contaminants of concern" for groundwater in the county. Iron and manganese are generally considered "natural" contaminants as they occur in groundwater as a result of weathering of soil or rock. They are often present in many parts of western Washington in concentrations exceeding secondary drinking water standards.

Iron and manganese concentrations above the secondary standards are not considered health threats. The problem is usually one of aesthetics as they can give water an unpleasant taste and smell, or stain fixtures and plumping. A water supply without these contaminants exceeding the secondary standards is desirable, but not always mandatory. Water users either put up with the aesthetic problems or pay for treatment.

Areas with many reports of excessive iron and/or manganese are not recommended for development of a regional water supply. New wells in such an area have a high probability of excess levels, too. Since areas are available in the county that meet all the water standards (including secondary), areas with excess iron or manganese are excluded from consideration for regional supply.

Industrial contamination has recently become a major groundwater quality concern. Contamination can result from spills, leaks, or dumps of industrial waste, chemicals or fuels. It can also result from application of agricultural chemicals that are now considered dangerous or hazardous, especially if application rates were high or the chemical does not readily decompose. Older solid waste landfills can also be sources of industrial contamination. Older landfills were not designed or constructed to keep contaminants out of the groundwater system. Many are not monitored to assess their impacts on nearby groundwater.

Regional water supplies can be developed in areas with industrial contamination, if the wells are located far enough away or in a non-downgradient position. Locating regional supply wells in areas without industrial contamination, is preferred, however.

5.2 Methods and Assumptions

Wells with historical occurrences of excess levels of iron, manganese and salinity (indicated by chloride concentrations) were identified based on published records and Department of Health water system records supplied by EES (1991).

Published sources included those listed in Chapter 3 and the following:

- Reconnaissance of Sea-Water Intrusion along Coastal Washington, 1966-68 (Walters, 1971), and

- Seawater Intrusion into Coastal Aquifers in Washington, (Dion and Sumioka, 1978).

Additional information on saline water was obtained from well logs from the Department of Ecology (1991), discussion with well drillers Dean Hayes (1991) and Ken Fowler (1991), and data contained in the files of the Department of Ecology (Garland, 1991).

Information on potential industrial contamination was obtained from the Skagit County Health Department (Haycox, 1991) and Ecology listings of remediation sites in the county.

Criteria were established to designate water quality problem areas. Any report of iron or manganese exceeding the secondary standards of 0.30 mg/l (iron) or 0.05 (manganese) was taken as an indication that future problems in the area were possible. Chloride concentrations of 100 mg/l were taken as an indication that saltwater intrusion (or relic sea water) was present in the area and that future development in the area may have similar problems.

Industrial contamination was considered as a potential problem. The presence of an abandoned landfill, a gas station with a leaking tank, an industrial site such as a refinery or waste transfer/processor, or an agricultural area with known problems such as EDB were all noted, even if actual groundwater contamination had not been reported. For our regional groundwater analysis, we have assumed that these potential problem areas should be avoided, especially when other areas capable of regional supply yields without these problems, are available.

Areas with iron, manganese, chloride or industrial contamination were listed. Problem or potential problem areas were identified to the nearest 1/4-1/4 section based on the well number (for existing wells) and map location (for potential industrial sites).

5.3 Water Quality Assessment Results

Review of the data (Tables 5-1, 5-2 and 5-3) indicates that the area east of Concrete has the preferred water quality conditions for a regional water supply. The areas between Concrete and Sedro Woolley may also be acceptable. This area has fewer reported and potential water quality problems that areas further to the west.

A regional groundwater supply source developed in the area east of Concrete would be less likely to have excess iron or manganese that a source further down the valley or in the delta. Areas with wells reporting excess levels of iron and or manganese are listed in Table 5-1. The table lists the general location based on nearby geographic features. The table indicates that most iron and manganese problem areas lie in the Skagit delta. Some can also be found in glacial deposits in the western part of the county and on Guemes Islands. Areas up-valley east of Concrete do not report excess iron or manganese. Some portions of some aquifers within this area are likely to have excess levels as these contaminants are very common throughout the northwest. The data indicate that these problems are less common in this area, however.

A regional groundwater supply source developed in the area east of Mt. Vernon would be less likely to have saltwater intrusion than other areas closer to the delta front. Most areas more than a few miles inland, away from the river are also acceptable. Areas with wells reporting saline water are listed in Table 5-2. The table also lists the general location based on nearby geographic features. As would be expected, most saltwater intrusion problems occur near the sea, either on islands or near the coast in the delta. Guemes Island indicates many wells reporting saltwater intrusion, but this may be more of the availability of data

from the unpublished Ecology study (Garland, 1991). Other islands (Fidalgo and Samish) also indicate some intrusion. Non-island intrusion areas are generally confined to the delta area. Some of these occur several miles inland. The salinity at these locations could be relic from the time of deltaic deposition or it could be the result of a wedge of saline water moving up the bottom of the Skagit River during high tides. Wells tapping aquifers connected to the river may be drawing this water into local aquifers.

Table 5-3 indicates areas with potential for industrial contamination in the groundwater. These potential sources are generally located near population centers. Most lie west of Range 5E as do most of the people in the county. A few abandoned landfills can be found further inland. Since these inland landfills are near small, non-industrial centers, they are unlikely to have taken a significant volume of hazardous materials. These small landfills are probably not a major concern for development of a regional groundwater supply. Based on these assumptions, the preferred location to minimize potential industrial contamination is inland, east of Concrete away from the few potential problem areas.

6.0 AQUIFER RECHARGE AND WATER BUDGET

6.1 Background and Overview

The water budget is a first-cut estimate of the major components of the hydrologic cycle. This estimate indicates the approximate volumes of water that are flowing in and out of the county's hydrologic system through precipitation, evapotranspiration, runoff, groundwater recharge, human consumption, and natural discharge.

The water budget serves as the basis for initial planning of ground water use. It provides a general understanding of the components of recharge, groundwater use and natural discharge. This general understanding helps in the management of groundwater resources by indicating the relative magnitude (importance) of each component of the flow system. It cannot be used by itself as a tool for accurate long-term management of groundwater resources. The variability of the natural earth system is too great to allow for precise knowledge of the individual components of the budget to the degree required for management of the resource by water budget analysis alone.

Estimates of the social, ecological and economic costs of diversion of natural discharge to human use is not part of a water budget. A comprehensive, site-specific assessment of an area is needed to detail the social, ecological and economic value of water discharging naturally and water diverted for human use. It is usually relatively easy to place a value and cost for water pumped by a well. The value of natural discharge is significantly more difficult to quantify. For example, natural discharge may be maintaining a stream or a wetland or the proper salinity balance in an estuary. Changes in natural discharge to these environments may affect plant and animal life, scenic beauty, fisheries and more. Assessment of the value of these situations is far beyond a hydrogeological evaluation. Society must make these decisions aided by input from many disciplines.

6.2 Methods and Assumptions

The water budget is based on the mass-balance principal: water going into the system is equal to the water flowing out of the system plus or minus the change in storage of the water within the system. This situation is true at all points of the system at all times based on the principle of the conservation of mass. In the natural system, groundwater storage changes seasonally and with dry/wet year cycles. Pumping of groundwater also changes the amount of storage in the system. In our analysis we have assumed that long-term (multi-year) changes in the system are zero. The water budget represents an "average" year.

With the assumption that change in storage is zero (equilibrium conditions) the mass balance equation becomes:

Recharge = Discharge

where: Recharge = Precipitation - Evapotranspiration - Runoff

and: Discharge = Consumption + Natural Discharge

From these equations the amount of recharge and discharge within the county were estimated by assessing:

- o precipitation (A significant water input),
- o evapotranspiration (a relatively large component),
- o runoff (a relatively large component),
- o groundwater recharge (relatively small compared to precipitation),
- o consumption via wells and springs (relatively small compared to total recharge), and
- o unaccounted natural discharge (a major component).

Each of the methods and assumptions used in the analysis of each of these components is discussed below.

The range in possible values of each of the hydrologic components in the mass balance analysis is high, often greater than the value of some of the other components. For example, estimated evapotranspiration for an area cannot be accurately measured and is typically estimated. The estimate has an uncertainty of two to three inches per year. The actual value of evapotranspiration is likely to lie somewhere within this range of uncertainty. Average annual precipitation is estimated based on interpolation between widely scattered points, using best meteorological judgement. Different methods of assessing average annual precipitation produce different results producing a calculated average that may vary by several inches from the "true" average precipitation for the area. The uncertainty in both precipitation and evapotranspiration require that the analysis be done using a range of values. Together the combined ranges in precipitation and evapotranspiration may be larger than the total amount of recharge to the groundwater system.

A conservative analysis of recharge would require using the higher end of the evapotranspiration range, the higher end of the run off range, and the lower end of the precipitation range. This approach would be misleading and often indicate that groundwater is not recharged, a situation contradicted by water level data that show flow within the system and on-going recharge. We have used a more "middle of the road" approach and used values closer to the center of the range of estimated values.

The water budget is typically based upon average conditions. Long-term averages for the various components of the hydrologic system are used in the analysis. Our assessment follows this convention.

6.2.1 Precipitation

Precipitation was estimated from an isohyetal (equal depth of rainfall) maps prepared by the National Weather Service (1957). The county was divided into townships (six miles by six miles) and the rainfall representing that township was estimated based on the isohyets bounding and crossing the area. (Guemes Island lies in four townships. Only one representative rainfall for the island was estimated.) This method assumes that the rainfall varies linearly over each of the areas being assessed. This assumption is not always true but likely introduces only a small error (estimated at 1 to 2 in or less for each of the areas). This error is relatively small compared to overall rainfall rate.

6.2.2 Runoff

Runoff was estimated for each of the townships by one of three methods. Runoff was estimated for most of the county using runoff coefficients based on conversations with NOAA (1991) flood forecasters. These values were based on their "best professional judgement" from working with actual data and computer forecast models. They varied from runoff equal to 80% of precipitation during the wetter months to 10% during the driest times of the year.

Normally runoff would be estimated by comparing rainfall and river hydrographs. The volume associated with a rapid rise in river flow would be compared with the volume of rainfall recorded for the same period. In a similar manner, summer flows during no rain periods would be assessed to determine the groundwater contribution to the river (base flow). This component would be subtracted during rainy periods and contributions from rainfall (runoff) would be calculated.

This approach was not possible as the series of dams on the Skagit and the numerous glaciers in the North Cascades introduce flow that cannot be readily separated from the available records. A major component of river flow in the summer comes from water released behind the dams. Natural flow in the fall and spring is typically reduced by storage behind the dams. Glaciers in the summer melt contributing flow that is unrelated to rainfall induced runoff or groundwater. Because of these complications, the best professional judgement estimate of runoff was used.

Runoff in the drier bedrock areas of Fidalgo Island was estimated based on data from San Juan County. Runoff was quantified in Boyce, 1983. Similar rock types, slopes and climate allow the use of the San Juan runoff coefficients on Fidalgo Island. The coefficients were generally in the 30% range.

Runoff from the glaciated portions of western Skagit County was estimated based on studies on Whidbey Island (PGG, 1988; Sapik et al, 1988). Runoff was generally in the range of only 10% of precipitation.

6.2.3 Evapotranspiration

Evapotranspiration (water evaporated by soil and transpired by plants) was estimated using the Blaney-Criddle method (USSCS, 1970) for each of the townships. This method uses crop, latitude and temperature to calculate potential evapotranspiration. A simple water balance within the soil based on rainfall and potential evapotranspiration was then used to relate potential to actual evapotranspiration. In this balance, actual evapotranspiration equals potential as long as rainfall is sufficient to keep the soil moist enough to provide plants with enough water. When the soil is drier, the actual rate decreases below the potential rate.

In our analysis we have computerized the soil mass balance procedure to calculate the actual evapotranspiration rate on a weekly basis. In this analysis monthly data (rainfall and temperature) are distributed evenly over four "weeks" of the month.

When precipitation was equal to or greater than potential evapotranspiration:

$$AET = PET$$

When precipitation was less than potential evapotranspiration:

$$AET = PET \quad (\text{when } SM/SMC >= 0.75)$$

or

$$AET = PET * 1.333 * (SM/SMC) \quad (\text{when } SM/SMC < 0.75)$$

Where:

AET = Actual evapotranspiration (in/yr)

PET = Potential evapotranspiration (in/yr), calculated by the Blaney-Criddle method

SM = Soil moisture content from the previous week (in)

SMC = Soil moisture holding capacity (in)

This linear function of the ratio of actual water content to soil moisture holding capacity is one of at least five methods used to relate actual to potential evapotranspiration reported in Dunne and Leopold (1978).

Precipitation and soil moisture holding capacity vary considerably. In our analysis we have calculated a series of evapotranspiration rates for the various precipitation rates indicated for each area and an estimated average soil moisture holding capacity of 6 inches. Total soil moisture holding capacity is equal to soil moisture holding capacity per foot of soil times total depth of soil, generally about 3 feet.

The choice of values for representative "crop factors" proved problematical. Most of Skagit County is vegetated by coniferous trees. The published crop factors for the method include many irrigated crops, but not coniferous trees. Possible values were proposed by several workers in the field. These values were based on analyses conducted in eastern Washington. They did not appear reasonable. The reported values were more likely for actual evapotranspiration and not potential. Comparison with the literature indicated that crop factors for grass were greater than the proposed conifer crop factor. In order to use a conservative approach (i.e. tending toward underestimating recharge) we have used the grass crop factor in our analysis.

6.2.4 Groundwater Recharge

Groundwater recharge was calculated using the precipitation, evapotranspiration and runoff values calculated using the methods discussed above. Recharge was calculated using the mass balance equation listed above. This equation calculates a rate (in/yr). The rate was converted to a volume per year by multiplying the rate by the recharge area where the rate is valid. Recharge area was estimated based on the physiography of each township. Upland areas were assumed to be recharge areas. Lowland areas near streams, rivers or sea were assumed to be discharge areas. The approximate area for each was estimated.

Recharge in the hard rock areas was assessed using two methods. The first is the Blaney-Criddle method described above. The second is a "permeability limited" method where it was assumed that bedrock underlying the evapotranspiration zone cannot accept all the surplus water generated in the high precipitation areas. Assuming a hydraulic conductivity of 10^{-6} cm/sec[2] and a vertical gradient approaching 1.0, the maximum possible recharge rate in these areas is limited to about 1 foot per year. Additional surplus would be discharged as delayed runoff from soil.

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[2] The bulk hydraulic conductivity of bedrock forming the mountainous regions of the county has not been measured. Modelling studies of mountainous terrains by Forster (1991) indicate that bulk hydraulic conductivities of mountainous regions often range from 10^{-3} cm/sec to 10^{-6} cm/sec. We have use the upper bound of this range as many studies have shown the upper 100 to 300 feet contains the majority of permeable fractures and is the hydraulically active.

This method provides a better approximation to the actual recharge rates in the county, than does the standard Blaney-Criddle method. The higher recharge rates in the wetter parts of the study area generated by the unmodified Blaney-Criddle method would require hydraulic conductivity values higher than those typically observed or reported in the literature. The "permeability limited" method takes into account the hydraulic effects of bedrock lying beneath the soil zone experiencing evapotranspiration.

6.2.5 Consumption

Consumption was based on water rights. A listing of all groundwater rights for the county was reviewed and the total rights for each township totaled. Water rights as the sole basis for water use may underestimate existing use, as those with rights pending or those who have never applied are not considered. These uncounted users may be off set, however. Our experience in other counties indicates that many water rights are not fully used. The differences between non-used rights and unaccounted for users without rights may be self-canceling.

Water rights for the erstwhile proposed Skagit Nuclear power plant were excluded from the analysis. Their rights represented the majority rights within the sections where they had been appropriated. Since it is unlikely that this plant will be built, these rights will probably never be used.

6.2.6 Natural Discharge

Natural Discharge is the portion of total discharge that is not used by wells and springs. In Skagit County, most groundwater discharges to the Skagit River. Only a small portion either discharges to areas out of the county or to the sea.

The usual method for quantifying natural discharge is by difference. Groundwater consumption (wells and springs) is quantified and subtracted from the total amount of discharge (which under equilibrium conditions is equal to recharge). The difference is equal to natural discharge.

