KING COUNTY

1200 King County Courthouse
516 Third Avenue
Seattle, WA 98104

Signature Report

October 10, 2000

Ordinance 13968

Proposed No. 2000-0558.1 **Sponsors** Irons

AN ORDINANCE approving the Cedar River Water and Sewer District 2000 Comprehensive Water System Plan.

PREAMBLE:

K.C.C. chapter 13.24 requires approval of comprehensive plans for water utilities as a prerequisite for granting right-of-way franchises and approval of right-of-way construction permits.

The Cedar River Water and Sewer District 2000 Comprehensive Water System Plan (plan) discusses water service to existing and future populations within the district's forty-square-mile service area. The service area includes urban and rural unincorporated areas and portions of the city of Maple Valley. The service area is predominantly comprised of single-family residences, although commercial uses are also served.

The district purchases nearly all of its water from Seattle Public Utilities. A single well in the Webster Lake area is also in use. The district supports Seattle's one percent for conservation program.

The King County utilities technical review committee (UTRC) reviewed and approved the plan on August 9, 2000. The UTRC recommends that the council approve the plan.

The district prepared a determination of non-significance for the plan on January 25, 2000, in accordance with the state Environmental Policy Act.

The district approved the plan on April 18, 2000.

BE IT ORDAINED BY THE COUNCIL OF KING COUNTY:

SECTION 1. The Cedar River Water and Sewer District 2000 Comprehensive Water System Plan, Attachment A to this ordinance, is hereby approved without conditions.

Ordinance 13968 was introduced on 9/25/00 and passed by the Metropolitan King County Council on 10/9/00, by the following vote:

Yes: 11 - Mr. von Reichbauer, Ms. Miller, Ms. Fimia, Mr. Pelz, Mr. McKenna, Ms. Sullivan, Mr. Pullen, Mr. Gossett, Ms. Hague, Mr. Vance and Mr. Irons
No: 0
Excused: 2 - Mr. Phillips and Mr. Nickels

KING COUNTY COUNCIL
KING COUNTY, WASHINGTON

Pete von Reichbauer, Chair

ATTEST:

Anne Noris, Clerk of the Council

APPROVED this 11 day of October 2000.

Ron Sims, County Executive

Attachments A. Cedar River Water and Sewer District 2000 Comprehensive Water System Plan

13968

CEDAR RIVER WATER AND SEWER DISTRICT

2000
COMPREHENSIVE WATER SYSTEM PLAN

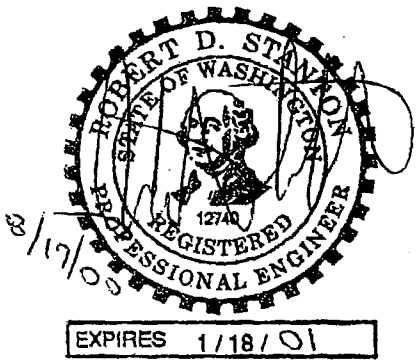
Cedar River Water and Sewer District
18300 SE Lake Youngs Road
Renton, Washington 98058-8058
425-255-6370

General Manager
Ron Sheadel

Commissioners
Walter Canter
Lorraine Snyder
Charles Terwillegar

PROJECT CERTIFICATION

The technical material and data contained in this report was prepared by Penhallegon Associates Consulting Engineers, Inc. under the supervision of the below listed individuals. Those responsible staff members who are registered professional engineers are licensed in the State of Washington.



Robert D. Stanton, P.E.
Vice President

Susan E. Boyd
Associate

The following staff members participated in the compilation and authoring of this Comprehensive Water System Plan.

Dan Mattson, P.E.

Ember Fry, E.I.T.

EXECUTIVE SUMMARY

This Comprehensive Water System Plan is a summary of recent planning and engineering studies completed by Penhallegon Associates Consulting Engineers, Inc. for Cedar River Water and Sewer District's water system. This plan updates and supersedes the District's previous Comprehensive Water System Plan, which was last approved by the Washington State Department of Health on April 24, 1994. It has been prepared in accordance with the requirements of the State of Washington Department of Health, King County, and the City of Maple Valley, within which the District operates.

The primary objectives in developing this document were to determine the adequacy of the existing water system to meet the current and projected needs of the customers of Cedar River Water and Sewer District in accordance with all applicable state, federal and local regulations governing the provision of domestic water service and fire flows; and, to develop a capital improvements program which will serve as a guideline for future development of the water system. In addition to the analysis of the water system and associated recommended improvements, this Plan outlines the District's conservation, operation and maintenance and emergency programs and identifies the District's financial plan for implementing the capital improvements program put forth herein.

The planning area for this Plan consists of Cedar River Water and Sewer District's water service area, as generally established by the East King County Coordinated Water System Plan. The service area consists of approximately 40 square miles of land located south and east of the City of Renton in the vicinity of the City of Seattle's Lake Youngs watershed, in southern King County. The only changes to the service area which are proposed in this Plan include a small adjustment in the southern portion of the District to include property which is partially within the District and can be served most efficiently by Cedar River rather than Covington. The District's service area is generally bounded by the City of Renton and Water District 90 to the north, the City of Seattle Lake Youngs watershed and the Soos Creek Water and Sewer District to the west, the City of Seattle's Cedar River Watershed to the east and the Covington Water District to the south. The Urban Growth Area (UGA) boundary runs through the service area. The District currently serves approximately 14± square miles of land within its corporate area ans provides sanitary sewer service to approximately 3,450 connections within its corporate area.

The District's service area is divided into three primary regions (West, Central and East) according to physical location, demographic and topographic considerations, and operational characteristics. These

designations are used throughout the Plan for describing various elements of existing and proposed water service.

Generally, land use within the service area is a mixture of urban/suburban, transitional and rural. The West portion of the District is more urban/suburban, and has a higher population density while the Central and East Areas are generally more rural and sparsely populated. Consistent with current land uses, the more populated western portion of the District and portions of the southern portion of the Central and East Areas are within the UGA. Commercial and multi-family developments are generally limited to the Fairwood area in the western portion of the West Area and the Maple Valley area located in the southern portions of the Central and East Areas. Significant development is proposed within the service area, as defined by the Puget Sound Regional Council in response to recent Growth Management Act Planning. It is anticipated that future development will be consistent with the current land uses, with higher densities concentrated in those areas within and adjacent to the UGA.

As of January 1, 1999 the population of the District's service area (served and unserved) was nearly 17,000 people and approximately 2,500 people were employed within the service area. Approximately 5,700 actual customers, or nearly 7,200 equivalent residential units (ERU's), were connected to the District's system at the start of 1999. More than 92% of the District's connections are single-family residential, although these connections account for only about 74% of the ERU's in the District. Utilizing population and employment projections from the Puget Sound Regional Council, it is anticipated that by the year 2005 the District will serve more than 8,300 connections, or about 10,280 ERU's. The majority of this growth is anticipated in single-family developments within the UGA.

District-wide, average water use per equivalent residential unit has declined steadily over recent years, from approximately 238 gallons/ERU/day in 1994 to approximately to 222 gallons/ERU/day in 1998. This Plan assumes that regional and local conservation efforts will continue and projections are based on the District's commitment to the Regional 1% Conservation Plan. By 2005, the water use rate is anticipated to be reduced to approximately 207 gallons/ERU/day. The annual demand within the District is expected to increase from nearly 700 million gallons to approximately 900 million gallons per year, representing an increase of almost 30%.

The District maintains two metered water supply connections from the Seattle Public Utilities (SPU) for its normal water supply needs. All water received from these facilities is pumped into the system. In addition to the permanent supply connections, the District has one gravity back-up intertie with SPU

and three separate interties with Covington Water District. Other source facilities which the District owns include the ground water well serves the Webster Lake Area and the Maplewood Estates ground water well, which is intended to be used again as a permanent source of supply. As discussed in Section 5, the District currently has applications pending with the Department of Ecology for expanding the place of use descriptions associated with existing water rights.

Currently, the District's water transmission and distribution system consists of a network of pipes ranging in size from three- to twenty-inches in diameter, arranged into the three primary areas of the District (East, Central and West) and 20 separate pressure zones. The system relies on gravity and three pump stations to transport the water. There are currently six storage reservoirs owned or partially owned the District which hold approximately 6.53 million gallons of water.

Analysis of the system identified a variety of improvements which would either assist in improving the existing system or provide for future development with the water service area. Key improvements include reconfiguration of the existing pressure zones to simplify the system and improve reliability. These improvements will require the construction of an improved transmission system between the zones and reducing the number of zones by reconfiguration of valving. The proposed McGarvey Park development, which straddles the boundary between the West and Central areas, will provide for interconnection of the West and Central-East areas of the District and improve storage and reliability conditions in the Central-East areas. The proposed construction of a transmission/distribution main will provide improved fire flows in the Central-East areas, extend transmission capabilities and provide back-up supply connection to the Webster Lake area (which is currently supplied by a groundwater well and isolated from the remainder of the system).

Other proposed improvements with the District include further analysis of constructing the required improvements to maintain the Maplewood Estates well as a permanent source of supply to the East area of the District, and construction of additional storage and transmission facilities in the East Area. There are also numerous pipeline replacement projects identified for the service area, and additional interties (with Soos Creek Water and Sewer District) recommended to improve fire flows and service reliability in the West area. Section 5 of the Plan provides complete detail of the system analyses completed for this Plan while Section 6 provides a detailed Capital Facilities Plan.

Key to future operation of the water system is review and adjustment of rates to meet the increasing costs of water supply and operations. The District recently completed a rate review and adjusted rates

accordingly. It is recommended that the District continue to review water sales and expenditures on an annual basis in order to maintain the capital facility requirements of the system and to continue to provide high quality service to the residents of the District. It also recommended that the District accomplish a complete study of rates and charges utilizing the information provided herein. The District formerly prepared annual budgets but has recently started multi-year budgeting. The District should also continue its efforts at promoting water conservation both in daily operation of the system and by customers of the District.

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GLOSSARY

ACRONYMS

AC	Asbestos-Cement
ADD	Average Daily Demand
APWA	American Public Works Association
AWWA	American Water Works Association
ccf	One hundred cubic feet
cfs	Cubic Feet per second
CFP	Capital Facilities Plan
CI	Cast Iron
CRWSD	Cedar River Water and Sewer District
CT	Census Tract
CWD	Covington Water District
CWSP	Coordinated Water System Plan
DI	Ductile Iron
DOE	Washington State Department of Ecology
DOH	Washington State Department of Health
DOT/APWA	Standard Specifications for Road, Bridge, and Municipal Construction, Washington State Department of Transportation and the American Public Works Association, 1998 Edition
EPA	United States Environmental Protection Agency
ERU	Equivalent Residential Unit
ES	Equalizing Storage
FAZ	Forecast Analysis Zone
FF	Fire Flow
FSS	Fire Suppression Storage
gpcd	Gallons per capita per day
gpd	Gallons per day
gpm	Gallons per minute
HGL	Hydraulic Grade Line
MCL	Maximum Contaminant Level
MDD	Maximum Daily Demand
MG	Million Gallons
mgd	Million gallons per day
MID	Maximum Instantaneous Demand
NMFS	National Marine Fisheries Service
OFM	Office of Financial Management
OS	Operational Storage
PAA	Potential Annexation Area
PE	Professional Engineer
PHD	Peak Hour Demand

PSRC	Puget Sound Regional Council
PRV	Pressure Reducing Valve
psi	Pounds per square inch
PVC	Polyvinyl Chloride
RCW	Revised Code of Washington
SB	Standby Storage
SDWA	Safe Drinking Water Act
SEPA	State Environmental Policy Act
SPU	Seattle Public Utilities
SWSMP	Small Water System Management Program
TAZ	Transportation Analysis Zone
UBC	Uniform Building Code
UPC	Uniform Plumbing Code
ULID	Utility Local Improvement District
USGS	United State Geological Survey
WAC	Washington Administrative Code
WFI	Water Facility Inventory and Report Form (DOH form)
WSDOT	Washington State Department of Transportation
WSRB	Washington Surveying and Rating Bureau
WUCC	Water Utility Coordinating Committee
WUTC	Washington Utilities and Transportation Commission

GLOSSARY

TERMS

Annual Demand - Total water system demand for one calendar year, expressed in millions of gallons (MG).

Average Daily Demand (ADD) - The annual demand divided by the number of days per year, expressed in million gallons per day (MGD).

Cross Connection - A physical arrangement connecting a public water system, directly or indirectly, with anything other than another potable water system, and capable of contaminating the public water system.

Dead Storage - The volume of stored water not available to all customers at the minimum design pressure in accordance with WAC 246-290-230 (5) and (6).

Demand Charge - A penalty assessed to Seattle Water Department customers during the summer months for water use exceeding 1.3 times the average daily use as determined from the ten maximum flow days for that customer.

Equalizing Storage - The volume of water required to meet hourly variations in demand in excess of the available rate of supply.

Equivalent Residential Units (ERU) - The amount of water consumed by a typical full-time single family residence. Used for converting users other than single family residences into an equivalent number for the purpose of demand forecasting, system analysis and facility sizing.

Fire Flow - The rate of water flow, in gpm, required to fight fires under WAC 246-293-640 or adopted city or county standards.

Fire Suppression Storage - The volume of water required to accommodate fire demand.

Franchise Area - A designated area within which the utility system is permitted, by franchise, to own, operate and maintain facilities within public rights-of-way.

Legal Boundary - The corporate boundary established for the District. Extension of service beyond the District's legal boundary requires annexation to the District or specific agreement for the provision of such service.

Maximum Contaminant Level (MCL) - The maximum permissible level of a contaminant in water the purveyor delivers to any public water system user.

Maximum Daily Demand (MDD) - The highest water demand anticipated for any given day, expressed in MGD.

Maximum Instantaneous Demand (MID) - The maximum rate of water use, excluding fire flow, which has occurred or is expected to occur within a defined service area at any instant in time.

Operational Storage - The volume of the reservoir devoted to supplying the water system while, under normal operating conditions, the source(s) are in "off" status.

Peak Hour Demand (PHD) - The maximum rate of water use, excluding fire flow, which has occurred, or is expected to occur, over a one hour period of time. Typically expressed in gallons per minute.

Potable - Water suitable for drinking by the public.

Pressure Zone - A water supply or distribution subsystem operating at a uniform hydraulic gradient.

Service Area - The recognized area within which a provider of public services intends to serve.

Standby Storage - The volume of water required to augment the available supply of water during a period of partially or fully restricted flow from the supply source, due to such things as pipeline or pump failure or power outages.

Usable Storage - That portion of the total available storage which is available on a continuous basis, either by gravity flow or by reliable pumping facilities.

SECTION 1
INTRODUCTION

1.1 INTRODUCTION

This report compiles and summarizes the results and conclusions of planning and engineering studies undertaken by Penhallegon Associates Consulting Engineers, Inc. to develop this Comprehensive Water System Plan update for Cedar River Water and Sewer District. In accordance with Washington State Department of Health and King County regulations and guidelines, this document identifies the characteristics of the water system service area, describes the existing water system, establishes minimum design criteria for the water system, identifies existing system deficiencies and presents a schedule and financial plan for upgrading the water system to meet current and future service area needs.

1.2 AUTHORIZATION

Recognizing the need to update its Comprehensive Water System Plan to comply with state and local planning requirements and address recent Growth Management Planning efforts by other jurisdictions, the Board of Commissioners authorized Penhallegon Associates Consulting Engineers, Inc. to develop this Comprehensive Water System Plan update.

1.3 DISTRICT GOALS AND OBJECTIVES

A summary of the District's water system goals and objectives is outlined below:

- Provide and maintain high quality water service to all customers of the District in accordance with State and Federal standards.

- Maintain water system facilities to insure a high level of service and maximize the useful life of the water system.

- Coordinate with neighboring purveyors and other jurisdictions wherever appropriate and beneficial to the operation of the utilities.

- Participate in regional water utility groups to insure input in future water supply alternatives for the District and greater Seattle area.

- Construct new, efficient facilities required to meet the current and projected needs of the existing and future population of the District.

- Maintain a sound water conservation program in order to minimize water waste and protect water supply resources of the region.

- Conduct water system operations so as to maintain reasonable and equitable water rates.

- Conduct operations and planning in a manner which is consistent with protection of the natural environment of the service area.

1.4 OBJECTIVES OF THE STUDY

The purpose of this study is to establish a comprehensive water system plan which identifies the requirements for operation and maintenance of the water system. It is intended to provide a guideline for future development of the system in accordance with all applicable regulations and to provide for the needs of the population which the District serves. The Plan is based on existing conditions and the projected needs of the service area through the year 2020. The primary objectives and scope of the study are summarized as follows:

- Identify the demographic characteristics of the water service area, including population, land uses and historical water demand patterns, for the purpose of projecting future water system requirements within the service area;

- Coordinate the existing and projected service area of the District with the service areas of neighboring purveyors and other appropriate comprehensive planning documents;

- Identify existing system components which currently serve the customers of Cedar River Water and Sewer District, including interties and connections with the City of Seattle's regional water supply system and neighboring purveyor systems;

- Develop minimum design criteria for analysis of the existing system and to identify future system requirements;

- Make a detailed study of the existing water system, including hydraulic analyses with the use of a computerized hydraulic model;

- Based on current population and anticipated growth patterns, develop a detailed Capital Facilities Program which details proposed improvements scheduled for the next six years and summarizes anticipated system improvements for subsequent years;

- Develop a financing plan which outlines the District's current rates, fiscal requirements and methods of financing the improvements recommended in the Plan;

- Provide an overview of the District's operations and maintenance and water conservation programs;

- Address the requirements of the State Environmental Policy Act (SEPA); and,

- Provide all necessary documentation in accordance with the requirements of the State Department of Health and other agencies having jurisdiction.

1.5 LOCATION OF THE DISTRICT

As indicated on Figures 1-1 and 1-2, Cedar River Water and Sewer District is located in the southeastern part of King County. Cedar River Water and Sewer District's water service area, as established by the East King County Coordinated Water System Plan, consists of approximately 24,200 acres of land located south and east of the City of Renton, in the vicinity

of the City of Seattle's Lake Youngs watershed. The District's water service area includes portions of the City of Maple Valley and unincorporated King County and is shown on Figures 1-1 and 1-2.

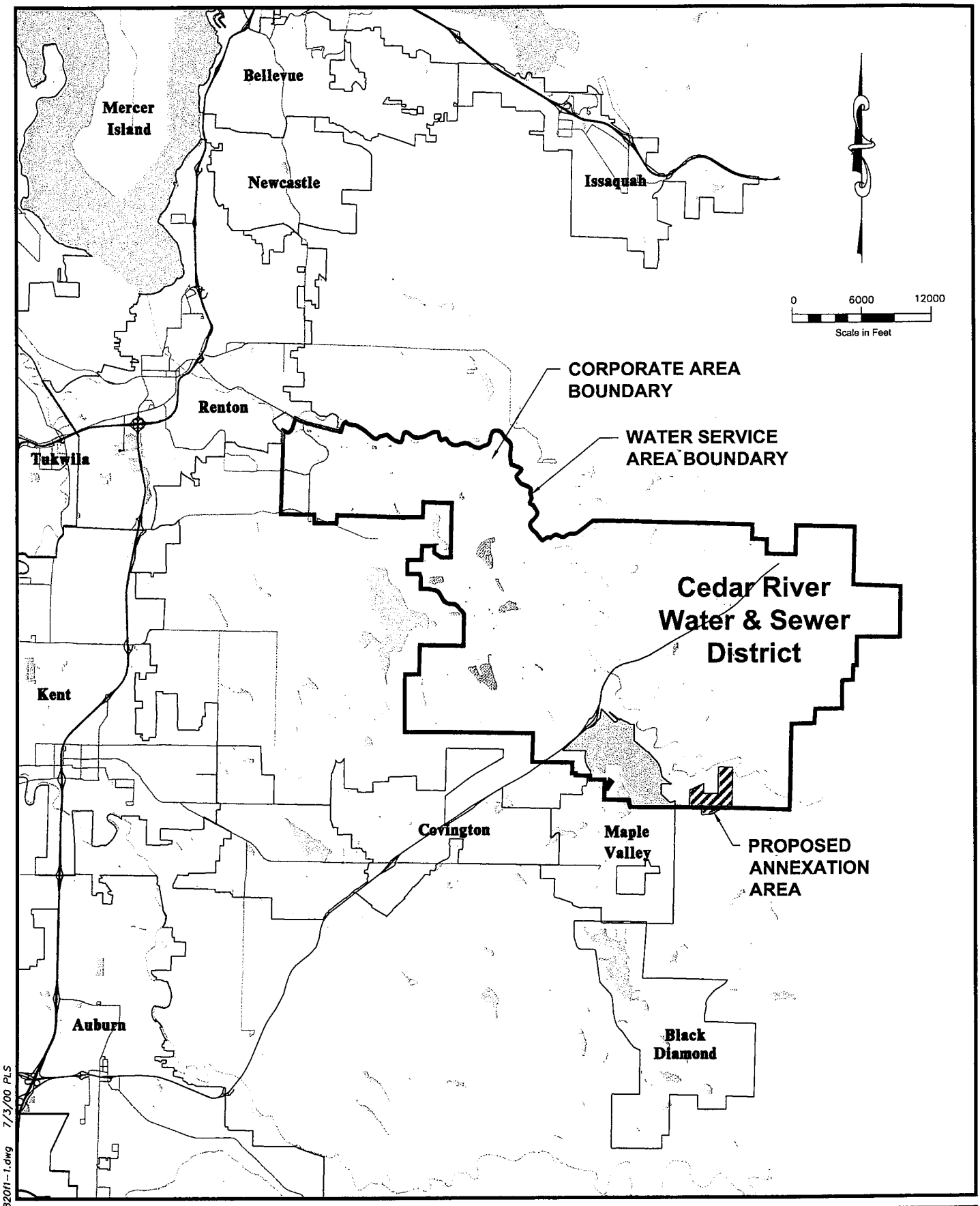
Neighboring water service providers include the City of Renton to the northwest, Mirrormont Services, Inc., and Water District 90 to the north, Soos Creek Water and Sewer District to the west, and Covington Water District to the south. Although no service area conflicts exist, there is a service area exchange with Covington Water District detailed in Section 2. *(Note to Readers: This exchange and proposed annexation are running concurrently with the Plan review and approval process.)*