6.2.7 Additional Yield

Only a portion of the undeveloped natural discharge can be developed as additional yield. The percentage that can be used is a function of many factors including economics, social impact, environmental concern and more. The percentage of total discharge that can be developed depends on how much society is willing to pay on an economic, social and environmental basis.

Several studies have assumed a percentage of total discharge ("capture ratio") as an estimate of the total water that may be available with acceptable impacts. These capture ratios have range from 20% to 50%. We have used a 20% capture ratio in our estimate of additional groundwater available. This number is taken from Drost (1979). Twenty percent is considered a conservative portion. It is the lowest value known to be used in a number of northwest resource studies. The actual percentage of groundwater discharge that can be "successfully" developed will depend on a number of factors beyond the scope of this project.

6.3 Water Budget Results and Aquifer Recharge

The results of the recharge portion of the water balance analysis are presented in Table 6-1. This table summarizes the rates and volumes of best estimates of recharge to each township during typical conditions. "Permeability Limited" values indicate rates where the underlying bedrock limits recharge. These values are more likely representative than those calculated by the unmodified Blaney-Criddle method, as discussed in section 6.2.5.

The total recharge to aquifers in the county is on the order of 600,000 acre-feet per year (530 mgd), using the modified method. This amount represents the recharge to all the aquifers in the county. The specific amounts to each zone cannot be accurately estimated from the existing data.

The total water balance is listed in Table 6-2. This table lists recharge, water use, difference between the two ("natural discharge") and an estimate of additional groundwater development that would be possible based on a 20% capture ratio. On a county-wide basis, an additional 100,000 acre-feet per year (about 100 mgd) may be available. Additional yield is discussed further below.

7.0 REGIONAL GROUNDWATER SUPPLY DEVELOPMENT

7.1 Background, Overview and Method

A regional water supply must be capable of producing water of sufficient quantity and quality such that development is cost effective. The quantity and quality needed are relative to other sources of water that are available in the general area. In order to assess the potential for regional water supply development from groundwater, several criteria were established for this study. These are discussed below.

A regional supply aquifer is one capable of producing at least 500 gpm from a single well, and preferably 1000 gpm or more. The aquifer should be capable of supplying a well field (two or more wells) of 2.0 mgd (1400 gpm) or more without long-term depletion of the aquifer (water level declines). It should not be located in an area closed to groundwater development or in a basin where surface water minimum flows inhibit groundwater pumping during part or all of the year.

Water quality should meet the state standards for all primary and secondary contaminants. Treatment for secondary or other parameters may be considered, if cost effective. Rejection of a regional supply aquifer capable of the desired yields but requiring treatment is an economic decision.

The previous chapters assessed the parameters affecting regional water supply from groundwater. These included: aquifer locations (Chapter 3), potential well yield (Chapter 4), water quality (Chapter 5) and aquifer yield (Chapter 6). The information in these chapters was combined to identify areas capable of meeting regional water supply needs. These areas have:

- high well yields,
- adequate recharge to sustain aquifer yield, and
- water meeting state drinking water standards.

In addition, other factors affecting groundwater development were assessed including:

- general potential water quality impacts associated with existing and future land use,
- the relationship of the Skagit River to groundwater development, and
- costs associated with development of additional groundwater supplies.

This chapter discusses the points listed above.

7.2 Additional Groundwater Development

The existing data indicate additional groundwater supplies can best be developed in the alluvial deposits in the Skagit River Valley. High-yield aquifers are present beneath the valley at many locations (Exhibit 1-1). High-yield wells appear feasible at most locations from the vicinity near Marblemount to the Skagit Delta west of Mt. Vernon. The available data indicate water quality is better and well yields possibly higher in the area just east of Marblemount. Other areas between Marblemount and Concrete also appear to have good water quality but slightly lower well yields. The valley areas further downstream near Sedro Woolley and Mt. Vernon also appear to have the potential for relatively high well yields but water quality may not be as good with more wells reporting excessive concentrations of iron, manganese, and in some areas near the coast, saline water.

A few areas outside the Skagit Valley indicate relatively large well yields such as near Lake McMurray. The limited extent of the aquifer in these areas make major development of a regional source less feasible, however. Other areas show moderate well yields, such as north of the Skagit River Valley. A large number of wells could be installed to produce a regional supply. The costs would likely be prohibitive, making other supply areas more desirable.

7.2.1 Regional Supply Well Yields

Yields from properly constructed wells, finished in the more productive aquifer(s) in the Skagit Valley area, are likely to be in the 500 gpm to 800+ gpm range. Deposits of gravel and sand lying within 200 feet of ground surface allow these high individual well yields. The highest well yields appear feasible in the Marblemount area where the high energy environment of the Skagit and Cascade Rivers allowed the deposition of the coarser grained materials. Localized high yields are also feasible further downstream where aquifers also comprise gravel and sand deposits. Areas of silts and fine sands are also present, however, making consistent very high yields (800+ gpm) less likely.

Upland areas surrounding the valley do not have regional water supply capability because well yields are generally low. These areas contain bedrock aquifers and only very localized and limited sand and gravel deposits. The bedrock areas typically have well yields of under 10 gpm and often much less. The sand and gravel areas may have yields that are higher, sometimes greater than 100 gpm. These yields are still below those needed for an economic regional water supply. They could be used for local supply, however.

7.2.2 Regional Supply Aquifer Yields

The water budget analysis indicates 100 mgd of additional groundwater may be available for development within the county. This estimate is a "first cut" planning value. It is based on as assumed capture ratio of 20 percent. More (or less) than 20 percent of total recharge may be potentially available, depending on the economic, environmental and social costs

that society is willing to pay. We have used this rate to be conservative and consistent with previous studies in the county.

Much, but not all, of this water flows to the aquifers lying beneath the Skagit River Valley floor. Data were not available to measure groundwater flow direction through the construction of water level contour maps. Our experience shows, however, that the generally low permeability of the uplands, the very large topographic relief and low elevation of the Skagit River, all indicate that groundwater flow will generally follow the topography of the county. Since the river is the local topographic low point, it defines the regional groundwater discharge point for most of the county. Only areas on the extreme west (the western portions of the Skagit Delta; Fidalgo, Guemes and other Island; and the Chuckanut areas), and some areas near the southern and northern boundaries of the county have groundwater that does not discharge to the Skagit River. As such, most of the 100 mgd surplus in the county is available from aquifers in the Skagit Valley.

Development of the 100 mgd would require a series of wells along the Skagit River Valley. Full development would likely require 70 to 100 wells from Mt. Vernon to beyond Marblemount. Such a series of wells would be needed to intercept groundwater before it discharged to the river. Some areas would require more wells than others, as yield from individual aquifers will vary, locally.

The yield from individual aquifers lying in the Skagit Valley alluvial deposits has not been calculated. Aquifer yields depends on several factors, one of which is the hydraulic relationship of the river to the valley aquifers. This relationship may be the most important factor and is discussed in a following section.

A series of wells or well fields is recommended for the high yield (800 gpm) area near Marblemount. The total volume of additional yield available from this area (indicated in Exhibit 1-1) cannot be accurately estimated. Only a portion of the 100 mgd available in the county is available from this area. Assuming that groundwater discharges to the river at a rate proportional to river bank length, perhaps 1/5 to 1/4 of the 100 mgd may be developable from the high-yield area. Thus, a yield from this area of about 20 to 25 mgd may be feasible.

An additional percentage of the 100 mgd could also be obtained from the moderate yield (500 gpm) area between the 800 gpm area and Mt. Vernon. Using the same relationship of discharge proportional to river bank length an estimated 70+ mgd may be feasible. Not all of this water may be desirable. Water quality may be an issue in these areas, as discussed below.

Because aquifers in this area are known to connect to the Skagit River (Hart Crowser, 1981), the total yield from wells completed in this area may be considerably higher than that possible without connection to the river. If groundwater withdrawals from aquifers connected to the Skagit is acceptable (discussed in section 7.2.3), a larger percentage of the

100 mgd may be feasible. On-site testing and regulatory interaction will be needed to quantify actual yield.

7.2.3 Regional Water Supply Quality

The existing data indicate that water quality in the valley aquifers east of Concrete generally meets state standards, both primary and secondary. A regional water supply developed in this area is also expected to meet the standards. Local concentrations of iron and manganese above the standards are possible, however. The aquifer materials contain minerals that weather to produce iron and manganese. Elevated levels are not expected to dominate. A regional supply system could likely mix the water from areas with elevated levels (should they exists) with water from other areas to lower the concentrations to below the criteria.

Valley aquifers down-valley from Concrete are more likely to exceed state secondary standards for iron and manganese. Several water systems and wells in this area have reported elevated levels. Since a regional system would likely mix water, excess iron or manganese concentrations may be controlled through mixing of sources.

Iron and manganese levels above the standards are more common in the delta area, west of Mt. Vernon. Many wells and water systems have reported iron above the secondary standard. A regional supply developed in this area would likely require treatment or mixing. A selective use of supply areas without excess levels of iron or manganese may be possible if a test well program can identify such areas. High-capacity wells in this area, especially those located further to the west could induce saltwater intrusion. A regional water supply well field is not recommended in this area for this reason.

The existing data indicate that industrial water quality problems would not be likely in a regional groundwater supply established up valley, say east of Concrete. A few abandoned landfills are known in the area (Table 5-3). Since these lie away from major urban and industrial areas, contaminants reaching the groundwater system are less likely to be significant. Supply wells should not be located in an area directly downgradient and close proximity to these old landfills. Water quality testing and a site-specific hydrogeological assessment should be undertaken before a well field is established.

7.2.3 Factors Affecting Additional Groundwater Development

Several factors may affect development of a regional groundwater supply system from a Skagit Valley aquifer. The main factor is the relationship between the aquifer(s) and the river.

The Skagit River is the discharge point for most groundwater in the county. Almost all groundwater eventually discharges to the river (except for a small amount that discharges

to the sea or to Snohomish or Whatcom County). Development of groundwater in the Skagit Valley removes groundwater before it reaches the river. In some cases, a high capacity well will also cause a reversal in flow gradients and draw water from the river.

In either situation, development of groundwater from Skagit Valley aquifers reduces the flow of the river. Over the long term (after pumping has removed water from storage and an equilibrium situation is established), the reduction in flow to the river may approximately equal the volume of water pumped.

Comparison of Skagit River flows and the estimated additional available groundwater shows that the reduction in flow is relatively very small. The mean flow of the Skagit is 16,870 cfs (Drost and Lombard, 1978). This flow is more than 100 times the 100 mgd (approximately 155 cfs) potentially available. The river exceeds 5,250 cfs more than 99 percent of the time. Complete development of 100 mgd is still less than 3 percent of this low-flow rate. These river flow rates indicate that on a volumetric basis, development of groundwater to the full 100 mgd capacity is not significant to river flow.

Full development of groundwater may be significant on a legal basis in the future, however. Currently, Ecology indicates the Skagit has no in-stream protection flow rates (S. West, 1991). Development of groundwater does not legally require consideration of impacts on the river flow. Most river basins in western Washington have in-stream protection requirements. These rivers have mandated minimum flows throughout part of the year. Many of these basins are closed to further development of groundwater because of the impacts of pumping on river flow. If similar restrictions are placed on the Skagit, groundwater development could be affected. The full 100 mgd of additional groundwater estimated in this study may not be available.

Changes in land use can affect groundwater development. Impacts can occur as changes in water quantity available and quality. Most of the area supplying groundwater to the regional supply aquifer(s) is rural to totally undeveloped. It is unlikely that future development will affect the quantity of water recharged to these aquifers. Development will be too minor in comparison to the total area.

Changes in land use near the supply area could possibly affect water quality. If areas upgradient from supply wells were over-sprayed with hazardous agricultural chemicals, converted to industrial use with poor "housekeeping" or allowed to be used for dumping of industrial waste, water quality could be affected. Development of a regional water supply should be accompanied by a wellhead protection program to monitor and minimize such potential problems.

7.3 Regional Supply Well Development Costs

Full development of the 100 mgd source estimated in this study could cost about $7 million. These costs are based on an estimated 70 to 100 wells needed to supply the water. The

estimated cost for these wells ranges from about $71,000 to $83,000, as shown in Table 7-1. These costs include drilling, testing, production pump installation, engineering and construction of a small well house. They are based on a compilation of estimates provided by several well drilling firms. The estimated average well depth is 150 feet. Diameters would likely range from 12 to 16 inch, based on anticipated peak yields of 600 to 1000 gpm.

The costs for transmission lines, plumbing, and other appurtenances are not included. Estimation of these costs is beyond the scope of a hydrogeologic evaluation. They would likely be more than the costs of well installation and development discussed above, as the source lies many 10's of miles from the population center of the county.

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Tables

Table 5–1 – Summary of Wells With Known Iron or Manganese Groundwater Problems in Skagit County

Township/ Range		Excess Iron (Fe > 0.30 mg/l)	Excess Manganese (Mn > 0.05 mg/l)	Location(s)/Source Aquifer(s)
33	3	9H1	–	S. Delta, near Rexville: Alluvial
	4	–	33D1	SW County, Near I–5: Glacial
	5	–	–	
	6	–	–	
	7	–	–	
	8	–	–	
	9	–	–	
	10	–	–	
34	1	–	–	
	2	2N1,15C1,15R1,26F1,34R6,35G1,35G3,35G4,35L1	–	Swinomish Upland: Glacial/Interglacial
	3	4L1,12N1,12Q1,13F1,25H1,25H2	–	S.Delta, W and NW of Mt. Vernon: Alluvial
	4	5D1,5D2,6H1,7P2,7P14,8C1,8C2,17D1,19N1,18R1,19B2,19L1,30J1,30P1,32C1,32B1,32P1	–	Mt. Vernon area: Alluvial
	5	19K1	–	Walker Valley: Glacial
	6	–	–	
	7	–	–	
	8	–	–	
	9	–	–	
	10	–	–	
	1	–	–	
	2	–	–	
	3	–	–	
	4	13R1,13R2,22C1,22L1,25C1,25J1,25K1,28L1,28P3,32P1,33B1	–	Sedro Wolley–Burlington area: Alluvial
	5	8D2,19D1,30K2,30K3,30L1	–	Sedro Wolley: Glacial and Alluvial
	6	–	–	
	7	–	–	
	8	–	–	
	9	–	–	
	10	–	–	
36	2	–	–	
	3	–	–	
	4	–	–	
	5	–	–	
	6	–	–	
	7	–	–	
	8	–	–	
	9	–	–	
	10	–	–	
Guemes Is.				
35	1	12P	–	S. Guemes: Glacial/Interglacial
	2	–	–	
36	1	36K	–	N. Guemes: Glacial/Interglacial
	2	–	–	

Table 5–2 – Summary of Wells With Known Indication of Saline Water Intrusion in Skagit County

Township/ Range		Saline Intrusion (Cl > 100 mg/l)	Location(s) / Source Aquifer(s)
33	3	8A1	S. Delta, near N. Fork: Alluvial
	4	–	
	5	–	
	6	–	
	7	–	
	8	–	
	9	–	
	10	–	
34	1	–	
	2	34R6,34R7	SW Swinomish upland, on coast: Glacial/Interglacial
	3	35P	Inland S. Delta, w of Skagit City: Alluvial
	4	25F	Inland S. Delta, near Mt. Vernon: Alluvial
	5	–	
	6	–	
	7	–	
	8	–	
	9	–	
	10	–	
35	1	27Q1	Fidalgo, Burrows Bay, on coast: Bedrock
	2	1A1	S of Samish Island, on coast: Alluvial
	3	11R1	SW of Bow, on Edison Slough: Alluvial
	4	–	
	5	–	
	6	–	
	7	–	
	8	–	
	9	–	
	10	–	
36	2	26R2	Samish Island,on coast: Glacial
	3	26N	N of Bow (1 mi): Glacial
	4	–	
	5	–	
	6	–	
	7	–	
	8	–	
	9	–	
	10	–	
Guemes Is.			
35	1	11L,13D	SW Guemes, on coast: Glacial/Interglacial
	2	8K	SE Guemes, on coast: Bedrock
36	1	25N,26A,26A,26H,26K,35G,36C,36C,36G,36K,36L	N Guemes, mostly on coast, some inland: Glacial/Interglacial
	2	–	