The existing corporate limits of the District represent the District's current water service area and is considerably smaller than the future service area. It includes approximately 9,240 acres of land in the more populated western and southern portions of the service area.

Water service is currently (1999) provided to approximately 5,900 connections. The District's current sewer service area, although not specifically addressed in this document, includes the urban areas of the District as well as any future extensions of the Urban Growth Area (UGA). Cedar River Water and Sewer District currently serves approximately 3,450 sanitary sewer connections.

1.6 EXTENT AND CONDUCT OF BUSINESS

Cedar River Water and Sewer District operates under Title 57 (Water and Sewer Districts) of the Revised Code of Washington. The District is responsible for providing adequate water and sewer service to its customers and for proper planning for the future populations of the service area. It operates under a three commissioner system whereby the Board of Commissioners sets District policies, oversees District operations and holds regular public meetings, usually twice monthly.



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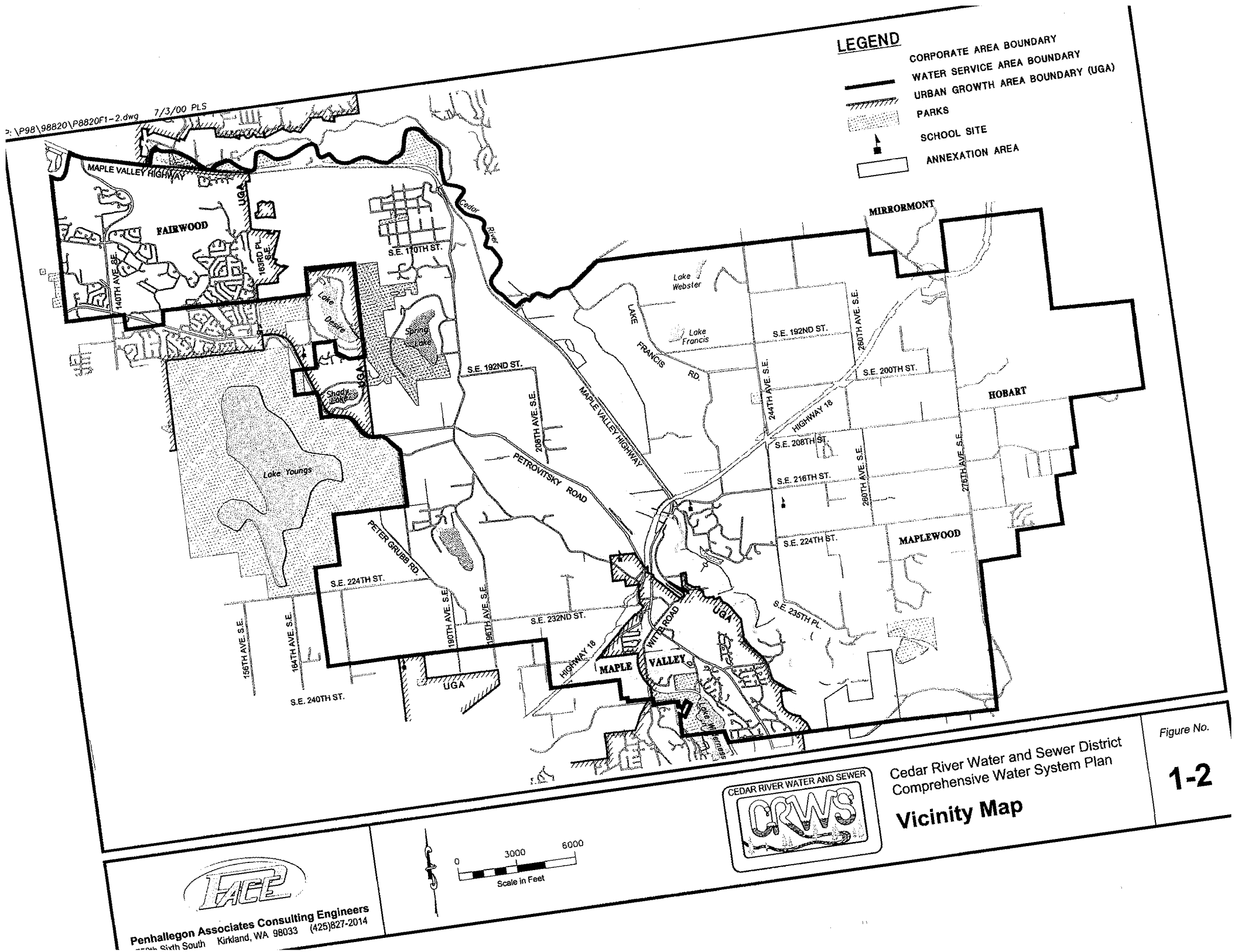
CEDAR RIVER WATER AND SEWER

Cedar River Water and Sewer District
Comprehensive Water System Plan

Location Map

Figure No.

1-1



CEDAR RIVER WATER AND SEWER

CRWS

Cedar River Water and Sewer District
Comprehensive Water System Plan

Vicinity Map

Figure No.

1-2

FACE

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Implementation of the Board's policies is the responsibility of the General Manager and staff. The General Manager handles the day-to-day responsibilities of the District, handles public relations, and is responsible for emergency response coordination. The Field Superintendent supervises the field staff and oversees day-to-day system operation and reports to the General Manager. The General Manager reports directly to the Board of Commissioners. The office staff report to the General Manager and are responsible for billings, collection of money, record keeping and general operations of the office. Please see Figure 8-4 in the Operations Program Section for a more detailed District employee roster.

The District retains the services of a professional engineering firm who performs planning and engineering services as needed for District operation, compliance with regulations, and system improvements. Legal counsel is also retained by the District to assist in compliance with statutes and other legal considerations. The District's Consulting Engineers and Legal Counsel report to the General Manager and attend regular District meetings to advise the Board of Commissioners. Financial advisors, accountants and other specialized consultants are retained as necessary to assist with financial and other aspects of District operations.

1.7 HISTORY OF THE DISTRICT

Cedar River Water and Sewer District was formed on June 21, 1960 to provide service to approximately 520 acres in the area known as Maple Valley Heights. Since that time the District's corporate area has grown through 38 annexations to approximately 9,240 acres, or 14.5 square miles.

The District's original Water System Comprehensive Plan was adopted by Resolution 18 on February 16, 1961. The next two updates of the Plan were adopted by Resolution 106 in 1965 and Resolution 901 in 1974. In 1978, the Rules and Regulations of the State Board of Health were revised to require the District to update its Plan every six years. The third update was adopted in 1982 by Resolution 1785 and was approved by the Washington State Department of Social and Health Services on October 1, 1982, and by King County Ordinance 6354 on February 28, 1983. The fourth update was authorized by District Resolution 2838 on March 6,

1991 and was approved by the Washington State Department of Health on April 24, 1994 and by King County Ordinance 10413 on June 8, 1992. A list of amendments to the previous comprehensive plans and summary of the District's growth and annexations can be found in the Appendices.

1.8 RULES AND REGULATIONS

Cedar River Water and Sewer District is authorized as a Public Water System under laws of the State of Washington. As such, the District must operate in accordance with specific regulations mandated by the State as well as the rules and regulations of the other jurisdictions within which the District operates. The District maintains adaptive management policies and practices in response to the ever increasing and changing regulations, requirements, plans, and policies of agencies having jurisdiction. At the same time it must plan for and deliver a level of service which is consistent with its commitment to domestic water and fire protection within the service area established by the East King County Coordinated Water System Plan. A summary of these rules and regulations is as follows:

1.8.1 Federal Regulations

Public Law 93-523, the Safe Drinking Water Act (SDWA), directs the United States Environmental Protection Agency (EPA) to establish minimum national drinking water standards which limit the amount of substances which can sometimes be found in drinking water sources. Cedar River Water and Sewer District maintains a water quality monitoring program which is in accordance with the current federal drinking water standards as governed by the State of Washington Department of Health. The District also publishes annual Consumer Confidence Reports and Lead and Copper Public Education Information according to EPA and DOH regulations. Specific information on water quality standards and monitoring is contained in the Appendices.

The Endangered Species Act (ESA) will impact both water and sewer system operations of the District because of the 1999 listing of the Puget Sound Chinook Salmon and Bull Trout as "threatened species". Although the exact nature and extent of requirements

to be imposed on the District await adoption of a "4d Rule" by the National Marine Fisheries Service (NMFS), the District expects that specific requirements will be imposed on at least its operation and maintenance activities. The District anticipates adoption of formal "Best Management Practices" (BMPs), as required by the "4d Rule", to supplement its existing operations and maintenance activities and programs. As part of its ESA compliance program, the District expects to assign and train selected staff as BMP compliance officers responsible for monitoring District projects for ESA compliance. The costs for ESA compliance, when identifiable, will be included in future rate studies for incorporation into the District's connection charges and service rates.

Other federal regulations which may have an impact on District operations include those associated with specific permits for individual projects. These specific regulations will be identified and addressed on a project by project basis.

1.8.2 State of Washington Requirements

The rules and regulations governing the operation of public water systems are a part of the Washington Administrative Code (WAC) and were adopted pursuant to the provisions of the Revised Code of Washington (RCW) 43.20.050 for the protection of public health. The rules and regulations set forth in WAC 246 identify cross connection control requirements and provide the minimum standards for design, construction, operation and maintenance of public water systems. They are intended to conform to the requirements of the Safe Drinking Water Act of 1974, and all amendments thereto administered under the DOH document "Group A Public Water Systems Waterworks Standards" in accordance with WAC 246-290.

Operation of the District is accomplished in accordance with the requirements of Title 57 of the Revised Code of Washington, which outlines the authorized actions, requirements and responsibilities of public water and sewer districts.

The Growth Management Act has a direct impact on utility system planning in that it

requires a complete inventory of existing utility system facilities and a comprehensive effort towards determining the capacity of utility systems to support anticipated growth. Although the majority of growth management activities are the responsibility of counties and cities, data and information from special purpose districts is required for these agencies to make informed decisions on growth and the ability of the systems to support future development. A primary outcome of the Growth Management Act is the establishment of an Urban Growth Area (UGA) boundary, within which an urban level of development is anticipated and an urban level of services required. As discussed below, portions of the Cedar River Water and Sewer District are within the UGA boundary for King County and as such, planning is for an associated level of development and service.

1.8.3 King County Requirements

Because the District operates in unincorporated King County, the District must operate within the rules and regulations established by King County and utilize County planning data in developing growth projections for those portions of the District which are within the County. Specifically, the King County Comprehensive Plan has a direct impact on the District and its planning efforts. King County Code Chapters 13.24 (Sewer and Water Comprehensive Plans) and 17.08 have been utilized in the development of this document to ensure that District operations are in conformance with King County requirements. The District must also operate within the terms of its current franchise with King County (K.C. Franchise No. 11642) which expires on January 3, 2020.

Land Use Planning by King County and in accordance with State Growth Management Planning established an Urban Growth Area (UGA) boundary for the County. The UGA establishes the area within which higher densities are anticipated and for which an urban level of services is to be planned. Conversely, the area outside of the UGA is expected to remain rural in nature and be provided an appropriate level of services. Implementation of the "Countywide Planning Policies" and subsequent King County planning has had a significant impact on projected growth within Cedar River Water and Sewer District.

As detailed in Section 2 of this Plan, the UGA boundary runs through Cedar River Water and Sewer District. Planning for an appropriate level of water service requires unique considerations for a district such as Cedar River which straddles the UGA boundary. Although existing zoning outside of the UGA may be consistent with a rural level of development, land uses in such areas typically include development which, for protection of health and safety, requires fire flows above the minimum flows established for rural areas. The District plans for the ability to provide protection of health and safety and fire flows for these types of development.

Another consideration in planning for the rural area is the expansion of water service to new developments which would otherwise require a private well. The East King County Coordinated Water System Plan establishes service areas to reduce the proliferation of additional groundwater wells and eliminate the need for new water systems. The District strongly supports this notion as a means of protecting groundwater supplies in its service extension policies and recognizes that satellite system management may be the best alternative for achieving this goal.

1.8.4 City Requirements

Small portions of the District lie within the Potential Annexation Areas (PAAs) of the Cities of Renton and Maple Valley. The land use plan, construction standards and permitting requirements of these cities are essential considerations in the design and construction of new facilities as well as in the daily operation and maintenance activities.

1.9 PREVIOUS PLANNING STUDIES

Previous studies and documents by Cedar River Water and Sewer District which have been utilized in the development of this Plan are summarized as follows:

- Comprehensive Water System Plan, Hugh Goldsmith and Associates, 1991.
- Comprehensive Sewer System Plan, Hugh Goldsmith and Associates, 1991.

- Capital Improvement Cost Projects, 1998 - 2007, Hugh Goldsmith and Associates, November 1997.

- Standard Specifications, Penhallegon Associates Consulting Engineers, Inc., 1999.

- Developer Extension Agreement, Volumes I, II and III, Penhallegon Associates Consulting Engineers, Inc., 1999.

1.10 RELATIONSHIP TO OTHER PLANS AND POLICIES

Information from the following plans and policies by others was used in the development of this Plan:

- **King County Comprehensive Plan** - Adopted by the King County Council on November 18, 1994 by Ordinance 11575, the Plan covers all of the District's planning area and sets forth the County's land use policies to direct decisions on growth and land development. It also provides policy guidance to functional plans such as this one. Subsequent amendments to the Plan have also been considered.

- **Soos Creek Community Plan** - The 1994 King County Comprehensive Plan set forth a new implementation framework focusing on the Urban Growth Areas and Potential Annexation Areas within the County. Due to this change, the Soos Creek Community Plan no longer exists as an individual document. Seventeen of the relevant policies from the Plan are now included in the King County Comprehensive Plan, Chapter 14.

- **Tahoma/Raven Heights Communities Plan** - As stated above, the 1994 King County Comprehensive Plan restructured the planning framework within the County. The Tahoma/Raven Heights Community Plan no longer exists as a separate document but two of the policies from the Plan are now included in the King County Comprehensive Plan, Chapter 14.

- **East King County Coordinated Water System Plan** - The East King County Coordinated Water System Plan (CWSP), was adopted October 12, 1989, by the East King County Water Utility Coordinating Committee, which represents approximately 55 water purveyors. A Plan update was adopted November 14, 1996. The CWSP was prepared in accordance with the Public Water System Coordination Act of 1977 to coordinate the planning and construction programs of water utilities and local government in the east King County area. The CWSP addresses service areas, design standards, service review procedures, a long-term water supply strategy, and a process to resolve water resource issues in a manner consistent with King County land use policies.

- **Seattle Comprehensive Regional Water Plan** - The City of Seattle last updated its regional water supply plan (COMPLAN) in 1992. As a wholesale customer of Seattle Public Utilities, Cedar River Water and Sewer District must consider impacts of that Plan and a variety of other documents developed by the City. Within the District's planning area, the Seattle comprehensive plan includes projects, most of which are of an upgrade or maintenance nature, which will increase the reliability and preserve the quality of the regional water supply. Other relevant documents include the City's Habitat Conservation Plan, Water Quality Monitoring Programs, Conservation Plans, and specific reports and studies on various aspects of the regional water system.

- **City of Renton Comprehensive Water Plan** - The City of Renton last updated its water system comprehensive plan in 1998. An agreement on common boundaries between Renton and Cedar River Water and Sewer District was passed by District Resolution 3740 in January 1999.

- **North Soos Creek Fiscal Impact Study** - This 1989 City of Renton study examines the fiscal impact of annexation of about 8.7 square miles southeast of the City (from Lake Youngs to the Maple Valley Highway). About one third of the study area lies within Cedar River Water and Sewer District and includes all of the Fairwood neighborhood

and the west half of the Valley Floor area. The findings of the study were not sufficiently favorable and in November 1990, the City of Renton decided to drop further annexation proceedings.

- **Soos Creek Water and Sewer District Water System Plan** - The Soos Creek Water and Sewer District Comprehensive Water System Plan was updated in 1996. As an immediate neighbor, various boundary and service issues have historically impacted both Districts. This Plan recommends that formal water service area agreements between the two Districts be negotiated and formalized in the next five years.

- **Water District 90 Comprehensive Water Plan** - King County Water District 90, which lies to the north of Cedar River Water and Sewer District, last updated its water system plan in 1996 and revised selected sections in 1999. The Districts are physically separated by the Cedar River and coordination of system facilities does not appear to be necessary until the systems of both Districts extend to the vicinity of Cedar Grove Road. The Districts do, however, have a boundary agreement which was executed in 1970.

- **Covington Water District Comprehensive Water Plan** - Covington Water District, which lies south of Cedar River Water and Sewer District, last updated its Comprehensive Plan in November, 1994. A planning area boundary line agreement was executed by the two Districts in 1969 and was revised in 1976 and 1983. Cedar River Water and Sewer District has three interties with the Covington system and the Districts share a joint-use reservoir built in 1993. Additional information on these facilities is further described in Section 3.

SECTION 2
BASIC PLANNING DATA

2.1 INTRODUCTION

This Section of the Plan provides an overview of the physical and demographic characteristics of Cedar River Water and Sewer District's service area and includes a description of the area, land use, population and water use data. Population and water system demand projections are included in this Section and utilized in later Sections for assessment of the existing water system to meet the needs of the projected development within the service area.

2.2 STUDY AREA

The study area for this Plan is the future service area established for Cedar River Water and Sewer District by the East King County Coordinated Water System Plan (CWSP) along with minor adjustments thereto which have been agreed to with neighboring jurisdictions. The service area includes approximately 24,200 acres generally located south and east of the City of Renton and is within unincorporated King County and the City of Maple Valley. The District's corporate boundary represents that area which has been annexed to the District and generally indicates the area to which the District provides direct water service. The corporate boundary, as well as the Urban Growth Area (UGA) boundary and applicable city limits are indicated on Figure 2-1. The service areas of neighboring jurisdictions are also indicated on Figure 2-2. The District recognizes that prior to extending service into Range 7, review or modification of existing Seattle water rights or modification of the District's Maplewood Estates water rights may be required.

The planning area of the District is divided into three primary regions, the West, Central and East Areas. The Webster Lake Area is located within the East Area. The area designations are indicated on Figure 2-2 and have been established according to physical location, topographic and demographic considerations and operational characteristics of the water system. These areas are used throughout this Plan to identify various characteristics of the service area. Later in this Section, the land use and demographic features of each area are described. Section 3 provides detailed information regarding the operational characteristics of the water system within

each area.

2.3 INTERLOCAL AGREEMENTS

Although the District's established future service area boundary represents the area to which the District intends to provide water service, from time to time it is necessary to negotiate Interlocal service agreements with neighboring purveyors in order to meet the specific needs of a developing property or area. Cedar River Water and Sewer District's water service area has been developed through agreements with neighboring Districts and purveyors. The District maintains service area agreements with the City of Renton, Covington Water District, King County Water District No. 90 and Soos Creek Water and Sewer District. A list of the current boundary and service agreements in effect is provided in the Appendices. The District recently arrived at an interlocal agreement with Covington Water District and includes the transfer of an 8.87 acre area from that district to Cedar River Water and Sewer District. The area is part of an annexation to Cedar River Water and Sewer District which is being completed concurrently with this Plan.