Table 5–3 – Summary of Areas With Known or Potential Industrial Contamination

Township/ Range		Sections with Possible or Known Industrial Contamination	Source(s) or Possible Source(s)
33	3	–	
	4	16,28	Abandoned Landfills
	5	–	
	6	–	
	7	–	
	8	–	
	9	–	
	10	33	Abandoned Landfill
34	1	–	
	2	2,10,1116,26,34	Abandoned Landfills, Industrial Waste Recycling
	3	–	
	4	18,19,28	Abandoned Landfills, Leaking Tank
	5	–	
	6	–	
	7	–	
	8	–	
	9	–	
	10	5	Abandoned Landfills
35	1	13,14,24,26	Leaking Tank, Abandoned Landfills
	2	21,28,29,33	Oil Refineries, Industrial Waste Recycling
	3	–	
	4	8,24	Septic Disposal Lagoon, Solvent Spills, Leaking Tank
	5	–	
	6	8,27	Abandoned Landfills
	7	8,17	Agricultural chemicals, Abandoned Landfill
	8	–	
	9	28	Abandoned Landfill
	10	–	
36	2	–	
	3	–	
	4	–	
	5	–	
	6	–	
	7	–	
	8	14	PCB Spill
	9	–	
	10	–	
Guemes Is.		–	
35	1	–	
	2	–	
36	1	–	
	2	–	

Table 6–1 – Summary of Estimated Recharge in Skagit County

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Tnshp /Rng	Loc Data Ctr*	Est Rech Area mi2	Rate** B–C Method in/yr	Rate** Limited Perm*** in/yr	Volume B–C Method mgd	Volume B–C Method ac–ft/yr	Volume Limited Perm mgd	Volume Limited Perm ac–ft/yr	Comments
33	3 A	1	9.9	9.9	0.5	530	0.5	530	One sq.mi. NOT Skagit Valley delta. GW discharge area.
	4 SW	35	12.0	12.0	20	22000	20	22000	Fifty percent bedrock upland.
	5 SW	35	9.6	9.6	16	18000	16	18000	Sixty five percent bedrock upland.
	6 SW	34	13.2	12.0	21	24000	19	22000	Eighty percent bedrock upland.
	7 C	35	15.8	12.0	26	30000	20	22000	All bedrock upland
	8 C	35	15.8	12.0	26	30000	20	22000	All bedrock upland
	9 D	35	16.7	12.0	28	31000	20	22000	All bedrock upland
	10 D	24	14.8	12.0	17	19000	14	15000	Thirty five percent Sauk River valley floor, rest bedrock.
34	2 A	17	5.3	5.3	4.3	4800	4.3	4800	Likely recharge 17 sq.mi. of Swinomish Upland, only.
	3 A	2	9.2	9.2	0.9	980	0.9	980	Ninety five percent Skagit delta. GW discharge area.
	4 SW	24	15.4	12.0	18	20000	14	15000	Till capped recharge area. One third Skagit delta.
	5 SW	35	12.7	12.0	21	24000	20	22000	Seventy percent bedrock upland.
	6 SW	34	16.7	12.0	27	30000	19	22000	All bedrock upland
	7 C	35	17.6	12.0	29	33000	20	22000	All bedrock upland
	8 C	35	22.4	12.0	37	42000	20	22000	All bedrock upland
	9 D	32	11.7	11.7	18	20000	18	20000	Ten percent Sauk/Skagit River valley floor.
	10 D	34	14.8	12.0	24	27000	19	22000	Five percent Sauk River valley floor, rest bedrock.
35	3 A	13	11.4	11.4	7.0	7900	7.0	7900	Sixty percent Skagit Valley delta. GW discharge area.
	4 SW	13	15.0	12.0	9.3	10000	7.4	8300	Sixty percent Skagit Valley delta. GW discharge area.
	5 SW	22	10.2	10.2	11	12000	11	12000	Forty percent Skagit Valley floor. GW discharge area.
	6 SW	31	15.7	12.0	23	26000	18	20000	Fifteen percent Skagit Valley floor. GW discharge area.
	7 C	31	10.7	10.7	16	18000	16	18000	Fifteen percent Skagit Valley floor. GW discharge area.
	8 C	31	11.3	11.3	17	19000	17	19000	Fifteen percent Skagit Valley floor. GW discharge area.
	9 C	32	14.3	12.0	22	24000	18	20000	Ten percent Skagit Valley floor. GW discharge area.
	10 C	29	14.3	12.0	20	22000	17	19000	Twenty percent Skagit Valley floor. GW discharge area.
36	3 SW	32	8.1	8.1	12	14000	12	14000	Thirty percent bedrock upland, Ten percent Skagit Delta
	4 SW	32	11.9	11.9	18	20000	18	20000	Forty percent bedrock upland, Ten percent flood plains.
	5 SW	35	10.2	10.2	17	19000	17	19000	Fifty percent bedrock upland.
	6 SW	35	14.9	12.0	25	28000	20	22000	Ninety five percent bedrock upland.
	7 C	35	15.8	12.0	26	30000	20	22000	Ninety five percent bedrock upland.
	8 C	31	17.0	12.0	25	28000	18	20000	Eighty percent bedrock upland.
	9 C	35	27.6	12.0	46	52000	20	22000	Ninety five percent bedrock upland.
	10 C	35	21.0	12.0	35	39000	20	22000	Ninety five percent bedrock upland.
Guemes	A	5.75	7.2	7.2	2.0	2200	2.0	2200	Non–bedrock recharge area about 5.5 to 6 sq.mi.
Fidalgo	A	23.5	2.5	2.5	2.8	3100	2.8	3100	Estimated recharge area 22 to 25 sq.mi. Mostly bedrock
TOTALS					670	750000	530	590000	

*Note: A=Anacortes, C=Concrete, D=Darington, SW= Sedro Wolley

**Note: All estimates to 2 significant figures, only.

***Note: Vertical permeability of till and fractured bedrock estimated at 10–6 cm/sec.

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Table 6–2 – Water Balance for Skagit County

Township/ Range		Perm. Limited Recharge* ac–ft/yr	GW use by Water Rights** ac–ft/yr	Change in Storage (Average) ac–ft/yr	Inflow–Outflow+ Change in Storage ac–ft/yr	Estimated Additional Yield*** ac–ft/yr	mgd	Comments
33	3	530	735	0	–210			Almost all GW discharge area.
	4	22000	1388	0	21000	4100	3.7	About 50 percent bedrock (permeability–limited) recharge area.
	5	18000	5314	0	13000	2500	2.3	About 65 percent bedrock (permeability–limited) recharge area.
	6	22000	None	0	22000	4400	3.9	About 80 percent bedrock (permeability–limited) recharge area.
	7	22000	None	0	22000	4400	3.9	Almost all bedrock (permeability–limited) recharge area.
	8	22000	None	0	22000	4400	3.9	Almost all bedrock (permeability–limited) recharge area.
	9	22000	None	0	22000	4400	3.9	Almost all bedrock (permeability–limited) recharge area.
	10	15000	None	0	15000	3000	2.7	About 35 percent GW discharge area, the rest bedrock recharge area.
34	2	4800	877	0	3900	780	0.7	About 50 percent GW recharge area, about 50 percent recharge area.
	3	980	27016	0	–26000			Almost all GW discharge area.
	4	15000	9100	0	5900	1200	1.1	About 35 percent GW discharge area, the rest glacial sediment recharge area.
	5	22000	3	0	22000	4400	3.9	About 70 percent bedrock (permeability–limited) recharge area.
	6	22000	None	0	22000	4400	3.9	Almost all bedrock (permeability–limited) recharge area.
	7	22000	None	0	22000	4400	3.9	Almost all bedrock (permeability–limited) recharge area.
	8	22000	None	0	22000	4400	3.9	Almost all bedrock (permeability–limited) recharge area.
	9	20000	None	0	20000	4000	3.6	About 10 percent GW discharge area.
	10	22000	None	0	22000	4400	3.9	About 5 percent GW discharge area, the rest bedrock recharge area.
35	3	7900	5686	0	2200	440	0.4	About 60 percent GW recharge area, about 40 percent recharge area.
	4	8300	6639	0	1700	330	0.3	About 60 percent GW recharge area, about 40 percent recharge area.
	5	12000	5300	0	6700	1300	1.2	About 40 percent GW recharge area, about 60 percent recharge area.
	6	20000	1295	0	19000	3700	3.3	About 15 percent GW recharge area, about 85 percent recharge area.
	7	18000	513	0	17000	3500	3.1	About 15 percent GW recharge area, about 85 percent recharge area.
	8	19000	None	0	19000	3800	3.4	About 15 percent GW recharge area, about 85 percent recharge area.
	9	20000	None	0	20000	4000	3.6	About 10 percent GW recharge area, about 90 percent recharge area.
	10	19000	None	0	19000	3800	3.4	About 20 percent GW recharge area, about 80 percent recharge area.
36	3	14000	162	0	14000	2800	2.5	About 10 percent GW recharge area, about 30 percent bedrock recharge area.
	4	20000	426	0	20000	3900	3.5	About 10 percent GW recharge area. Possible GW inflow from Whatcom County.
	5	19000	38	0	19000	3800	3.4	About 50 percent bedrock recharge area. Possible GW inflow from Whatcom County.
	6	22000	None	0	22000	4400	3.9	Almost all bedrock (permeability–limited) recharge area.
	7	22000	336	0	22000	4300	3.9	Almost all bedrock (permeability–limited) recharge area.
	8	20000	1773	0	18000	3600	3.3	About 80 percent bedrock (permeability–limited) recharge area.
	9	22000	127	0	22000	4400	3.9	Almost all bedrock (permeability–limited) recharge area.
	10	22000	4	0	22000	4400	3.9	Almost all bedrock (permeability–limited) recharge area.
Guemes Is.		2200	142	0	2100	410	0.4	Mostly glacial sediment recharge area.
Fidalgo Is.		3100	238	0	2900	570	0.5	Mostly bedrock recharge area.
TOTALS		588000	67112	0	518000	104000	92	

*Note: Rounded to 2 significant figures.

**Note: Based on WDOE water rights minus Skagit Nuclear Power Plant allotments.

***Note: Based on a 20% capture ratio used in Drost, 1979 (USGS OFR 79–12). Negative values not shown where in discharge area (Yield not limited by local recharge).

Table 7–1 – Production Well Cost Estimates

17938

16–IN WELL (1000 gpm)

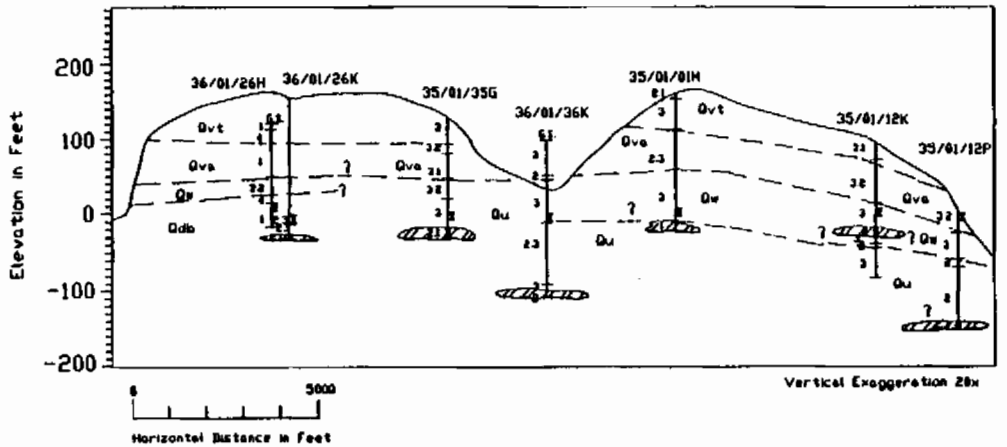
Item Description	Quantity	Unit Price	Total Price
Mob./Demob.	1	$2,500	$2,500
Surface Seal	1	$1,800	$1,800
16–Inch Drilling	150	$50	$7,500
16–inch Drive Shoe	1	$900	$900
16–inch Casing	150	$24	$3,600
Screen Assembly	1	$6,000	$6,000
Authorized Hourly	100	$90	$9,000
Test Pump Rental, Installation, Rem	1	$1,500	$1,500
Pump Test Hourly	28	$75	$2,100
Extra Materials	1	$500	$500
Production Pump (1000 gpm)	1	$9,000	$9,000
Pump controls, plumping etc	1	$8,000	$8,000
Pump Building	1	$15,000	$15,000
Engineering			$10,000
Subtotal			$77,400
WSST (@7.6%)			$5,882
TOTAL			$83,282

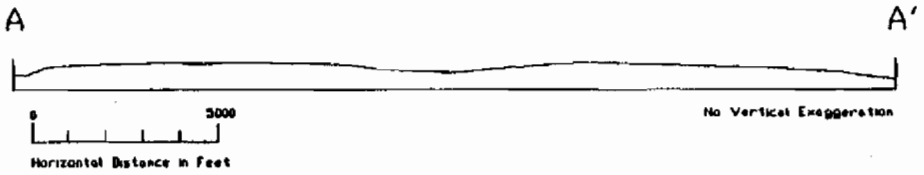
12–IN WELL (600 gpm)

Item Description	Quantity	Unit Price	Total Price
Mob./Demob.	1	$2,000	$2,000
Surface Seal	1	$1,500	$1,500
12–Inch Drilling	150	$45	$6,750
12–inch Drive Shoe	1	$400	$400
12–inch Casing	150	$20	$3,000
Screen Assembly	1	$4,000	$4,000
Authorized Hourly	100	$90	$9,000
Test Pump Rental, Installation, Rem	1	$1,000	$1,000
Pump Test Hourly	8	$75	$600
Extra Materials	1	$500	$500
Pump (600 gpm)	1	$6,000	$6,000
Pump controls, plumping etc	1	$7,000	$7,000
Pump Building	1	$15,000	$15,000
Engineering			$10,000
Subtotal			$66,750
WSST (@7.6%)			$5,073
TOTAL			$71,823

17938

Exhibits





BK0094PG4313

Legend

Qvt – Vashon Till
Qva – Vashon Advance Outwash
Qw – Whidbey Formation
Qdb – Double Bluff Qu – Undifferentiated Glacial

– Aquifer

1 – Gravel
2 – Sand
3 – Silt/Clay
4 – Till
R – Rock
W – Wood

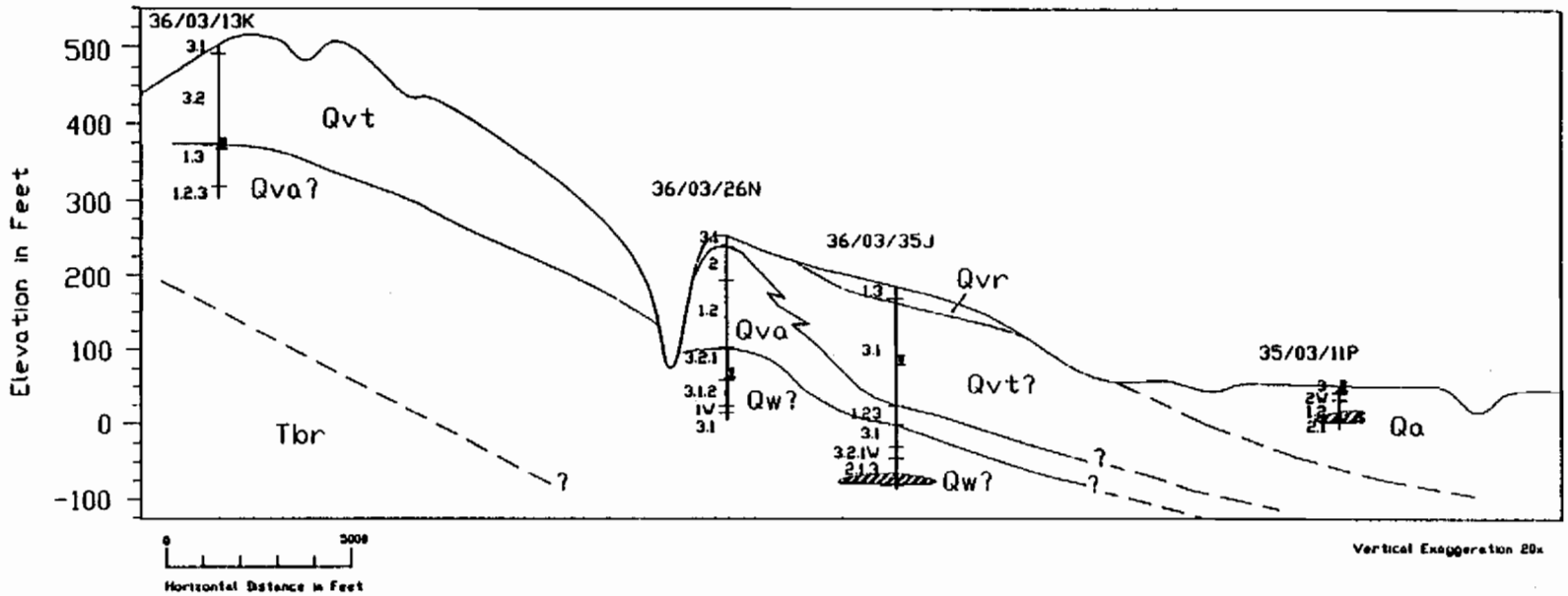
EXHIBIT 3-1
GEOLOGIC CROSSECTION
Crossection A-A'

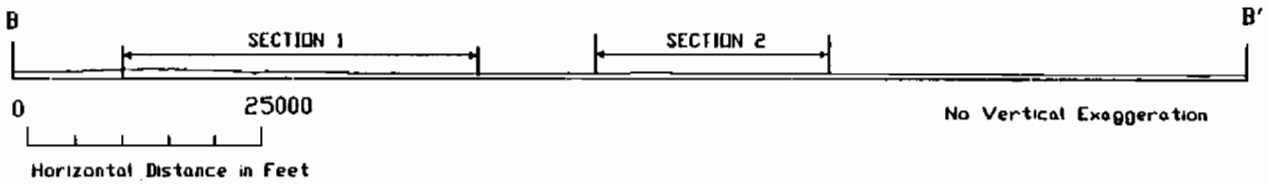
Skagit CWSP JU9007

Pacific Groundwater Group

12938

SECTION 1





Legend

Qa – Alluvium
Qvr – Vashon Ressional Outwash
Qvt – Vashon Till
Qva – Vashon Advance Outwash
Qu – Undifferentiated
Qw? – Whidbey Formation?
Tbr – Tertiary Bedrock
– Aquifer

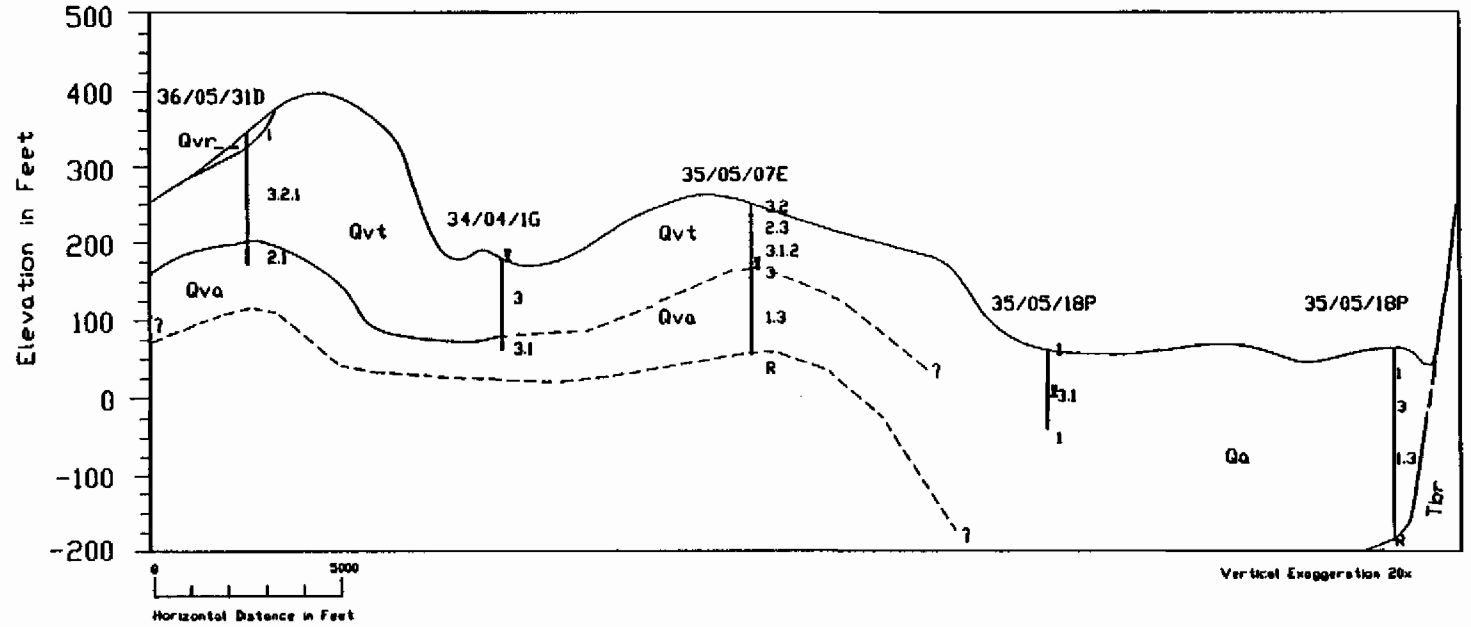
1 – Gravel
2 – Sand
3 – Silt/Clay
4 – Till
R – Rock
W – Wood

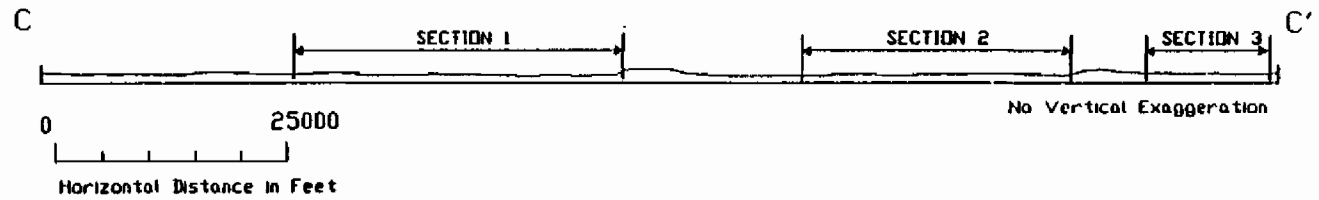
EXHIBIT 3-2
GEOLOGIC CROSSECTION
Crossection B-B' Section 1

Skagit CWSP JU9007

Pacific Groundwater Group

SECTION 1





Legend

Qa – Alluvium
Qvr – Vashon Ressional Outwash
Qvt – Vashon Till
Qva – Vashon Advance Outwash
Qu – Undifferentiated
Qw? – Whidbey Formation?
Tbr – Tertiary Bedrock
– Aquifer

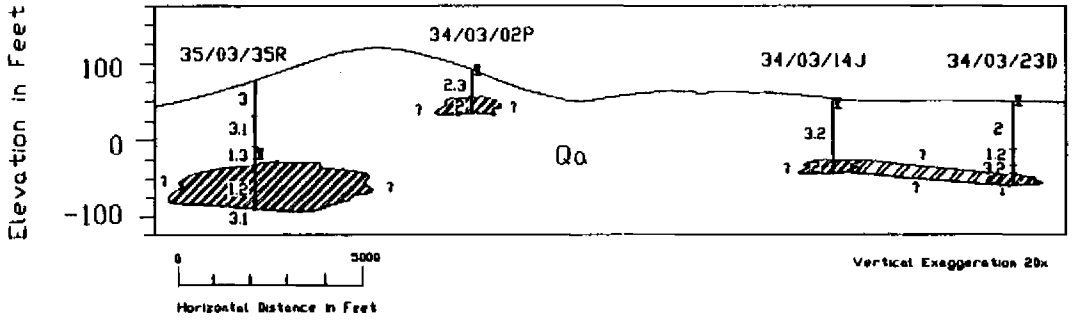
1 – Gravel
2 – Sand
3 – Silt/Clay
4 – Till
R – Rock
W – Wood

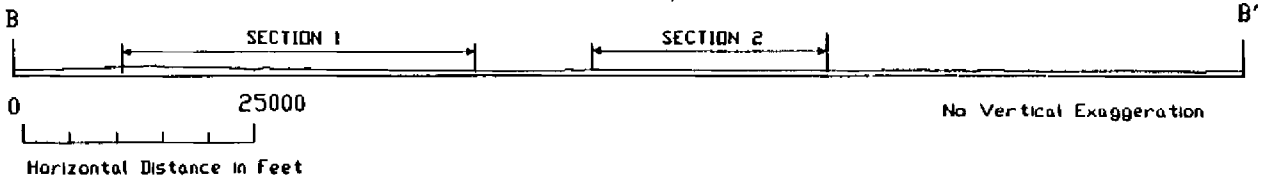
EXHIBIT 3-4
GEOLOGIC CROSSECTION
Crossection C-C' Section 1

Skagit CWSP JU9007

Pacific Groundwater Group

SECTION 2





Legend

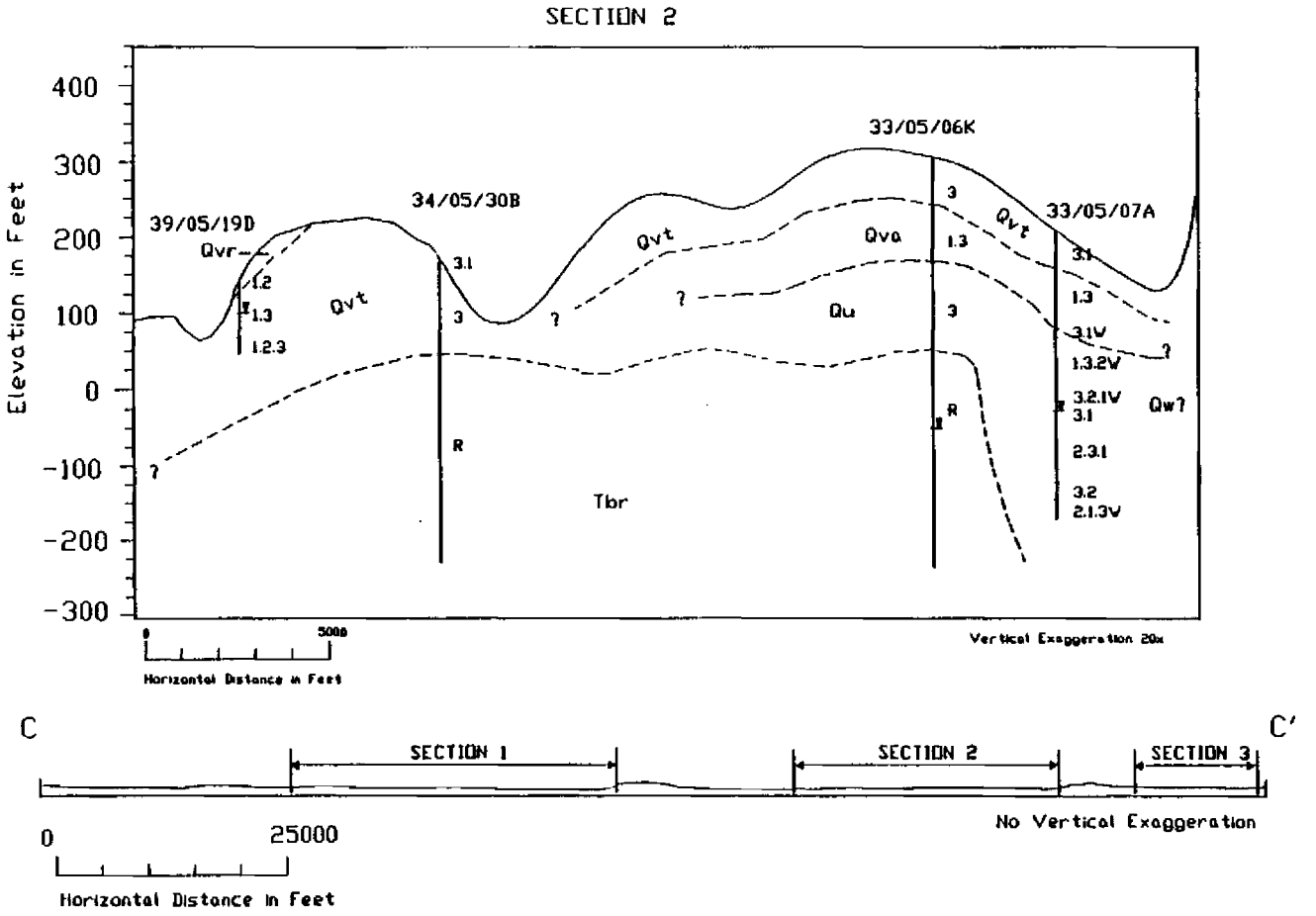
Qa – Alluvium
Qvr – Vashon Ressional Outwash
Qvt – Vashon Till
Qva – Vashon Advance Outwash
Qu – Undifferentiated
Qw? – Whidbey Formation?
Tbr – Tertiary Bedrock
– Aquifer

1 – Gravel
2 – Sand
3 – Silt/Clay
4 – Till
R – Rock
W – Wood

EXHIBIT 3-3
GEOLOGIC CROSSECTION
Crossection B-B' Section 2

Skagit CWSP JU9007

Pacific Groundwater Group



Legend

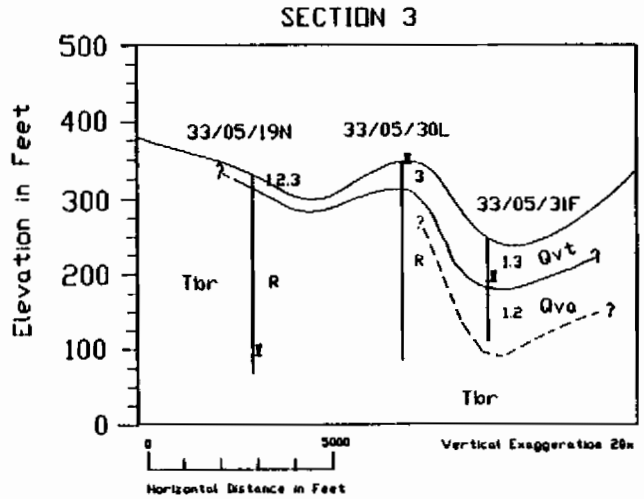
Qa – Alluvium
Qvr – Vashon Ressional Outwash
Qvt – Vashon Till
Qva – Vashon Advance Outwash
Qw? – Whidbey Formation?
Tbr – Tertiary Bedrock
Qu – Undifferentiated
– Aquifer

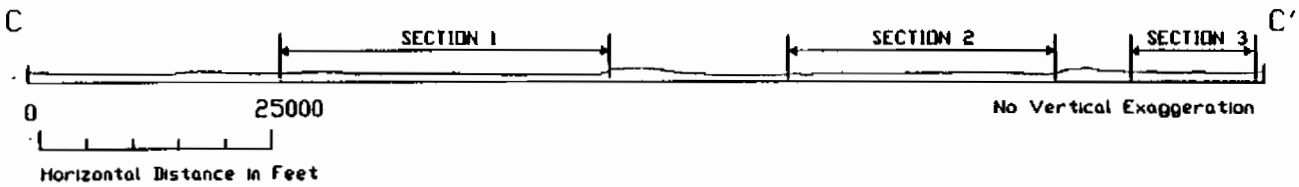
1 – Gravel
2 – Sand
3 – Silt/Clay
4 – Till
R – Rock
W – Wood

EXHIBIT 3-5
GEOLOGIC CROSSECTION
Crossection C-C' Section 2

Skagit CWSP JU9007

Pacific Groundwater Group





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Legend

Qa – Alluvium
Qvr – Vashon Ressional Outwash
Qvt – Vashon Till
Qva – Vashon Advance Outwash
Qw? – Whidbey Formation?
Tbr – Tertiary Bedrock
Qu – Undifferentiated
– Aquifer