In addition to service area agreements, the District maintains agreements for the purchase of water supply from Seattle Public Utilities as well as interties, water sales and joint use facility agreements with the Covington Water District. These agreements are on file at the District office.

2.4 WATER SERVICE AREA POLICIES

Key service area policies considered in developing this document and establishing future population and demand projections are identified in the following paragraphs:

2.4.1 Water Service Policy

Cedar River Water and Sewer District operates within the City of Maple Valley and unincorporated King County. It is the District's policy to make domestic water and fire protection service available to its entire service area, as put forth in this Comprehensive Plan and in accordance with all applicable requirements of all agencies having jurisdiction, subject to engineering and legal feasibility. The District's planning efforts

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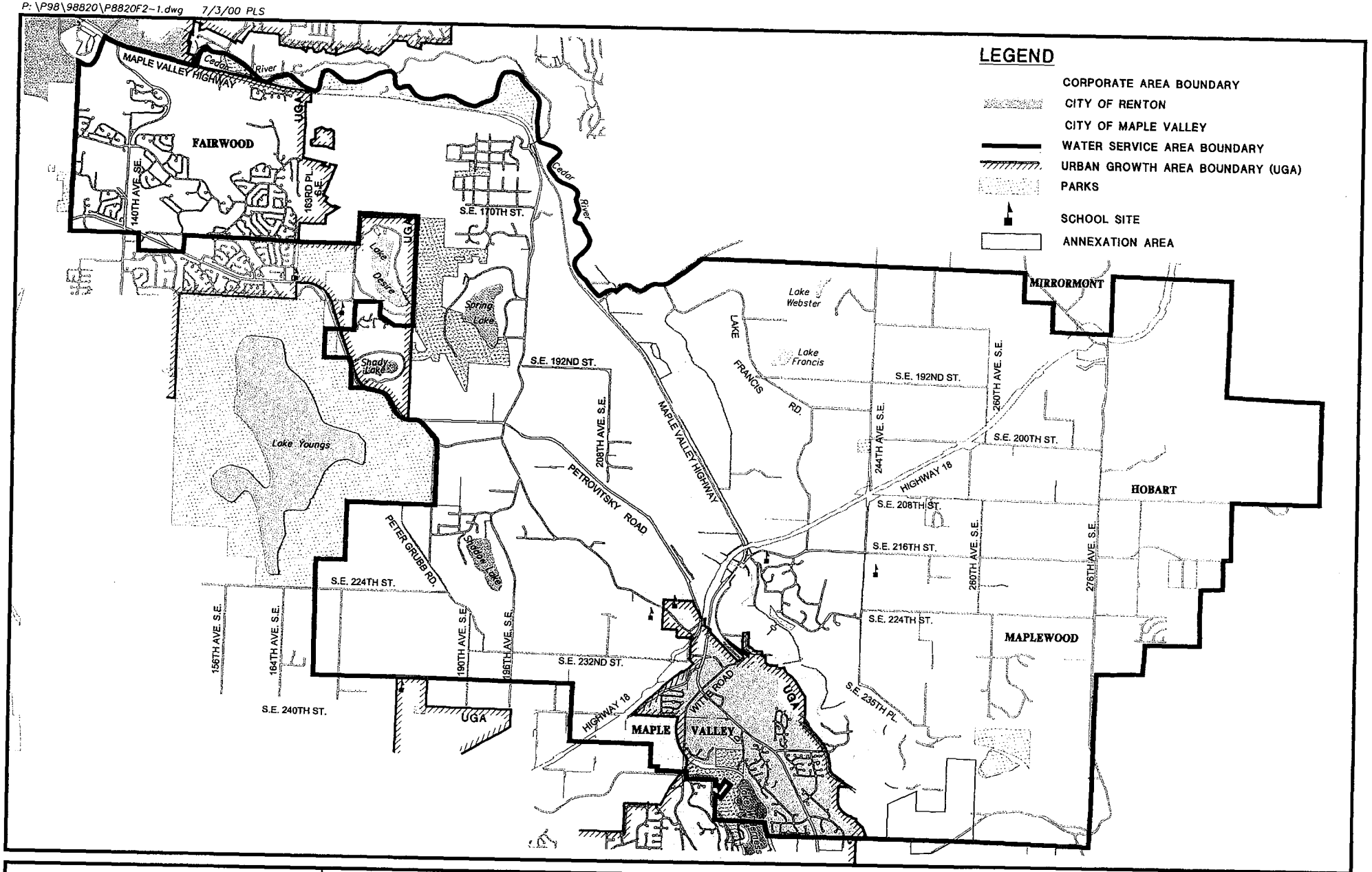

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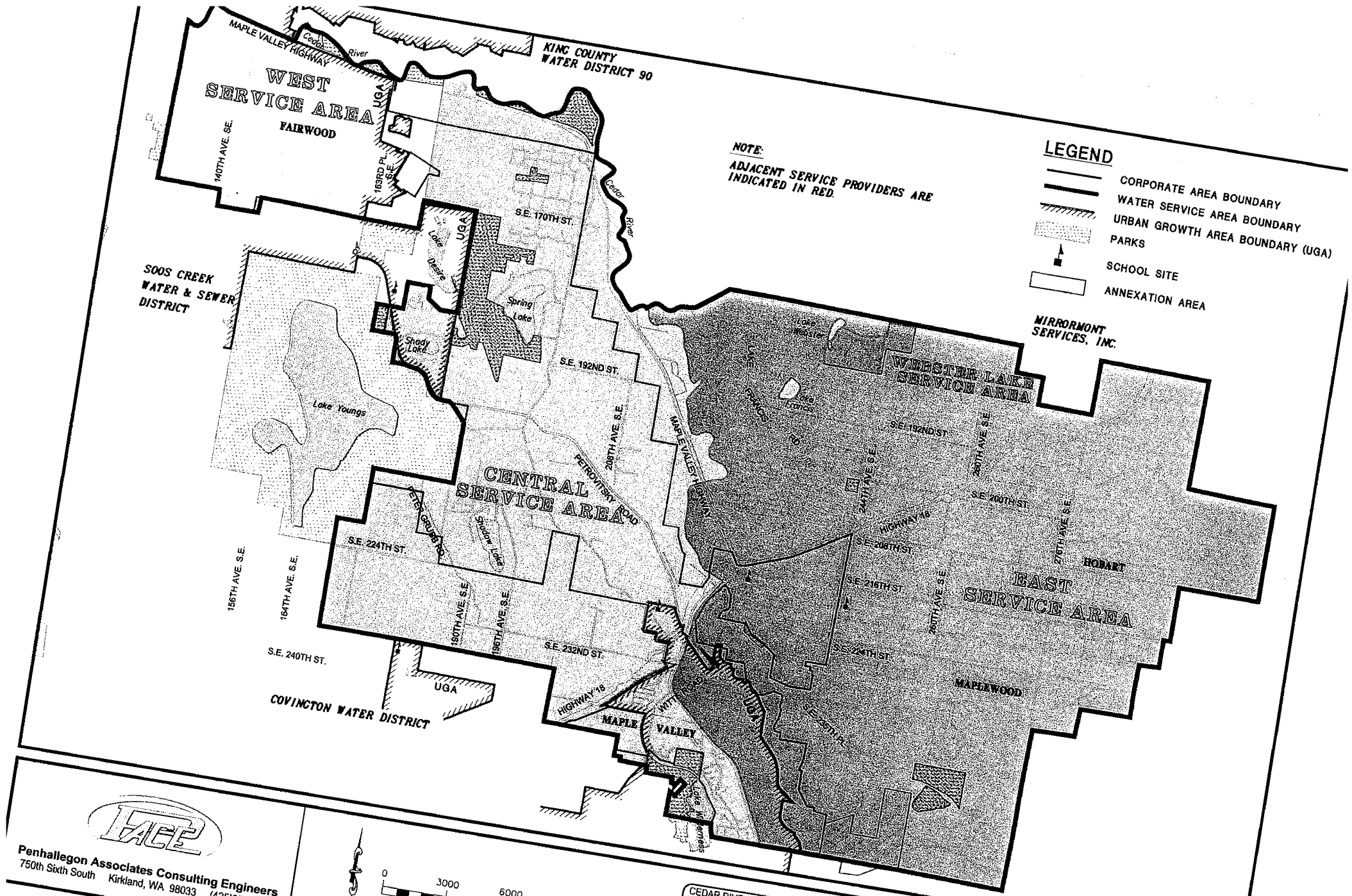
CEDAR RIVER WATER AND SEWER
CRWS

Cedar River Water and Sewer District
Comprehensive Water System Plan

District Boundary Map

Figure No.

2-1



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CEDAR RIVER WATER AND SEWER

Cedar River Water and Sewer District
Comprehensive Water System Plan

Service Area Map

Figure No. 2-2

include consideration of existing and allowable land uses in assessing domestic water and fire protection service needs.

2.4.2 Small Water Systems

The District recognizes that several private water systems and numerous individual wells serve customers within the existing corporate boundary and future service area. Although no formal plans exist for assuming responsibility for service to these areas, extension of service could be accomplished in response to a request from the individual systems currently served by other means. The costs associated with the extension of such service would be the responsibility of the property owners requesting service, as is the case for other system extensions. Known small water systems within the service area are identified in the Appendices.

2.4.3 Satellite System Management

Cedar River Water and Sewer District currently has a satellite system management policy (District Resolution No. 3277) which allows for consideration of satellite management on a case-by-case basis according to established criteria. A recommendation of this Plan is to revisit the established policy and criteria and develop a program for satellite system management appropriate for use in the event that such an arrangement is determined necessary and appropriate.

2.5 PHYSICAL CHARACTERISTICS

2.5.1 Topography

Topography in the District is generally dictated by the Cedar River, which runs north and west through the area. In general, steep slopes exist along the banks of the river. The range in elevation in the District varies between the three main areas - the West, Central, and East. In the West, the elevations range from approximately 75 feet in the flood plain along the River to approximately 580 feet. In the Central region, the elevations generally range from approximately 365 feet to 665 feet, although elevations near the Cedar River may drop beneath 365 feet. Rock Mountain, east of Lake Desire,

rises above 850 feet. The elevations in the East region vary from approximately 300 feet to approximately 600 feet for most of the area. A small portion of land in the District's eastern area reaches about 1,250 feet, the highest elevation in the District. Topography is shown on the Comprehensive Plan Map included in the Appendices.