1 – Gravel
2 – Sand
3 – Silt/Clay
4 – Till
R – Rock
W – Wood

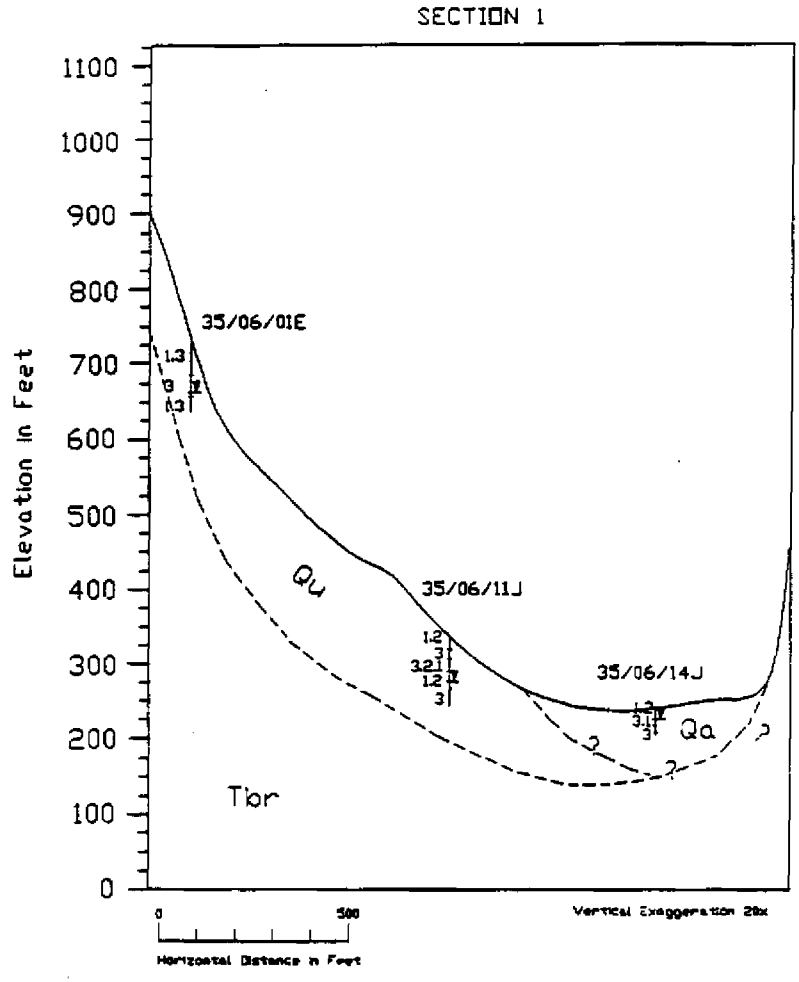
EXHIBIT 3-6
GEOLOGIC CROSSECTION
Crossection C-C' Section 3

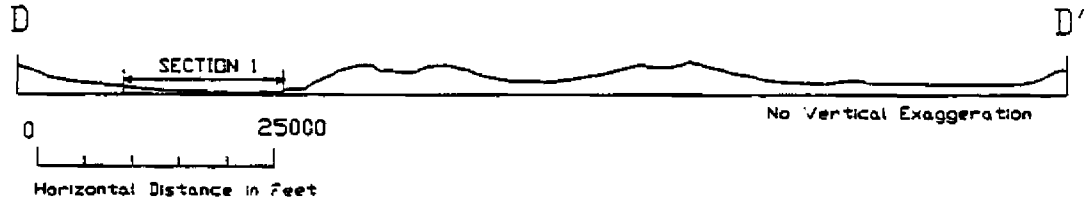
Skagit CWSP JU9007

Pacific Groundwater Group

17938

17938 17938





Legend

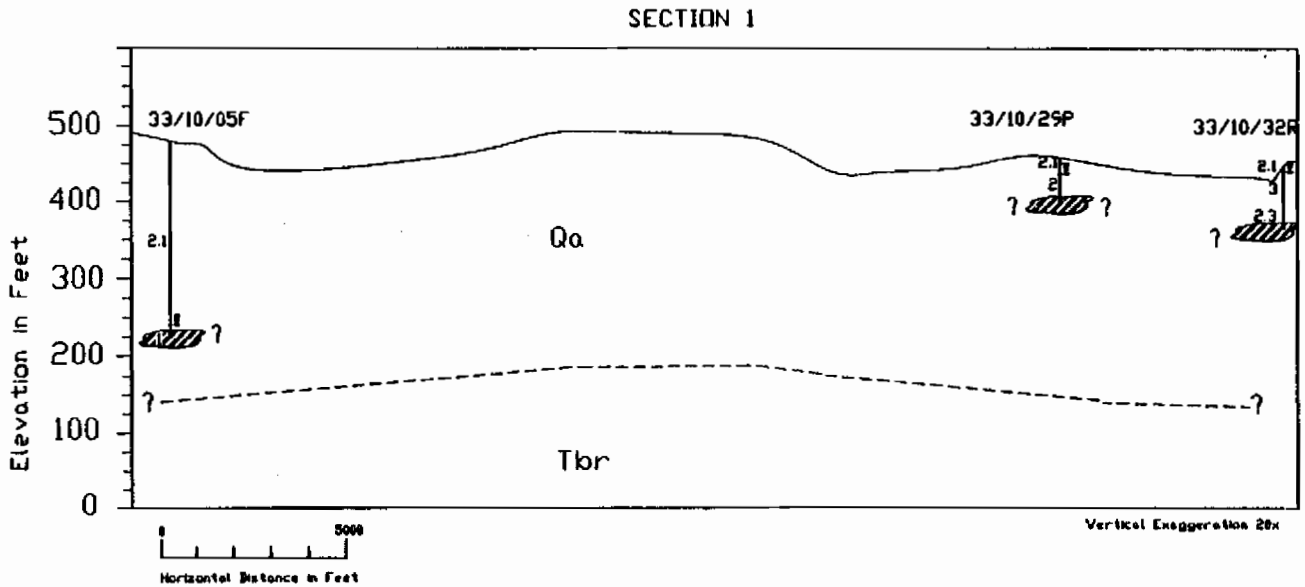
Qa - Alluvium
Qvr - Vashon Recessional Outwash
Qvt - Vashon Till
Qva - Vashon Advance Outwash
Qw? - Whidbey Formation?
Tbr - Tertiary Bedrock
Qu - Undifferentiated
- Aquifer

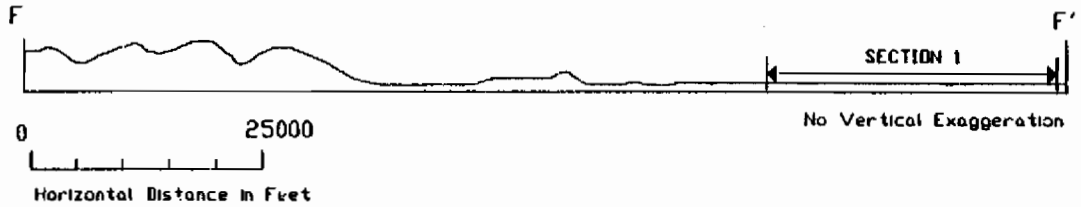
1 - Gravel
2 - Sand
3 - Silt/Clay
4 - Till
R - Rock
W - Wood

EXHIBIT 3-7
GEOLOGIC CROSSECTION
Crossection D-D' Section 1

Skagit CWSP JU9007

Pacific Groundwater Group





BK0094PG4320

Legend

Qa – Alluvium
Qvr – Vashon Ressional Outwash
Qvt – Vashon Till
Qva – Vashon Advance Outwash
Qu – Undifferentiated
Qw? – Whidbey Formation?
Tbr – Tertiary Bedrock
– Aquifer

1 – Gravel
2 – Sand
3 – Silt/Clay
4 – Till
R – Rock
W – Wood

EXHIBIT 3-8
GEOLOGIC CROSSECTION
Crossection F-F' Section 1

Skagit CWSP JU9007

Pacific Groundwater Group

17938

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Appendix

Table AT-1 – Summary of Well Yield Data Available in USGS Database 17938

Well Number	Latitude	Longitude	Surface Altitude ft msl	Owner	Boring Depth ft	Well Depth ft	Well Diam in	SWL Depth ft	Pump Rate gpm	Specific Capacity gpm/ft	Aquifer Elevation ft msl	Est. Maximum Short-Term Well Yield gpm
35N/04E-05E	483313	1221954	72.00	WEIDBAMP JOHN	49.0	37.0	6	4	200	119.8	35	2600
35N/03E-11P	483200	1222331	16.00	YOUNGQUIST 1 JOHN	53.0	47.0	8	3	490	78.4	-31	2300
35N/04E-07B	483238	1222025	42.00	SAMISH RVR PK 1	35.0	35.0	10	5	500	55.6	7	1100
34N/03E-20R01	482502	1222643	5.00	HART		27.0	36	8	100	50.0	-22	630
35N/03E-24E01	483036	1222229	20.00	BURLINGTON		74.0	8	9	167	41.8	-54	1800
35N/03E-11P	483201	1222328	15.00	YOUNGQUIST 2 JOHN	46.0	43.0	8	5	400	32.0	-28	820
35N/03E-11R03	483203	1222212	25.00	ROUTON HOWARD	72.0	72.0	8	8	250	27.8	-47	1200
35N/04E-05G01	483316	1221912	70.00	STATE DEPT OF		44.0		14	450	22.5	26	450
35N/04E-05D	483322	1221955	70.00	DEPT FISH	44.0	44.0	12	14	450	22.5	26	450
35N/03E-22Q01	483001	1222425		COOPER ROBERT L	42.0	42.0	8	5	200	22.2	-42	560
34N/02E-03K01	482735	1223212	144.00	SKAGIT-PUD	200.0	200.0	8	132	142	20.3	-56	920
35N/08E-15E	483130	1214548	195.00	EDWARDS EDWARD	61.0	60.5	6	16	15	18.1	135	530
35N/05E-21J02	483019	1220945		MULDER JAN	42.0	42.0	8	30	60	17.1	-42	140
34N/02E-03L01	482740	1223214	90.00	LARSON J	128.0	108.0		74	3	12.5	-18	290
35N/05E-30M01	482927	1221316	45.00	SKAGIT PUD	50.0	50.0	12	9	250	12.5	-5	340
34N/02E-15L01	482602	1223236	240.00	JOHNSON CHARLES	201.0	200.0	6	184	12	12.0	40	130
36N/04E-05D01	483840	1221950	420.00	RHONE		97.0	6	75	12	12.0	323	180
34N/02E-15R01	482545	1223148	234.00	SWIN-TRIBE	230.0	143.0	6	113	53	10.1	91	200
35N/04E-29E01	472939	1221952	20.00	DYKSTRA DOUWE	39.0	38.0	8	7	100	10.0	-18	210
35N/07E-10A	483238	1215242	288.00	GRAHAM JACK	127.0	127.0	6	95	60	10.0	161	220
34N/02E-26C01	482448	1223113	273.00	DAN GASPER	46.0	46.0	6	33	10	10.0	227	90
34N/02E-26F01	482432	1223115	281.00	EDWARDS REGGIE	43.0	40.2	6	25	10	10.0	241	100
34N/02E-23P01	482457	1223118	262.00	MCCLOUD VERN	46.0	46.0	6	39	10	10.0	216	49
35N/11E-16D02	483129	1222327	365.00	DNR,CASCADE ISL M2	70.0	60.0	6	20	30	9.6	305	250
35N/11E-16D01	483134	1222332	360.00	DNR,CASCADE ISL M1	70.0	70.0	6	23	30	9.1	290	280
35N/04E-18A01	483135	1222012	35.00	SKAGIT CO		27.0	6	6	18	9.0	8	130
34N/02E-03G01	482755	1223157	15.03	SKAGIT-PUD	19.0	18.5	8	1	75	8.9	-3	110
36N/04E-27A01	483504	1221619	239.00	PROSSER		28.0	6	10	15	7.5	211	90
35N/04E-10C01	483233	1221654	800.00	ANDERSON		24.0	6	6	25	6.3	776	75
34N/02E-26F02	482428	1223115	265.00	SCOLERI CARMAN	161.0	161.0	6	135	10	5.0	104	87
36N/03E-24J01	483542	1222127	300.00	MCTAGART		173.0	6	151	10	5.0	127	73
34N/02E-25C01	482445	1223011	125.00	CHARLES NORVAL	30.0	30.0	6	14	10	5.0	95	53
36N/04E-33K01	483355	1221739	100.00	RUTHFORD		26.0	6	10	15	5.0	74	53
34N/02E-35E01	482333	1223143	206.00	BAILEY GEORGE		108.0		88	15	4.8	98	64
35N/03E-12D01	483207	1222238	70.00	KING		170.0	6	135	18	4.5	-100	110
34N/02E-02N01	482727	1223132	86.00	SWIN-TRIBE	100.0	89.8	6	69	18	4.5	-4	62
33N/02E-03A04	482257	1223152	45.00	DAMEN DAISY	33.0	28.0	6	5	16	3.2	17	49
34N/03E-23D01	482534	1222347	15.00	DRALLE EARL	107.0	107.0	8	11	200	3.1	-92	200
35N/05E-27E01	482958	1220921	50.00	WINTER BOB	50.0	50.0	6	31	30	3.0	0	38
34N/02E-23F01	482527	1223114	245.00	CAYOU ROGER	135.0	135.0	6	108	9	3.0	110	54
36N/04E-20N	483518	1221942	180.00	MORRISON ROBERT	84.0	84.0	6	34	15	3.0	96	100
34N/02E-34H01	482340	1223207	35.00	WAGNER PAUL F		53.0			50	2.8	-18	99
36N/04E-20F01	483548	1221922	260.00	WEST		15.0	6	8	8	2.7	245	13
36N/04E-26C01	483503	1221532	215.00	MEITZLER		59.0	6	43	10	2.5	156	27
36N/04E-32N01	483335	1221947	85.00	MCINNES		82.0	6	40	12	2.4	3	67
35N/08E-09F01	483218	1214649	190.00	THEODORATUS GEOR(	53.0	53.0	8	15	40	2.1	137	53
34N/02E-23L02	482502	1223115	250.00	MCLEOD HECTOR	49.0	49.0	6	37	25	2.1	201	17
34N/02E-23L01	482505	1223112	254.00	IRVINE ALBERT	100.0	93.0	6	68	10	2.0	161	33
33N/04E-25K01	481903	1221352	250.00	CHENEY		88.0	6	-1	40	1.9	162	110
34N/02E-34R09	482314	1223156	50.00	JORGENSON	80.0	80.0	6	49	15	1.7	-30	35
36N/01E-26H01	483448	1223809	100.00	CHARLES STUART	134.0	134.0	6	116	15	1.5	-34	18
34N/02E-27D10	482447	1223300	29.00		78.0	75.0			15	1.5	-46	75
34N/02E-34R01	482307	1223153	32.00	EVERITT G L	35.0	35.0	6	2	14	1.4	-3	31
34N/04E-22Q01	482502	1221627		HALD MORRIS C		262.0		185	20	1.3	-262	68
33N/04E-05K	482236	1221918	10.00	MCCAULEY ROBERT	120.0	108.0		8	50	1.3	-98	83
33N/02E-02D02	482254	1223148	90.00	SILVERMAN BARBARA	99.0	99.0	6	79	8	1.1	-9	15
35N/03E-11R01	483002	1222242	18.00	ROUTON L H	197.0	197.0	4	12	20	1.1	-179	140
34N/02E-22E01	482519	1223304	98.00	CHARLES RAY	109.0	107.0	6	83	7	1.0	-9	16
34N/02E-27K04	482411	1223230	44.00	SNEE-OOSH	54.5	54.0	6	21	10	0.8	-10	18
34N/02E-22N02	482458	1223305	36.00	ERICKSON DR.	64.0	64.0	6	12	20	0.8	-28	28
34N/02E-27K01	482410	1223229	48.00	SNEE-OOSH	89.0	89.0	6	6	14	0.7	-41	39
34N/02E-35L01	482320	1223116	235.00	SWORD JAMES	289.0	130.0	6	109	4	0.7	105	10
36N/04E-08N01	483701	1221951	305.00	SCIDMORE		44.0	6	9	10	0.7	261	16
34N/02E-15C01	482630	1223238	193.00	CAMPBELL LARRY	165.0	150.0	6	109	20	0.6	43	17
34N/02E-27D01	482440	1223301	21.00	WAGNER PAUL F		108.0		4	30	0.6	-87	42
34N/02E-27D11	482439	1223259	26.00	BEDINGFELD DAVID	141.0	141.0	7	30	30	0.5	-115	45
34N/02E-27K03	482409	1223229	46.00	SNEE-OOSH		48.0	45			0.5	-2	11
34N/02E-22N01	482457	1223304	34.00	MISNER ROBERT	52.0	52.0	4	9	7	0.5	-18	13

Table AT-1 – Summary of Well Yield Data Available in USGS Database (Cont'd)

Well Number	Latitude	Longitude	Surface Altitude ft msl	Owner	Boring Depth ft	Well Depth ft	Well Diam in	SWL Depth ft	Pump Rate gpm	Specific Capacity gpm/ft	Aquifer Elevation ft msl	Est. Maximum Short-Term Well Yield gpm
35N/03E-32N01	482822	1222733	30.00	JENSEN ELMER	77.0	76.0	6	37	12	0.4	-46	11
34N/02E-21J09	482509	1223310	25.00	SKOMERZA GLENN	93.0	93.0	6	17	24	0.4	-68	22
34N/02E-35R01	482310	1223039	80.00	SHLTER-BAY	91.0	91.0	6	46	7	0.4	-11	12
34N/02E-34R10	482302	1223150	65.00	SNELSON GREG	130.0	125.0	6	60	15	0.4	-60	16
34N/02E-22N05	482453	1223301	34.00	ASHLAND SIGNE	47.0	47.0		9	7	0.3	-13	8
34N/02E-27D03	482438	1223300	25.00	HOVRUD OLA		112.0	4	12	10	0.3	-87	19
34N/02E-22N03	482458	1223303	32.00	HULBERT PAT	42.0	42.0	6	8	7	0.3	-10	6
34N/02E-27R02	482358	1223209	113.00	CLIFTON ROBERT	88.0	85.0	6	33	9	0.3	28	9
34N/03E-06A01	482816	1222757	3.00	TIEMERSMA		108.0	6	5	17	0.3	-105	18
34N/02E-22E03	482522	1223503	120.00	SMITH HENRY	133.0	132.0	6	107	5	0.3	-12	4
35N/01E-14B01	483144	1223839	25.00	YOUNG RODGER	81.0	81.0	6	20	10	0.3	-56	10
34N/02E-22N06	482455	1223302	40.00	HULBERT MRS. ROBT.	78.0	77.0	6	20	8	0.2	-37	9
34N/02E-21H10	482524	1223319	45.00	EVANS KEN	76.0	76.0	6	34	7	0.2	-31	6
33N/05E-08L01	482138	1221145	250.00	CARLSON		130.0	6	60	10	0.2	120	9
33N/02E-03H02	482238	1223151	38.00	CRIBB BEN H	92.0	92.0	6	25	8	0.2	-54	8
34N/02E-34B01	482354	1223223	13.00	DAN MORRIS		112.0	6	-3	6	0.2	-99	15
35N/03E-15D02	483148	1222512	10.00	JENSEN		103.0		11	15	0.2	-93	10
34N/02E-27R03	482358	1223211	111.00	CLIFTON ROBERT	72.0	72.0	6	39	4	0.2	39	4
34N/02E-27L02	482421	1223241	50.00	WAGNER PAUL	113.0	112.0	6	12	15	0.2	-62	11
34N/02E-35H04	482338	1223039	170.00	EFEIR MAUDE	110.0	110.0	6	64	4	0.1	60	4
34N/02E-27R01	482355	1223207	100.00	LOMBARD F L	73.0	73.0	6	21	5	0.1	27	5
34N/02E-27Q02	482400	1223221	46.00	SHOREWOOD		117.0		-0	12	0.1	-71	9
34N/02E-34A04	482348	1223210	37.00	NELLES JOE	95.0	95.0	6	30	6	0.1	-58	5
34N/02E-34A01	482346	1223211	36.00	THORP LOUIS	92.0	89.0	6	30	5	0.1	-53	4
34N/02E-27F02	482423	1223246	42.00	REEF-POINT	103.0	98.0	6	18	7	0.1	-56	5
34N/02E-27L01	482420	1223305	40.00	REEF PT.	99.0	99.0	6	6	7	0.1	-59	6
34N/02E-27D06	482438	1223252	68.00	HUGHES L H	183.0	177.0	6	31	9	0.1	-109	9
34N/02E-34R02	482304	1223152	43.00	SMITH C. P	95.0	95.0	6	38	3	0.1	-52	2
34N/02E-34A02	482345	1223210	38.00	ANDERSON LEROY	99.0	99.0	6	30	3	0.04	-61	2
34N/02E-34A05	482348	1223205	50.00	LAMMERS ARBERTA	160.0	128.0	6	38	3	0.04	-78	2
33N/02E-03H01	482239	1223151	41.00	BALICH MAX	113.0	113.0	6	28	2	0.04	-72	2

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Median Well Yield GPM	42

Table AT-2 – Summary of Selected Well Yield Information

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Wells Used in Mainland Cross Sections (Ecology Files)

PGG Well No.	Well No.	SWL Depth ft	Aquifer Depth ft	Pump Test Type	Pumping Rate gpm	Drawdown FT	Test Time hrs	Est. Maximum Short-Term Well Yield gpm
1	36N/03E-13K	139	198	B	10	0.5	1	800
2	36N/03E-26N	181	216	P	20	3	NA	200
3	36N/03E-35J	123	242	P	50	100	6	40
4	35N/03E-11P	4	31	P	490	6	1	1000
5	35N/03E-35R	138	174	B	25	7	1	90
6	34N/03E-02P	7	41	P	250	25	4	200
7	34N/03E-14J	11	77	A	100	20	NA	200
8	34N/03E-35P	5	67	P	150	15	1	400
9	34N/03E-23D	11	97	B	200	65	NA	200
10	33N/03E-10J	NA	17	NA	NA	NA	NA	–
11	36N/05E-19B	105	137	A	15	132	1	2
12	36N/05E-31D	77	162	P	68	22	6	200
13	36N/05E-18D	32	58	B	25	2	3	200
14	36N/05E-07L	140	178	A	80	175	1	10
15	35N/05E-30J	NA	18	NA	NA	NA	NA	–
16	35N/05E-18P	61	100	B	60	61	NA	30
17	35N/05E-06J	NA	135	P	10	140	1	–
18	35N/05E-07E	80	198	A	20	193	1	8
19	34N/04E-01G	1	111	B	6	99	NA	4
20	34N/05E-30B	NA	400	NA	NA	NA	NA	–
21	34N/05E-19D	39	93	A	4	90	1	2
22	33N/05E-06K	360	437	B	10	80	NA	6
23	33N/05E-07A	235	377	A	50	NA	NA	–
24	33N/05E-19N	242	260	B	0.3	15	1	0
25	33N/05E-31F	60	135	P	350	7	24	3000
26	33N/05E-30L	0	300	NA	NA	NA	NA	–
27	33N/06E-35A	12	38	A	60	35	1	30
28	33N/06E-26M	18	134	B	3	112	NA	2
29	33N/06E-22P	10	60	B	4	33	4	4
30	35N/06E-14J	15	48	B	24	3	6	200
31	35N/06E-11S	60	69	B	10	1	3	60
32	35N/06E-01E	73	100	A	40	95	NA	8
33	35N/08E-24A	26	52	A	75	46	1	30
34	35N/08E-15D	40	70	P	15	1	4	300
35	36N/08E-35L	63	92	A	15	20	NA	10
36	35N/10E-30G	80	287	A	10	280	1	5
37	34N/10E-18F	14	36	A	20	7	NA	40
38	34N/10E-19P	14	40	A	15	6	NA	40
39	34N/10E-29E	19	37	B	20	10	NA	20
40	33N/10E-32R	7	75	P	30	33	2	40
41	33N/10E-29P	21	55	P	38	0	12	–
42	33N/10E-05F	240	251	B	6	10	NA	4

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Wells in Guemes Data Base (Garland File)

PGG Well No.	Well No.	SWL Depth ft	Aquifer Depth ft	Pump Test Type	Pumping Rate gpm	Drawdown FT	Test Time hrs	Est. Maximum Short-Term Well Yield gpm
43	35N/01E-02F	57	79	B	15	0	1	–
44	35N/01E-01A	135	151	P	12	0	6	–
45	35N/01E-01K	108	200	A	5	90	NA	3
46	35N/01E-01M	160	185	A	12	12	NA	20
47	35N/01E-01R	90	223	B	12	66	1	20
48	35N/01E-02G	88	130	A	30	20	NA	40
49	35N/01E-11A	65	107	B	45	10	NA	100
50	35N/01E-11H	168	190	B	3	43	NA	1
51	35N/01E-12N	90	140	A	7	30	NA	8
52	35N/01E-11N	42	55	A	15	8	NA	20
53	35N/01E-11Q	68	101	B	20	20	4	20
54	35N/01E-11	20	76	B	10	40	4	9
55	35N/01E-12H	120	220	B	4	80	2	3
56	35N/01E-12N	38	75	A	20	1	NA	500
57	35N/01E-12K	28	30	B	10	2	2	7

Table AT-2 – Summary of Selected Well Yield Information (Cont'd)

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PGG Well No.	Well No.	SWL Depth ft	Aquifer Depth ft	Pump Test Type	Pumping Rate gpm	Drawdown FT	Test Time hrs	Est. Maximum Short-Term Well Yield gpm
58	35N/01E-12K	100	117	B	3	15	NA	2
59	35N/01E-12	23	159	B	45	45	NA	90
60	35N/01E-12	70	255	B	6	170	NA	4
61	35N/02E-08K	46	76	A	4	32	NA	3
62	35N/02E-08S	0	189	B	4	NA	1	–
63	35N/02E-06N	160	20	B	1	NA	NA	–
64	35N/02E-06G	60	150	B	7	85	NA	5
65	35N/02E-07A	71	108	B	30	40	NA	20
66	35N/02E-08H	47	115	B	15	60	NA	10
67	36N/01E-25N	68	72	B	10	2	4	10
68	36N/01E-26H	116	129	B	15	10	2	10
69	36N/01W-26	163	184	B	20	1	1	300
70	36N/01E-26P	20	26	P	5	0.5	4	40
71	36N/01W-35E	133	150	A	20	15	NA	20
72	36N/01E-35G	147	158	B	8	10	NA	6
73	36N/01E-36K	108	200	B	5	90	NA	3
74	36N/01E-26R	149	156	B	10	0.5	1	90
75	35N/01E-12N	80	99	B	2	15	2	2
76	35N/01E-12H	67	121	B	32	57	NA	20
77	35N/01E-12F	90	115	B	5	24	NA	3
78	35N/02E-07C	57	99	B	6	35	NA	5
79	36N/01E-36P	26	41	B	15	11	NA	10
80	36N/01E-36P	7	44	B	8	35	1	6
81	36N/01E-36C	59	66	P	15	1	3	70
82	36N/01E-36C	29	37	B	10	4	NA	10
83	36N/01E-26R	167	189	B	10	4	2	40
84	36N/01E-26K	101	152	B	20	24	NA	30

MEAN YIELD (GUEMES) GPM 42

MEDIAN YIELD (GUEMES) GPM 6.5

Saltwater in Guemes Island wells prompts study proposal

By TIM CHRISTIE
Staff Writer

MOUNT VERNON — Skagit County officials and Guemes Island residents know saltwater is getting into wells on the island's fringes. What they don't know is why it's happening or what can be done about it.

To find out, the U.S. Geological Survey has proposed a $202,000 comprehensive ground water study for the island. Survey officials have pledged $101,000, and the state Department of Ecology has offered $50,500 through the state's Centennial Clean Water Fund.

Now a committee of island residents is asking the Skagit County Commissioners to provide the remaining $50,500 as a match for the state money.

Commissioners Bill Vaux and Robby Robinson took no action Monday after meeting with county Health Department officials and island residents, but promised to have an answer by the Feb. 22 deadline for applying for the state funds.

"We're saying, where are we going to get $50,000?" Commission Chairman Vaux said after the meeting.

The Department of Ecology has identified at least six pockets of saltwater intrusion along the south, west and northwest coasts of the island. The problem is probably worse during the summer months when the island population increases, water consumption rises and little rain falls, said John Thayer, the county's environmental health director.

A layer or lens of fresh water floats on top of saltwater, Thayer said. When the fresh water lens is drawn down too rapidly, saltwater gets into wells.

Thayer guessed more than 125 homes are affected by saltwater intrusion in wells.

Saltwater doesn't run out of the home's taps, but there is an excess concentration of chlorides in the drinking water, Thayer said. Chloride is an element of salt, which dissolves in water.

"I have not heard anybody complain that the chloride level is so great that the taste is obnoxious," Thayer said. "They are not in danger from a public health standpoint."

Information from the USGS study is needed to make informed decisions about land-use planning and ground-water quality protection, say members of the Guemes Island Water Resource Committee. The committee represents the two main community organizations — the Guemes Island Property Owners Association and the Guemes Island Environmental Trust.

"The alarm bells are going off, saying you're pumping too much water," said Joseph Miller, a committee member.

That could mean residents are either pumping water in the wrong places or that the island has reached its population limit, beyond which there aren't sufficient supplies

See GUEMES, Page A4

Guemes well study proposed

Continued from Page A3

of water, he said.

"The main question we hope to answer is whether we have a resource problem or a distribution problem," Miller said. "If there is a sufficient resource, it becomes a distribution problem."

County Finance Director Mike Woodmansee said today the commissioners have not yet talked to him about finding an extra $50,500 in the county budget. He said he'll find out from them how urgent the need is and whether it can wait until the next budget year.

"We have a budget process that should be followed. If the project has so much merit that it overrides our normal standards, then we do what we can do," he said.

"If something is going to have a significant effect on property values or people then we usually step up and make whatever budget changes we have to make."

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Appendix I
Recommended Cultus Mountain In-Stream Flows

Table Instream Flows Required for Skagit PUD # 1 Diversions
Agreement reached in Agency Meeting October 6, 1997

Mundt Creek Stream Flows
Required at Diversion (RM 3.4)

Month	Flows (CFS)
October	7.6
November	9.4
December	9.4
January	6.4
February	6.4
March 1-15	6.4
March 16-31	9.4
April	9.4
May	9.4
June	9.4
July	7.6
August	7.6
September	7.6

Turner Creek Stream Flows
Required at Diversion (RM 4.2)

Month	Flows (CFS)
October	7.9
November	7.9
December	7.9
January	7.9
February	5.4
March	5.4
April	7.9
May	7.9
June	4.9
July	4.9
August	4.9
September	4.9

Salmon Creek Stream Flows
Required at Diversion (RM 4.3)

Month	Flows (CFS)
October	4.0
November	4.0
December	4.0
January	4.0
February	4.0
March	4.0
April	4.0
May	1.4
June	1.4
July	1.4
August	1.4
September	4.0

Gilligan Creek Stream Flows
Required at Diversion (RM 3.2)

Month	Flows (CFS)
October	23.8
November	27.7
December	27.7
January	19.8
February	19.8
March 1-15	19.8
March 16-31	27.7
April	31.7
May	31.7
June	31.7
July	39.6
August	39.6
September	39.6

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Appendix J
Environmental Checklist, 1999 CWSP

ENVIRONMENTAL CHECKLIST

A. BACKGROUND

1. Name of proposed project, if applicable:

Skagit County Coordinated Water System Plan (CWSP).
A county initiated, non-project action to update the 1993 Anacortes-Fidalgo Island Coordinated Water System Plan. This update is required every five years as prescribed in Chapter 246-293-280 WAC.

2. Name of Applicant:

Skagit County

3. Address and phone number of applicant and contact person:

Skagit County Planning and Permit Center
200 West Washington Street
Mount Vernon, WA 98273
(360)336-9416

Contact: R. Christensen

4. Date checklist prepared:

September 10, 1998

5. Agency requesting checklist:

Skagit County Health Department

6. Proposed timing or schedule (including phasing, if applicable):

Approval of plan by the end of 1998; update every 5 years thereafter.

7. Do you have any plans for future additions, expansion or further activity related to or connected with this proposal? If yes, explain.

Yes. Water system purveyors who have defined their systems as expanding will update their respective individual comprehensive water system plans for consistency with the CWSP within one year from presentation to the County Commissioners, estimated fall, 1999.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

There are none.

9. Do you know of pending applications for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

There are none.