2.5.2 Surface Water Features

The primary surface water feature in the area is the Cedar River, which runs along the northern boundary and then divides the Central and East Areas of the District. Other significant surface water bodies include Lake Youngs (the Seattle Public Utilities' primary water storage area for its Cedar River source of supply), Lake Desire, Spring Lake, Shady Lake, Peterson Lake, Lake Francis, Webster Lake, Lake Wilderness, Walsh Lake and Shadow Lake.

Wetlands and other surface water features occurring within the service area are identified in the King County Sensitive Areas Folio.

2.5.3 Climate and Rainfall

The climate of the area is characterized by mild summers and wet winters. The average annual precipitation for the area is approximately 56.5 inches, with 84 percent of the precipitation occurring from October through May. The average annual temperature in the area is approximately 49°F, which represent a range from approximately 37°F to approximately 62°F.

2.5.4 Soils

The soil formations in the area are related to the glacial activity which has occurred. A large portion of the soils present is in the Alderwood Association, which is generally characterized by moderately well drained, undulating to hilly soils that have dense, very slowly permeable glacial till at a depth of 20 to 40 inches, and is located on uplands and terraces. A small portion of the soil is in the Everett Association, which is generally characterized by somewhat excessively drained, gravely, gently undulating soils

underlain by sand and gravel located on terraces. Other soils include small areas of a variety of soils including, but not limited to, muck, silt loam, riverwash, sandy loams, and mixed alluvial land.

2.6 LAND USE AND ZONING

Cedar River Water and Sewer District land use and zoning is under the jurisdiction of King County and the City of Maple Valley. As such, land use and zoning varies between the different jurisdictions. The District is bisected by the Urban Growth Area (UGA) boundary established by King County's Countywide Planning Policies in accordance with the Growth Management Act. The UGA is critical in utility system planning because it provides a boundary within which higher densities are anticipated and an "urban" level of service is to be provided. Conversely, areas outside of the UGA are expected to be developed at lower densities and receive the appropriate level of public services. Figure 2-3 and the following paragraphs provide a general description of anticipated land uses within the service area which have been used in developing this Plan. Specific property zoning designations should be obtained from appropriate agencies having jurisdiction.

2.6.1 West Area

The West Area consists of the neighborhood center known as Fairwood. This area is generally bounded on the west, south and north by the District boundary and on the east by 172nd Avenue Southeast (west of Lake Desire). The West Area includes approximately 2,500 acres or nearly 4 square miles and is within the UGA.

The Fairwood portion of the District is predominantly single family residential with multi-family apartment complexes and commercial activity concentrated in the vicinity of the Fairwood Shopping Center at the intersection of Petrovitsky Road and 140th Avenue Southeast. North of the commercial area is the Fairwood Golf Course and associated residential community. Two mobile home parks, Valley View and Wonderland, are located in this portion of the District along the Maple Valley Highway. The Aqua Barn Ranch is located in the northwestern-most portion of the District and includes thirty-

three acres of land which is zoned neighborhood business center (north 10 acres), urban residential, 4-12 DU per acres (16 acre mid-section), and urban residential low, 1 DU per acre (south 7 acres). The Aqua Barn Ranch is currently a mixed recreational use development. Re-zoning of the property is addressed in the Second Addendum for the 1998 Amendments to the King County Comprehensive Plan, which contemplates increasing densities in the northern portion of the property. The remainder of the land in the West Area is used for farmlands, pastures, and single family residences.

2.6.2 Central Area

The District's Central Area is generally bounded by the District boundaries to the north and south, by approximately 172nd Avenue Southeast to the west and by the Cedar River and the Maple Valley Highway (State Route 169) to the east, as shown on Figure 2-2.

In general, the Central Area has remained rural in nature, with single family residences accounting for most of the District's current service connections in the area. Commercial and multi-family accounts are limited within the Central Area and are primarily located in the Wilderness Village region. Only a small area in the west part of the Central Area and the portion of the City of Maple Valley in the Central Area are within the UGA.

2.6.3 East Area

The East Area of the District consists of a portion of the area known as Maple Valley and the Maplewood area. This area is generally bounded by the District boundaries to the north, south, and east, and by the Cedar River and Maple Valley Highway (State Route 169) to the west.

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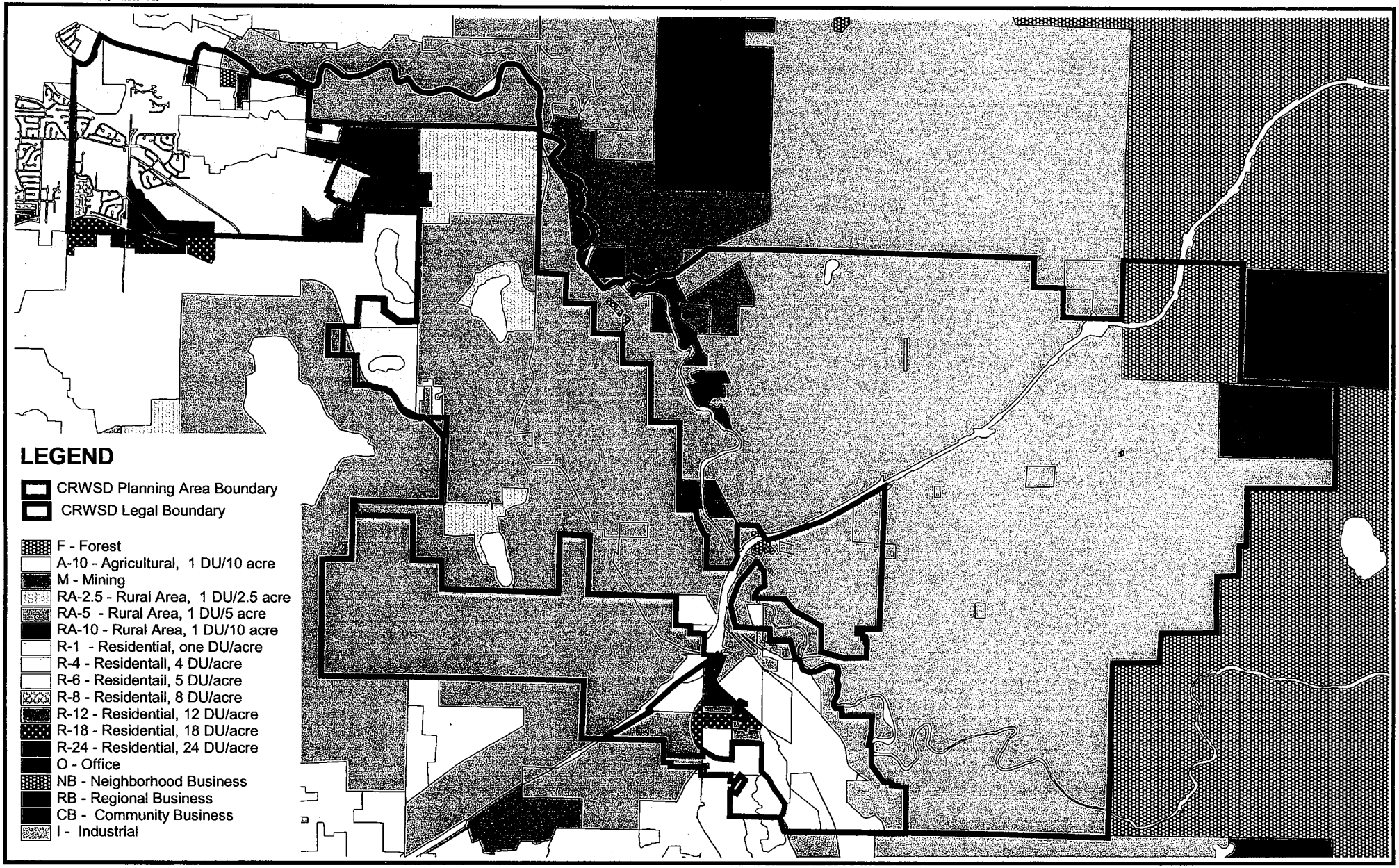

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CEDAR RIVER WATER AND SEWER

Cedar River Water and Sewer District
Comprehensive Water System Plan

Land Use Map

Figure No.

2-3

Agriculture, pastureland, woods and forest cover most of the land in the East Area. There are two main areas of activity in this region: Maple Valley and Maplewood. Maple Valley is a mixed use community which includes single-family and multi-family residences and commercial development. The Maplewood area represents Maplewood Estates, a fairly new single-family development consisting of approximately 87 homes. Although the majority of the East Area is rural in nature, the area immediately surrounding the City of Maple Valley is within the UGA.