10. List any government approvals or permits that will be needed for your proposals, if known.

The Coordinated Water System Plan will be reviewed by the Board of County Commissioners with at least one public hearing. Once it is approved by the Commissioners it is forwarded to the State Department of Health for approval pursuant to Chapter 70.116 RCW.

11. Give a complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist which ask you to describe certain aspects of your proposal. You do not need to repeat those answers of this page.

The Skagit County Coordinated Water System Plan creates processes which organize development of water utilities and integrates water system development with land use planning within the Critical Water Supply Service Area which in Skagit County is all of Skagit County.

2. Location of the proposal. Please give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any. If a proposal would occur over a range of area, please provide the range or boundaries of the site(s). Please provide a legal description, site plan, vicinity map, and topographic map if possible. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist. (Indicate if maps or plans have been submitted as part of a permit application.)

Applies to all lands and to all land use and development and to all structures and facilities in Skagit County except incorporated areas, Federal lands, tribal and trust lands.

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site (circle one): flat, rolling, hilly, steep, slopes, mountainous, other.

Not applicable

b. What is the steepest slope on the site (approximate % slope)?

Not applicable

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, please specify and note any prime farmland.

Not applicable

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

Not applicable

e. Describe the purposes, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.

Not applicable

f. Could erosion occur as a result of clearing, construction, or use? If so, general describe.

Not applicable

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

Not applicable

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

Not applicable

2. Air

a. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction, and when the project is completed? If any, generally describe and give approximate quantities if known.

Not applicable

b. Are there any off-site sources of emissions or odor which may affect your proposal? If so, generally describe.

Not applicable

c. What are the proposed measures to reduce or control emissions or other impacts, if any:

Not applicable

3. Water

a. Surface:

1) Is there any surface water on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, associated wetlands)? If yes, describe type, provide names, and, if known, state what stream or river it flows into.

Not applicable

2) Will the project require any work over or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

Not applicable

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

Not applicable

4) Will surface water withdrawals or diversions be required by the proposal? Give general description, purpose, and approximate quantities if known.

Not applicable

5) Does the proposal lie within a 100-year floodplain? Note location on the site plan, if any.

Not applicable

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

Not applicable

b. Ground:

1) Will ground water be withdrawn or recharged? Give general description, purpose, and approximate quantities if known.

Not applicable

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals...; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or human the system(s) are expected to serve.

Not applicable

c. Water Runoff (including storm water):

1) Describe the source of runoff and storm water and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into waters? If so, please describe.

Not applicable

2) Could waste materials enter ground or surface waters? If so, generally describe.

Not applicable

d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:

Not applicable

4. Plants

a. Check or circle types of vegetation found on the site:
deciduous tree: alder, maple, aspen, other
evergreen tree: fir, cedar, pine, other
shrubs
grass
pasture
crop or grain
wet soil plants: cattail, buttercup, bulrush, skunk cabbage,
water plants: water lily, eelgrass, milfoil, other
other types of vegetation

b. What kind and amount of vegetation will be removed or altered?

Not applicable

c. List threatened or endangered species known to be on or near the site

Not applicable

d. List proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Not applicable

5. Animals

a. Circle any birds and animals which have been observed on or known to be on or near the site:

birds: hawk, heron, eagle, songbirds, other
mammals: dear, bear, elk, beaver, other
fish: salmon, trout, shellfish, other

b. List any threatened or endangered species known to be on near the site.

Not applicable

c. Is the site part of a migration route? If so, explain.

Not applicable

d. Proposed measures to preserve or enhance wildlife, if any:

Not applicable

6. Energy and Natural Resources

a. What kinds of energy(electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

Not applicable

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

Not applicable

c. What kinds of energy conservation features are included in the plans of this proposal?

Not applicable

d. What are the proposed measures to reduce or control energy impacts, if any?

Not applicable

7. Environmental Health

a. Are there any environmental health hazards, exposure to toxic chemicals, including risk of fire and explosion, spill, or hazardous waste, that occur as a result of this proposal? If so, describe.

Not applicable

b. Describe special emergency services that might be required.

Not applicable

c. What are the proposed measures to reduce or control environmental health hazards, if any:

Not applicable

8. Land and shoreline Use

a. What is the current use of the site and adjacent properties?

Not applicable

b. Has the site been used for agricultural purposes? If so, describe.

Not applicable

c. Describe any structures on the site.

Not applicable

d. Will any structures be demolished? If so, what?

Not applicable

e. What is the current zoning classification of the site?

Not applicable

f. What is the current comprehensive plan designation of the site?

Not applicable

g. If applicable, what is the current shoreline master program environment designation of the site?

Not applicable

h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.

Not applicable

i. What are proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

Not applicable

j. Approximately how many people would reside or work in the completed project?

Not applicable

k. Approximately how many people would the completed project displace?

Not applicable

l. What are proposed measures to avoid or reduce displacement or other impacts, if any:

Not applicable

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

Not applicable

b. Approximately now many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

Not applicable

c. What are proposed measures to reduce or control housing impacts, if any:

Not applicable

10. Noise

a. What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

Not applicable

b. What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

Not applicable

c. What are the proposed measures to reduce or control noise impacts, if any:

Not applicable

11. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

Not applicable

b. What views in the immediate vicinity would be altered or obstructed?

Not applicable

c. What area the proposed measures to reduce or control aesthetic impacts, if any?

Not applicable

12. Light and Glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

Not applicable

b. Could light or glare from the finished project be a safety hazard or interfere with views?

Not applicable

c. What existing off-site sources of light or glare may affect your proposal?

Not applicable

d. What are the proposed measures to reduce or control light and glare impacts, if any:

Not applicable

13. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

Not applicable

b. Would the proposed project displace any existing recreational uses? If so, describe.

Not applicable

c. What are the proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

Not applicable

14. Historic and Cultural Preservation

a. Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.

Not applicable

b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on the site.

Not applicable

c. What are the proposed measures to reduce or control impacts, if any.

Not applicable

15. Transportation

a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

Not applicable

b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

Not applicable

c. How many parking spaces would the completed project have? How many would the project eliminate?

Not applicable

d. Will the proposal require any new roads or streets, or improvements to any existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

Not applicable

e. Will the project use or occur in the immediate vicinity of water, rail, or air transportation? If so, generally describe.

Not applicable

f. How many vehicular trips per day would be generated by the completed projects? If known, indicate when peak volumes would occur.

Not applicable

g. What are proposed measures to reduce or control transportation impacts, if any:

Not applicable

16. Public Services

a. Would the project result in an increased need for public services (for example: fire protection, health care, schools, other)? If so, generally describe.

Not applicable

b. What are proposed measures to reduce or control direct impacts on public services, if any.

Not applicable

17. Utilities

a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other:

Not applicable

b. Describe the utilities which are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

Not applicable

C. **SIGNATURE**

The above answers are true to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature:_____

Date Submitted: September 1998

D. SUPPLEMENT SHEET FOR NONPROJECT ACTIONS

(do not use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

The CWSP responds to growth and related water demand. The CWSP does not create the projected increase in population and attendant environmental impacts. The CWSP uses OFM population figures and accepted formulas for creating population projection figures. The CWSP has an objective to be efficient and prudent with public resources, e.g. the joint plan of operation encourages efficiency and a sharing of the resource.

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

The CWSP has no effect on these resources. Implementation of certain aspects of the CWSP may have some effect, but such actions would be subject to individual environmental review.

3. How would the proposal be likely to deplete energy or natural resources?

The CWSP has no effect on these resources. Implementation of certain aspects of the CWSP may have some effect, but such actions would be subject to individual environmental review.

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

All elements of the CWSP must be found to be consistent with local land use plans, policies, and development programs to be approvable. Specific actions proposed for implementation under the CWSP would be subject to environmental review.

Proposed measures to protect such resources or to avoid or reduce impacts are:

None.

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

All elements of the CWSP must be found to be consistent with local land use plans, policies, and development programs to be approvable. Specific actions proposed for implementation under the CWSP would be subject to environmental review.

Proposed measures to avoid or reduce shoreline and land use impacts are:

None.

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

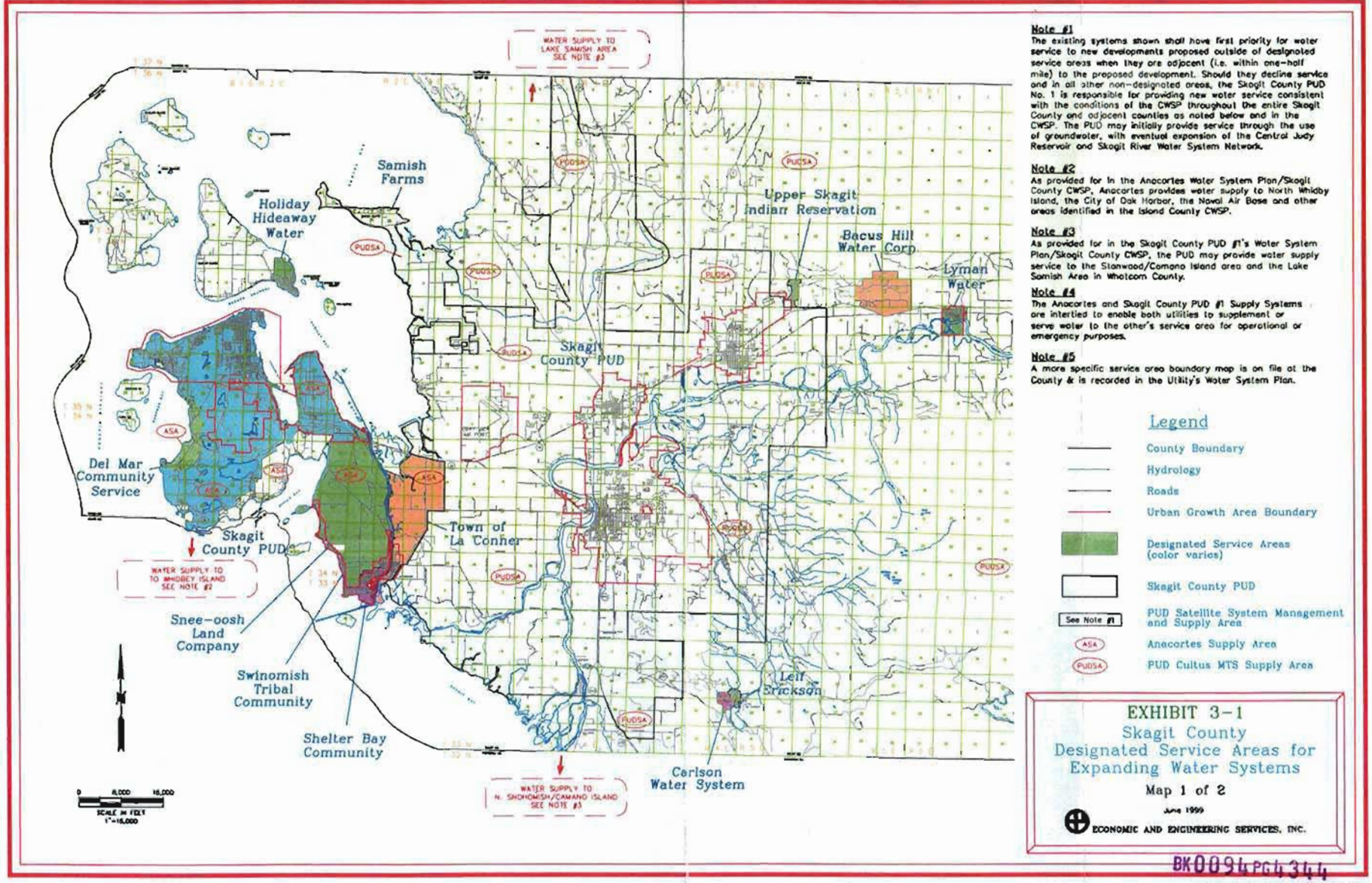
The CWSP will provide clarity concerning water service to specific areas, thereby supporting growth planned under existing zoning and land use plans.

Proposed measures to reduce or respond to such demand(s) are:

None.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

The CWSP is in the format called for by Chapter 70.116 RCW and has had both state and local agency review throughout its development. There is no conflict expected.



Note #1
The existing systems shown shall have first priority for water service to new developments proposed outside of designated service areas when they are adjacent (i.e. within one-half mile) to the proposed development. Should they decline service and in all other non-designated areas, the Skagit County PUD No. 1 is responsible for providing new water service consistent with the conditions of the CWSP throughout the entire Skagit County and adjacent counties as noted below and in the CWSP. The PUD may initially provide service through the use of groundwater, with eventual expansion of the Central Judy Reservoir and Skagit River Water System Network.

Note #2
As provided for in the Anacortes Water System Plan/Skagit County CWSP, Anacortes provides water supply to North Whidby Island, the City of Oak Harbor, the Naval Air Base and other areas identified in the Island County CWSP.

Note #3
As provided for in the Skagit County PUD #1's Water System Plan/Skagit County CWSP, the PUD may provide water supply service to the Stanwood/Camano Island area and the Lake Samish Area in Whatcom County.

Note #4
The Anacortes and Skagit County PUD #1 Supply Systems are intertied to enable both utilities to supplement or serve water to the other's service area for operational or emergency purposes.

Note #5
A more specific service area boundary map is on file at the County & is recorded in the Utility's Water System Plan.

Legend

- County Boundary
- Hydrology
- Roads
- Urban Growth Area Boundary
- Designated Service Areas (color varies)
- Skagit County PUD
- See Note #1 — PUD Satellite System Management and Supply Area
- ASA — Anacortes Supply Area
- PUDSA — PUD Cultus MTS Supply Area

EXHIBIT 3-1
Skagit County
Designated Service Areas for Expanding Water Systems
Map 1 of 2

June 1999

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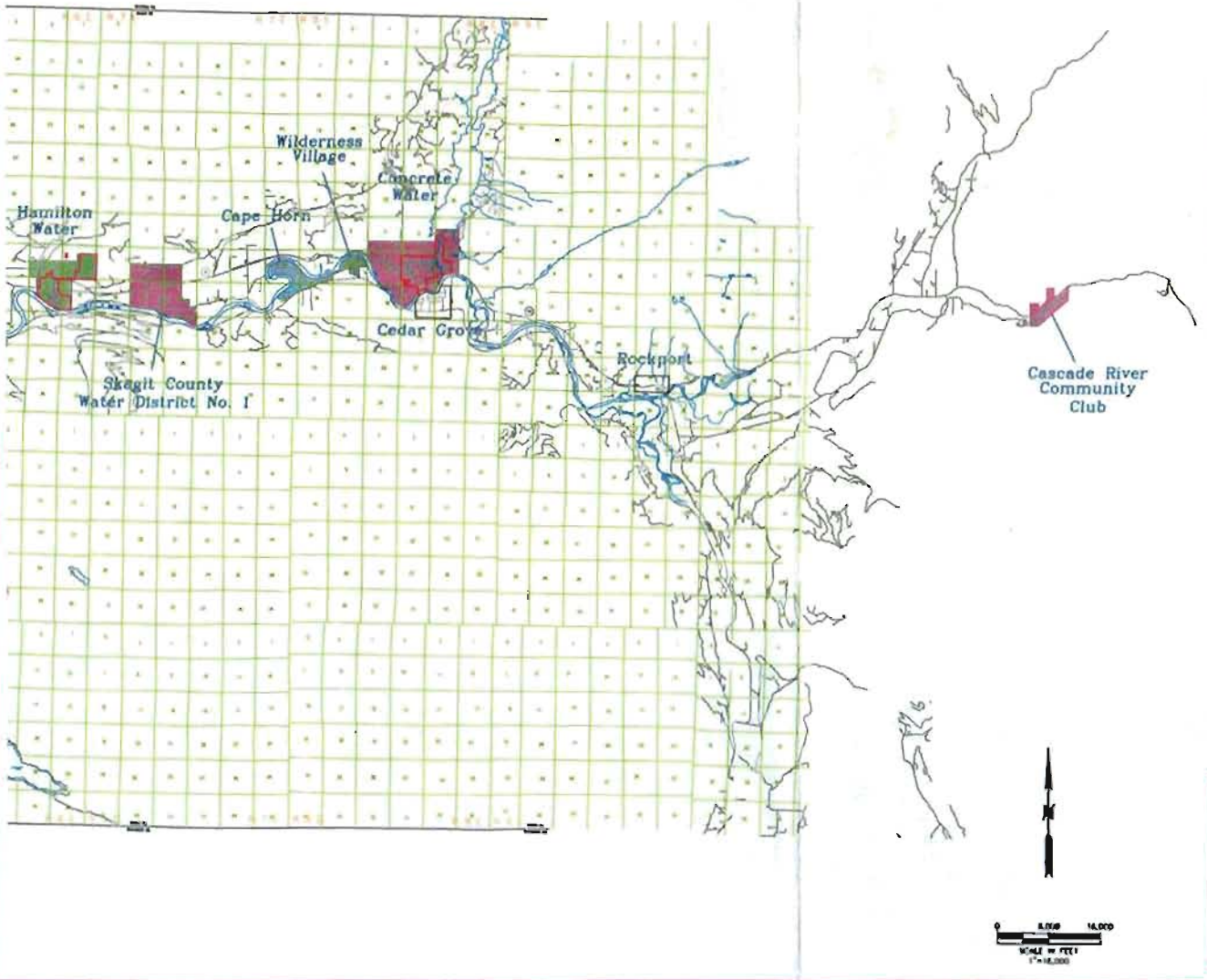

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- Designated Service Areas (color varies)
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- ASA — Anacortes Supply Area
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0 8,000 16,000
SCALE IN FEET
1"=16,000'

EXHIBIT 3-1
Skagit County
Designated Service Areas for Expanding Water Systems
Map 2 of 2

June 1999

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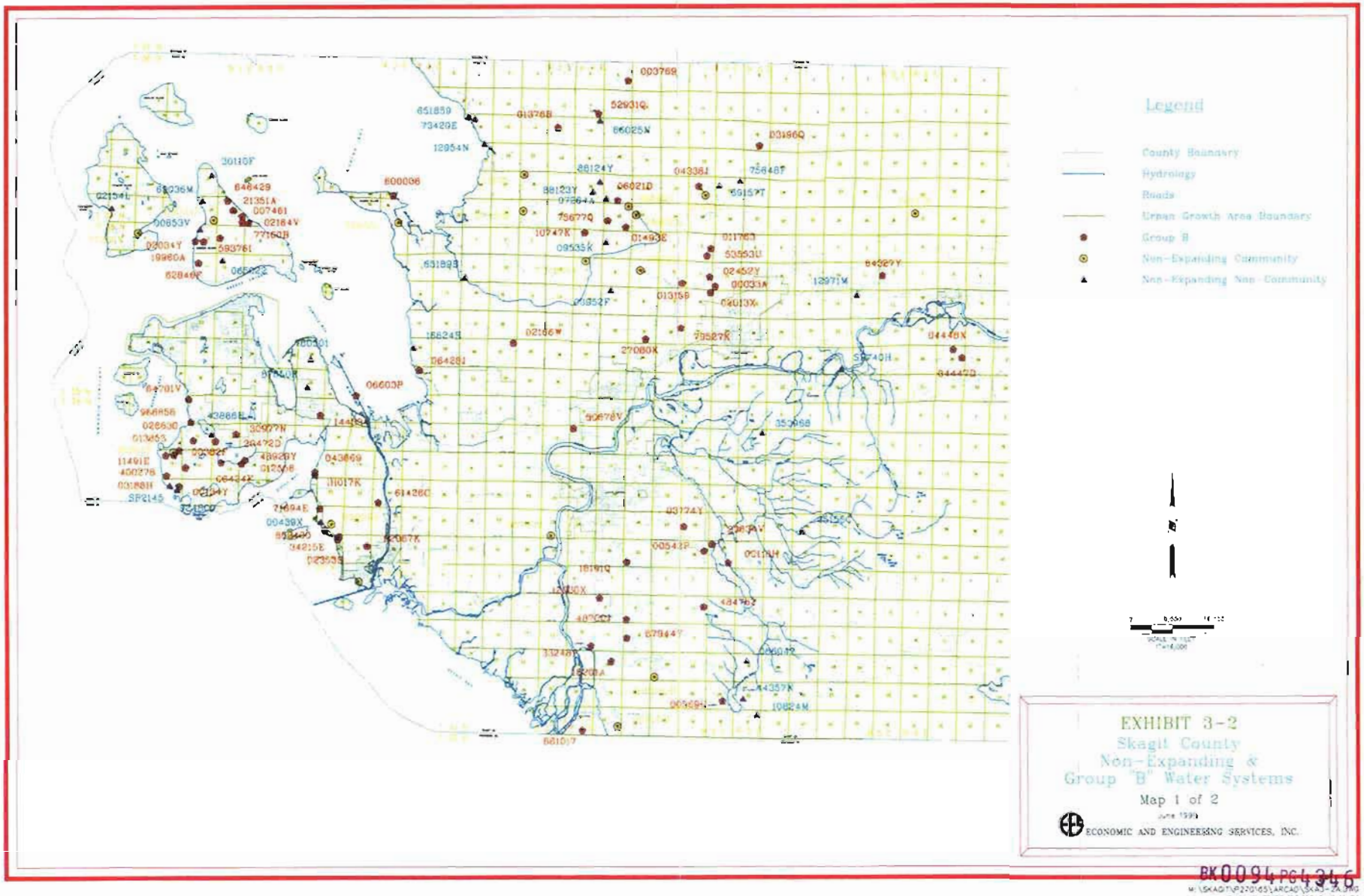

EXHIBIT 3-2
Skagit County
Non-Expanding &
Group "B" Water Systems
Map 1 of 2
June 1999
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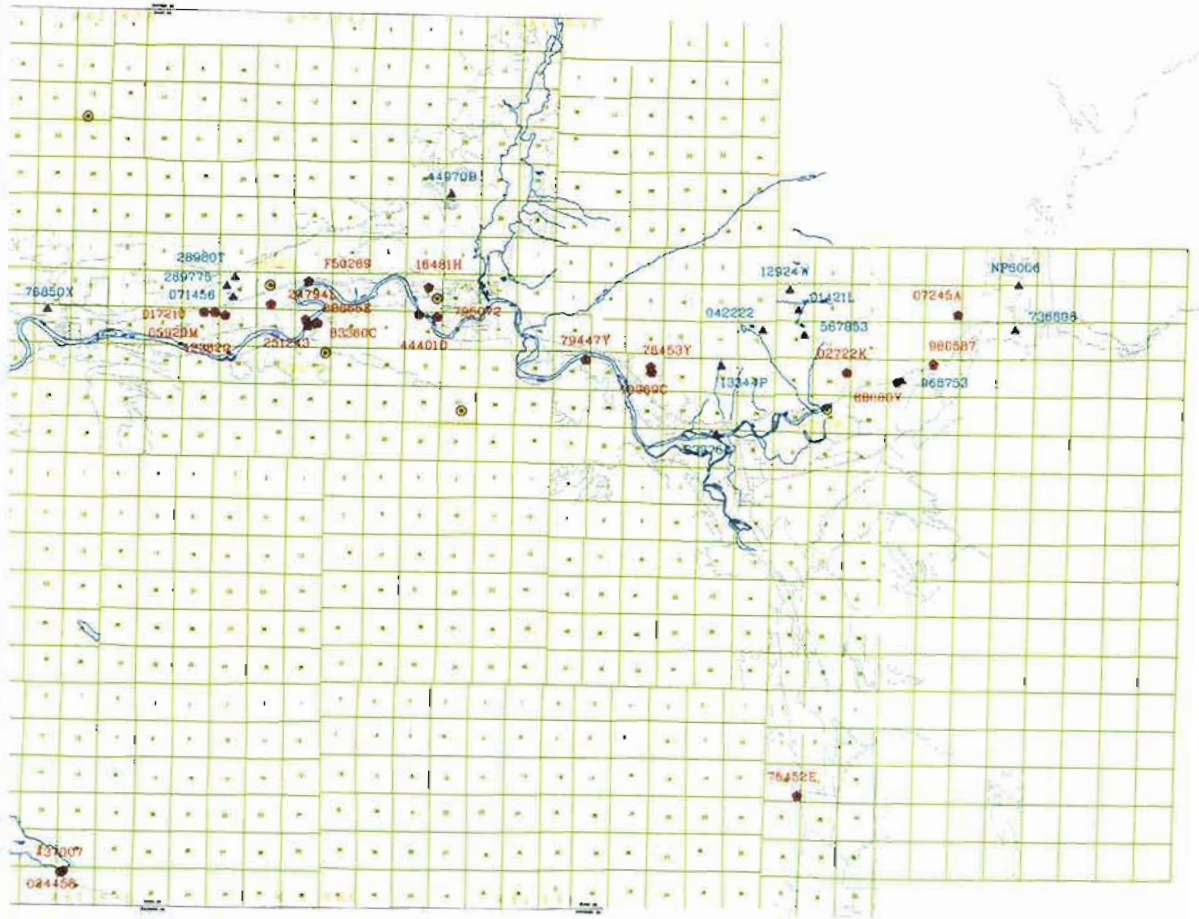

Legend

- County Boundary
- Hydrology
- Roads
- Urban Growth Area Boundary
- Group B
- Non-Expanding Community
- Non-Expanding Non-Community

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SCALE IN FEET
1"=16,000

EXHIBIT 3-2
Skagit County
Non-Expanding &
Group "B" Water Systems
Map 2 of 2
June 1999
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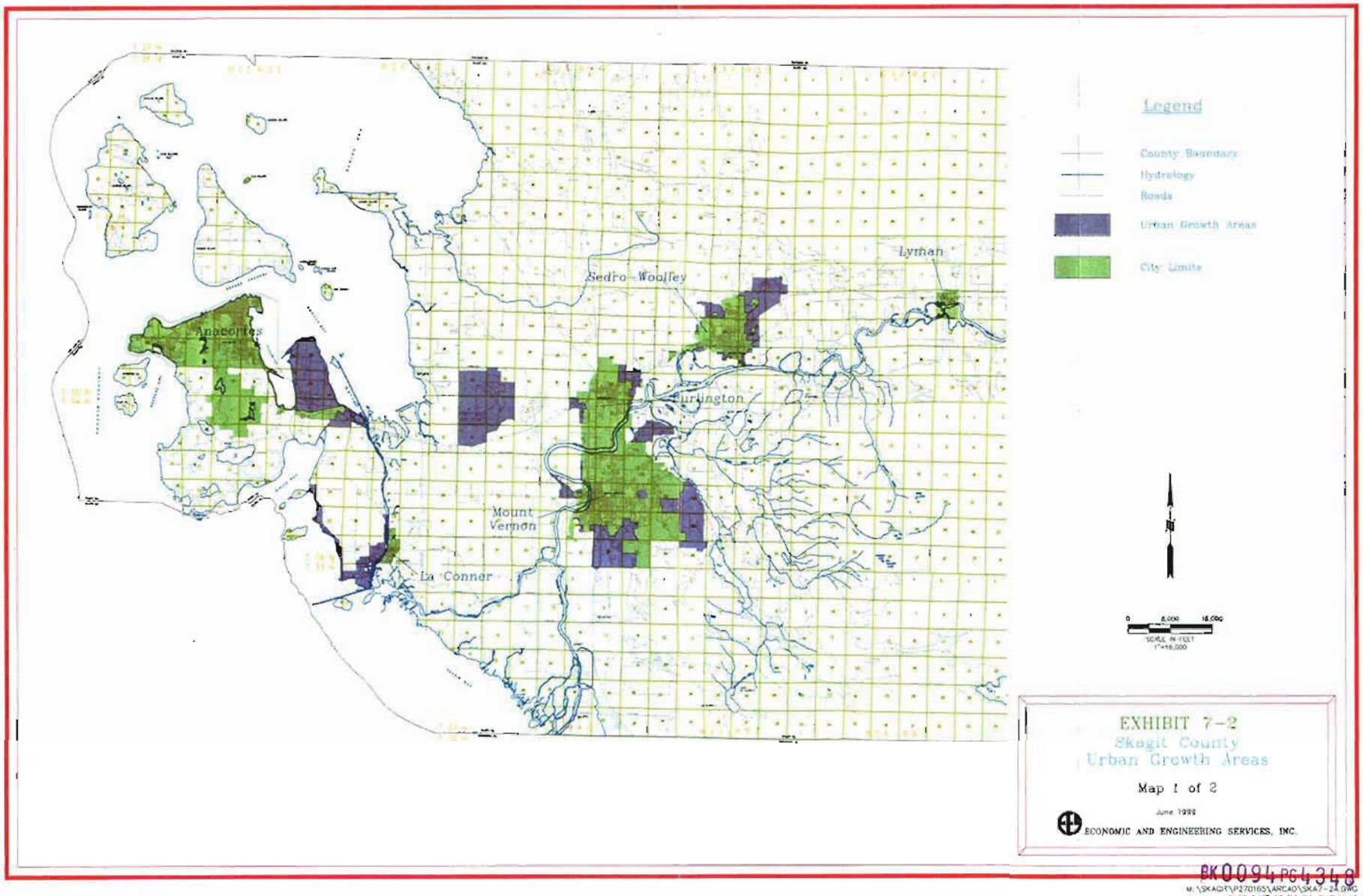

EXHIBIT 7-2
Skagit County
Urban Growth Areas

Map 1 of 2

June 1998

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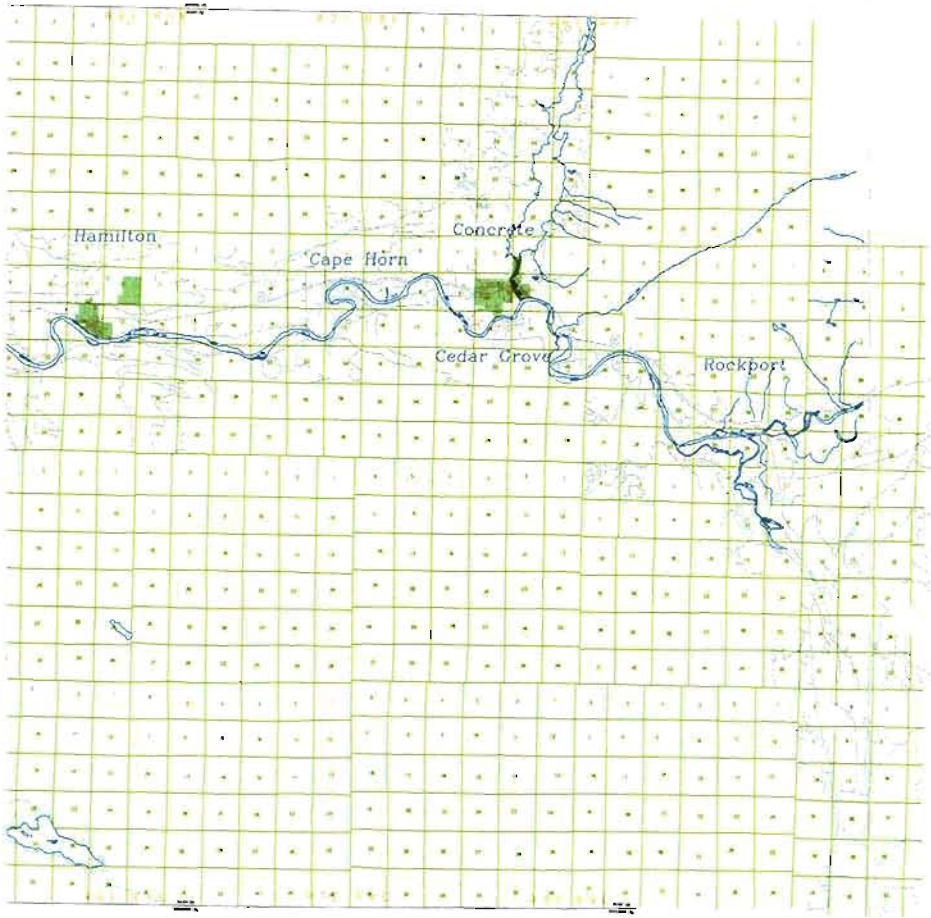

Legend

- County Boundary
- Hydrology
- Roads
- Urban Growth Areas
- City Limits

N

0 5,000 10,000
SCALE IN FEET
1" = 10,000

EXHIBIT 7-2
Skagit County
Urban Growth Areas

Map 2 of 2

June 1999

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