2.6.4 Webster Lake Area

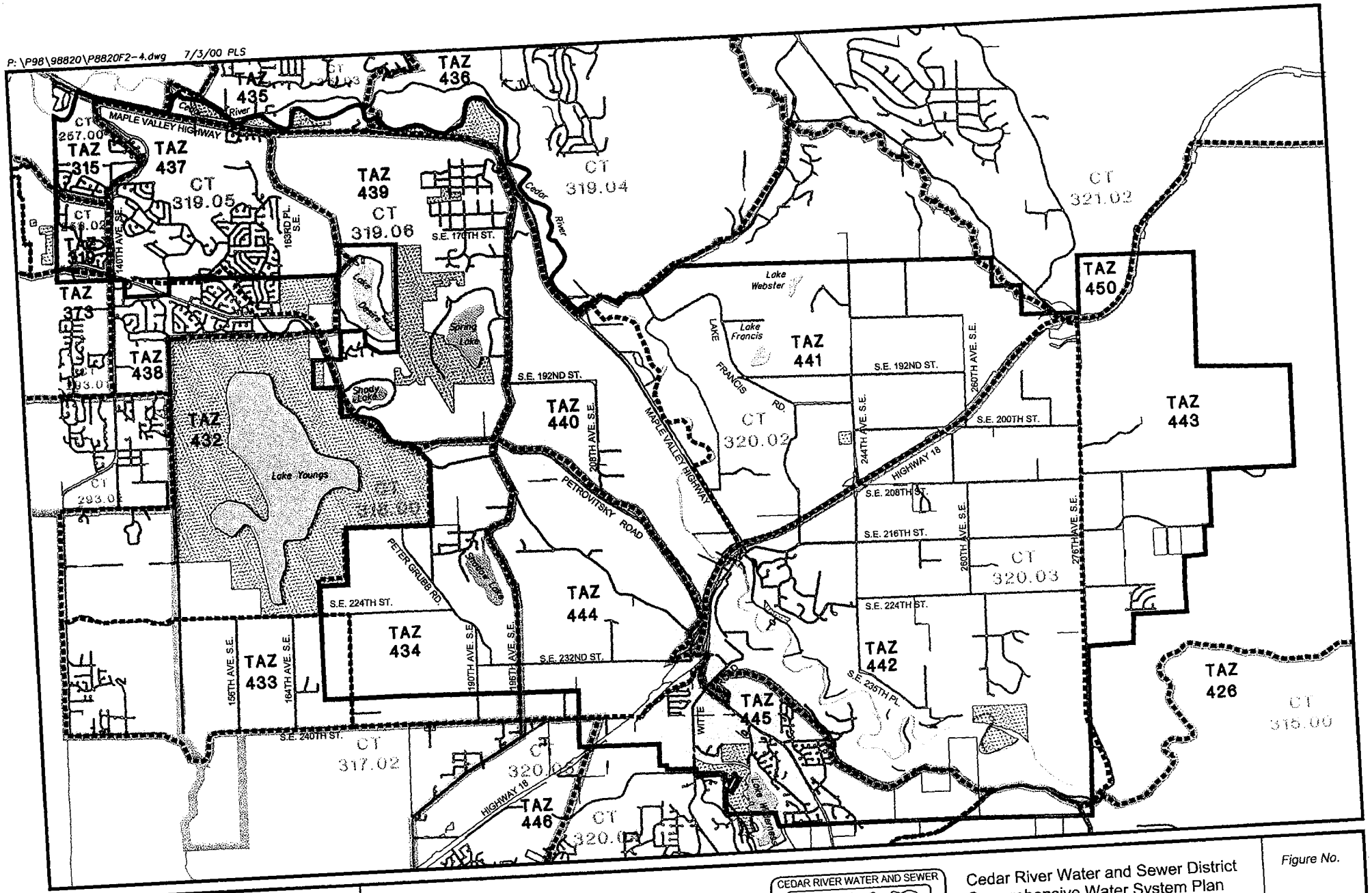
The Webster Lake area is a small area located geographically within the Central Area but referred to separately because it has an independent source of supply. The area includes two developments of large single-family residential lots. The water system was built as part of the developments and dedicated to the District after completion.

2.7 POPULATION AND EMPLOYMENT

In order to effectively assess the future water system needs of the District, it is necessary to project future population and employment for the service area. The population and employment projections are obtained by analyzing past demographic trends and by utilizing the planning data developed by the Puget Sound Regional Council (PSRC).

Table 2-1 presents a summary of the anticipated population and employment base to be served by Cedar River Water and Sewer District through the year 2020. The population projections have been developed by the Transportation Analysis Zones (TAZ's) shown on Figure 2-4. Projections have been developed using a combination of District data regarding the number and type of connections served and PSRC data regarding anticipated growth. Average household sizes used in the projections for Forecast Analysis Zones (FAZ's) were obtained from the PSRC. This FAZ data was evaluated by Census Tracts (CT) and then by TAZ's. (FAZ's are comprised of CT's which are comprised of TAZ's.) The projections have been coordinated with the planning data put forth by Seattle Public Utilities, King County, the City of Maple Valley and the State Office of Financial Management (OFM).

Because only a small portion of the District's ultimate service area is currently served, significant assumptions had to be made regarding the timing and nature of the development of the remainder of the service area and annexation of territory into the District. Key assumptions have been developed using a combination of King County land use plans and policies and known development proposals within the area. Generally, it has been assumed that development within the UGA and "four-to-one" areas within and in the immediate vicinity of the District's corporate boundary will occur soonest. This plan recognizes that a certain number of individual wells will always exist within the service area and that in the more rural eastern portion of the service area, service may not be extended until sometime after the year 2020.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TAZ 436
MAPLE VALLEY HIGHWAY
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TAZ 439
CT 319.06
CT 319.04
CT 321.02
Cedar River
S.E. 176TH ST.
140TH AVE. SE
163RD PL. S.E.
TAZ 373
TAZ 438
Lake Desire
Spring Lake
Shady Creek
Lake Webster
Lake Francis
LAKE FRANCIS RD.
TAZ 441
TAZ 450
S.E. 192ND ST.
TAZ 440
TAZ 432
Lake Youngs
CT 320.02
208TH AVE. S.E.
MAPLE VALLEY HIGHWAY
244TH AVE. S.E.
260TH AVE. S.E.
S.E. 200TH ST.
TAZ 443
HIGHWAY 18
S.E. 208TH ST.
PETROVITSKY ROAD
S.E. 216TH ST.
276TH AVE. S.E.
CT 320.03
PETER GRUBB RD.
Spring Lake
S.E. 224TH ST.
TAZ 444
TAZ 434
TAZ 442
TAZ 426
156TH AVE. S.E.
164TH AVE. S.E.
190TH AVE. S.E.
196TH AVE. S.E.
S.E. 232ND ST.
TAZ 433
S.E. 235TH PL.
WITTE
TAZ 445
S.E. 240TH ST.
CT 317.02
CT 320.01
HIGHWAY 18
TAZ 446
CT 320.0
CT 315.00
0 3000 6000
Scale in Feet
Penhallegon Associates Consulting Engineers
750th Sixth South Kirkland, WA 98033 (425)827-2014
CEDAR RIVER WATER AND SEWER
CRWS
Cedar River Water and Sewer District
Comprehensive Water System Plan
Census Tract Map
Figure No.
2-4

TABLE 2-1
CEDAR RIVER WATER AND SEWER DISTRICT
POPULATION AND EMPLOYMENT DATA BY TAZ

			1990		1998		2000		2005		2010		2020	
FAZ	CT	TAZ	POP	EMP	POP	EMP	POP	EMP	POP	EMP	POP	EMP	POP	EMP
4110	257.00	315	1,497	180	1,714	320	1,768	355	1,827	495	1,886	636	1,945	918
3416	258.00	319	1,028	148	1,120	203	1,143	216	1,185	247	1,228	278	1,325	292
3415	239.01	373	84	8	103	9	108	9	113	10	119	10	130	12
6900	315.00	426	0	0	0	0	0	0	0	0	0	0	7	0
3310	316.00	428	0	0	0	0	0	0	29	7	26	8	38	8
3413	318.00	432	5	0	6	0	6	0	12	1	11	1	16	1
		433	0	0	0	0	0	0	0	0	172	31	240	34
		434	448	1,028	525	194	544	210	706	327	1,029	561	1,674	773
4230	319.03	435	153	10	171	18	176	19	423	46	435	47	441	49
	319.04	436	0	0	0	0	0	0	180	15	185	15	188	14
3416	319.05	437	5,927	729	6,757	1,031	7,085	1,125	7,279	1,265	7,474	1,405	8,201	1,655
		438	376	19	415	29	424	32	436	36	447	40	491	46
3413	319.06	439	1,529	81	1,810	131	2,161	165	2,115	197	2,070	230	2,854	274
3330	320.02	440	490	36	590	61	615	68	1,116	133	1,079	140	1,094	150
		441	0	0	0	0	0	0	0	0	787	13	1,602	22
3320	320.03	442	543	77	652	78	679	78	1,432	170	2,893	355	3,670	472
		443	0	0	0	0	0	0	0	0	0	0	0	0
	320.04	444	429	70	584	100	623	107	736	134	966	185	1,086	216
		445	1,686	153	2,297	364	2,450	417	3,608	645	3,761	702	4,103	705
3330	320.05	446	0	0	0	0	0	0	0	0	142	6	154	7
	321.02	450	0	0	0	0	0	0	0	0	61	4	60	4
TOTAL			**15,836**	**1,640**	**16,744**	**2,537**	**17,782**	**2,802**	**21,198**	**3,729**	**24,769**	**4,668**	**29,319**	**5,654**

Source: Puget Sound Regional Council data (dated 1/99).

2.8 WATER SYSTEM DEMANDS

2.8.1 Historical Demands

To provide an overall perspective of total water consumption within the District, Tables 2-2 and 2-3 present a historical summary of the total water purchased and sold by the District for the past 5 years. Table 2-2 presents water purchase data as well as information regarding both metered and unmetered water use. Water sales data, miscellaneous water uses and unaccounted for water are also indicated. Miscellaneous water is defined as that water which is metered and billed at under a different rate structure (such as hydrant meters) and includes uses associated with system operation, construction and related activities. Unaccounted for water includes unmetered and/or unauthorized water use, leaks and breaks, fires, theft, meter inaccuracies, and other unspecified losses throughout the system. Table 2-3 presents five years of the historical water sales information by District area and customer class. Also provided are the number of connections and estimated equivalent residential units (ERUs) by District area and customer class. It should be noted that the amount of water sold to the Webster Lake area is not included in the comparison of water sold to water purchased since the area is served by an independent well source.

2.8.2 Projected Demands

Table 2-4 includes projected water demands for the Cedar River Water and Sewer District system through the year 2020. The demand projections are based on the projected rate of population and employment increases for single-family, multi-family, irrigation and commercial customers in each of the four areas of the District. Rates of increase were determined from the Puget Sound Regional Council (PSRC) projections, taking into account the percentage of population that lives within the District but is not served by the District. By applying the projected rate of increase to each customer class and by specific geographic area within the District, realistic demand projections were developed. As mentioned previously, the demand projections take into account the likelihood of continued private wells allowed on 5 acre and larger lots and anticipated development concentrations within and adjacent to the UGA. Table 2-4 also takes into

account the "Regional 1% Conservation Plan" for a total demand reduction of 10% over the next ten years. Also included in the total demand is the potential amount of water Cedar River could supply to another wholesale customer. This water would be sold through a wholesale intertie agreement approved by SPU.

2.8.3 Peaking Factors

Table 2-5 summarizes the results in Table 2-4 and also presents the projected maximum day demands and peak hour demands. The maximum day demand peaking factor was determined to be 2.25 and represents the ratio of the maximum day demand to the average day demand. The peak hour demand peaking factor of 3.5 represents the ration between the peak hour demand and the average day demand. These peaking factors are applied to the average day demands and are based on historical District water consumption data and are comparable to similarly sized and operated jurisdictions.

2.8.4 Demand Summary

From 1994 to 1997 the District experienced an increase in water sales of approximately 9% while the increase in water purchased was approximately 8%. From 1997 to 1998 water sales increased approximately 10%, due mainly to the District providing wholesale water to a neighboring jurisdiction. The percentage of unaccounted for water has remained fairly constant over the last five years, ranging from 4.7% to 7.3 %. The District's demand projections are based on the population projections and therefore, similar relative percent increases are used to project the District's future needs. An estimate of 6% has been used for unaccounted for water while the average annual increase in demand is 7%. It should be noted that the demand projections include a specific amount for potential wholesale sales through interties with other purveyors. The District acknowledges that all new interties are subject to DOH and DOE approval.

TABLE 2-2
CEDAR RIVER WATER AND SEWER DISTRICT
HISTORICAL WATER SALES AND PURCHASES

YEAR	TOTAL PURCHASE	TOTAL SALES	MISCELLANEOUS WATER	UNACCOUNTED FOR WATER	
				Quantity	%
1994	758,007 CCF 566.99 MG	688,544 CCF 515.03 MG	35,704 CCF 26.71 MG	35,579 CCF 26.61 MG	4.7%
1995	783,842 CCF 586.31 MG	720,425 CCF 538.88 MG	20,994 CCF 15.70 MG	42,423 CCF 31.73 MG	5.4%
1996	831,807 CCF 622.19 MG	747,569 CCF 559.18 MG	24,537 CCF 18.35 MG	59,701 CCF 44.66 MG	7.2%
1997	820,126 CCF 613.45 MG	750,178 CCF 561.13 MG	9,956 CCF 7.45 MG	59,992 CCF 44.87 MG	7.3%
1998	932,319 CCF 697.37 MG	828,898 CCF 620.01 MG	11,142 CCF 8.33 MG	39,349 CCF 29.43 MG	4.2%

NOTES: Miscellaneous water includes metered water uses which are not billed such as flushing and other operational uses.
Unaccounted for water includes water losses and/or unauthorized and/or metered used.

TABLE 2-4
CEDAR RIVER WATER AND SEWER DISTRICT
PROJECTED WATER DEMANDS (IN MG)

	1998 - ACTUAL			2000 - PROJECTED			2005 - PROJECTED			2010 - PROJECTED			2015 - PROJECTED			2020 - PROJECTED		
	SALES	CONN	ERUS	SALES	CONN	ERUS	SALES	CONN	ERUS	SALES	CONN	ERUS	SALES	CONN	ERUS	SALES	CONN	ERUS
WEST																		
Single-Family	206.74	2,557	2,557	209.42	2,644	2,644	205.66	2,735	2,735	206.31	2,826	2,826	214.59	2,940	2,940	222.87	3,053	3,053
Multi-Family	60.78	144	752	61.57	149	777	60.46	154	804	60.66	159	831	63.09	166	864	65.53	172	898
Commercial	32.56	59	403	34.40	64	434	38.22	74	508	42.22	85	578	46.27	93	634	50.32	101	689
Irrigation	13.84	46	171	14.02	48	177	13.77	49	183	13.81	51	189	14.37	53	197	14.92	55	204
Subtotal	313.93	2,806	3,883	319.41	2,904	4,033	318.11	3,013	4,231	323.00	3,121	4,425	338.32	3,251	4,635	353.64	3,381	4,844
gall/ERU/day			222			217			206			200			200			200
CENTRAL																		
SINGLE FAMILY	104.31	1,275	1,275	109.28	1,361	1,361	165.83	2,174	2,174	179.77	2,426	2,426	203.88	2,752	2,752	227.98	3,077	3,077
Multi-Family	1.12	1	14	1.18	1	15	1.78	2	23	1.93	2	26	2.19	2	30	2.45	2	33
Commercial	6.76	7	83	7.45	8	93	12.43	14	163	14.93	17	201	16.09	18	217	17.26	20	233
Irrigation	1.30	12	16	1.36	13	17	2.07	20	27	2.24	23	30	2.54	26	34	2.84	29	38
Subtotal	113.50	1,295	1,387	119.27	1,383	1,485	182.12	2,210	2,387	198.87	2,468	2,684	224.70	2,798	3,033	250.53	3,128	3,381
gall/ERU/day			224			220			209			203			203			203
EAST																		
Single-Family	142.22	1,446	1,446	146.87	1,524	1,524	250.13	2,730	2,730	321.53	3,610	3,610	350.45	3,935	3,935	379.36	4,260	4,260
Multi-Family	13.01	37	132	13.44	39	139	22.89	70	250	29.42	92	330	32.07	101	360	34.71	109	390
Commercial	22.86	91	232	24.05	98	250	42.55	182	464	65.59	288	736	71.07	312	798	76.54	337	859
Irrigation	9.20	30	94	9.50	32	99	16.18	57	177	20.80	75	234	22.67	82	254	24.54	88	275
Subtotal	187.29	1,604	1,904	193.87	1,693	2,012	331.75	3,039	3,621	437.34	4,066	4,911	476.25	4,430	5,347	515.16	4,794	5,784
gall/ERU/day			269			264			251			244			244			244
WEBSTER LAKE																		
Single-Family	5.24	28	28	6.60	36	36	7.33	42	42	7.11	42	42	7.11	42	42	7.11	42	42
Irrigation	0.06	2	0.33	0.06	2	0.35	0.11	4	0.63	0.14	5	0.83	0.15	5	0.90	0.17	6	0.98
Subtotal	5.30	30	28	6.66	38	36	7.44	46	43	7.25	47	43	7.27	47	43	7.28	48	43
gall/ERU/day			513			502			478			464			464			464
TOTAL - PROJECTED SALES																		
Single-Family	458.51	5,306	5,306	472.17	5,565	5,565	628.95	7,681	7,681	714.72	8,905	8,905	776.02	9,668	9,668	837.33	10,432	10,432
Multi-Family	74.92	182	898	76.19	189	931	85.14	226	1,077	92.01	253	1,187	97.35	268	1,254	102.69	283	1,320
Commercial	62.18	157	718	65.90	169	777	93.20	270	1,136	122.74	390	1,516	133.43	424	1,649	144.12	457	1,782
Irrigation	24.34	88	281	24.95	94	293	32.13	130	387	36.99	154	454	39.73	166	487	42.47	178	519
Total	619.95	5,733	7,202	639.21	6,017	7,566	839.41	8,307	10,282	966.46	9,702	12,062	1,046.54	10,526	13,058	1,126.61	11,350	14,053
gall/ERU/day			236			231			224			220			220			220
OTHER USES																		
Miscellaneous	8.34			8.90			14.22			15.87			18.00			20.13		
Unaccounted	29.43			41.41			54.55			62.77			68.02			73.28		
Wholesale Supplier (potential)	39.59			120.00			240.00			360.00			480.00			600.00		
TOTAL DEMAND	697.32			809.52			1,148.18			1,405.10			1,612.56			1,820.01		

Notes: Unaccounted for water demand assumed to be 6% of total demand (not including wholesale sales).
Projected water use for Webster Lake based on 1998 average use of 513 gall/ERU/day due to limited historical data.

SECTION 3
EXISTING WATER SYSTEM

3.1 INTRODUCTION

This Section of the Plan provides an overview of Cedar River Water and Sewer District's existing water system including source(s) of supply, storage, and transmission and distribution main characteristics. Primary system components are described according to the areas which they serve (West, Central and East). A general map showing the District's main facilities is presented as Figure 3-1. A graphical summary of the existing water system is presented on the hydraulic profiles shown in Figures 3-2 and 3-3 and shown on the Water System Plan Map included at the back of this document. Minimum design criteria is presented in Section 4 while Section 5 provides an analysis of the existing system with regards to meeting current and projected water system needs.

Cedar River Water and Sewer District is a fully metered public water system which currently (January 1999) serves an estimated population of 17,000 through approximately 5,700 connections. The District's service area is located east of the City of Renton and includes a primarily residential area of unincorporated King County and the City of Maple Valley. Although nearly 93% of the District's current accounts are single family residences, multi-family commercial and related community services such as churches and schools are also served by the District. The District maintains interties with Covington Water District which allow for transfer and/or sales of water between the two Districts.

3.2 WATER SUPPLY

Cedar River Water and Sewer District is a multiple source system which relies on two permanent and regular sources of supply (the City of Seattle regional water supply and the District's ground water well serving the Webster Lake area), and enjoys the benefit of interties with the Covington Water System. The District also maintains ground water wells in the Maplewood Estates area, although they are not currently being utilized as a permanent source of supply. These existing sources are further described in the following paragraphs and analyzed in Section 5.

3.2.1 City of Seattle Supply

The District is adjacent to the Seattle Public Utilities' Lake Youngs watershed area and currently purchases nearly all (99%) of its supply from that regional source of supply. The West Area of the system is supplied by a supply connection point (SP-W2) located in the Lake Youngs Tunnel (near Station 89 + 04 of the Lake Youngs Tunnel right-of-way). The hydraulic grade line (HGL) at this location is approximately 496 feet under static conditions. The District's Fairwood Pump Station, as described later in this Section, pumps water from the Seattle supply line into the West portion of the District. A 10-inch meter is located at the pump station and theoretically allows for approximately 2,500 gpm of supply capacity.

The Central and East Areas of the District are supplied through a connection to the Seattle system located at 19201 Petrovitsky Road Southeast. This connection (SP-C2) was constructed in 1992 and the hydraulic grade line of this facility is approximately 640 feet. The District's Central Pump Station boosts water from the Seattle system into the Central Area's distribution system. A 10-inch sonic meter from Seattle serves the area and allows for an estimated supply capacity of approximately 2,500 gpm at 10 fps. Since 1988, the Wilderness Village portion of the East Area has been consolidated with and supplied by the Central Area. Shortly thereafter, in 1989, the supply was extended further east to include the subdivision of Maplewood Estates, which had previously been supplied by a ground water well. Additional information regarding the Maplewood well and the booster station which currently allow for service to this area is provided later in this Section.

A third connection (SP-C1) to the Seattle system is located near 141st Avenue Southeast and Southeast 171st Way on the Lake Youngs pipeline right-of-way. This connection was the District's original supply connection until the SP-W2 connection described above was constructed and is currently maintained as a gravity fed emergency backup supply to the West area of the District. As detailed in Table 3-1, this connection is capable of supplying approximately 2,000 gpm.

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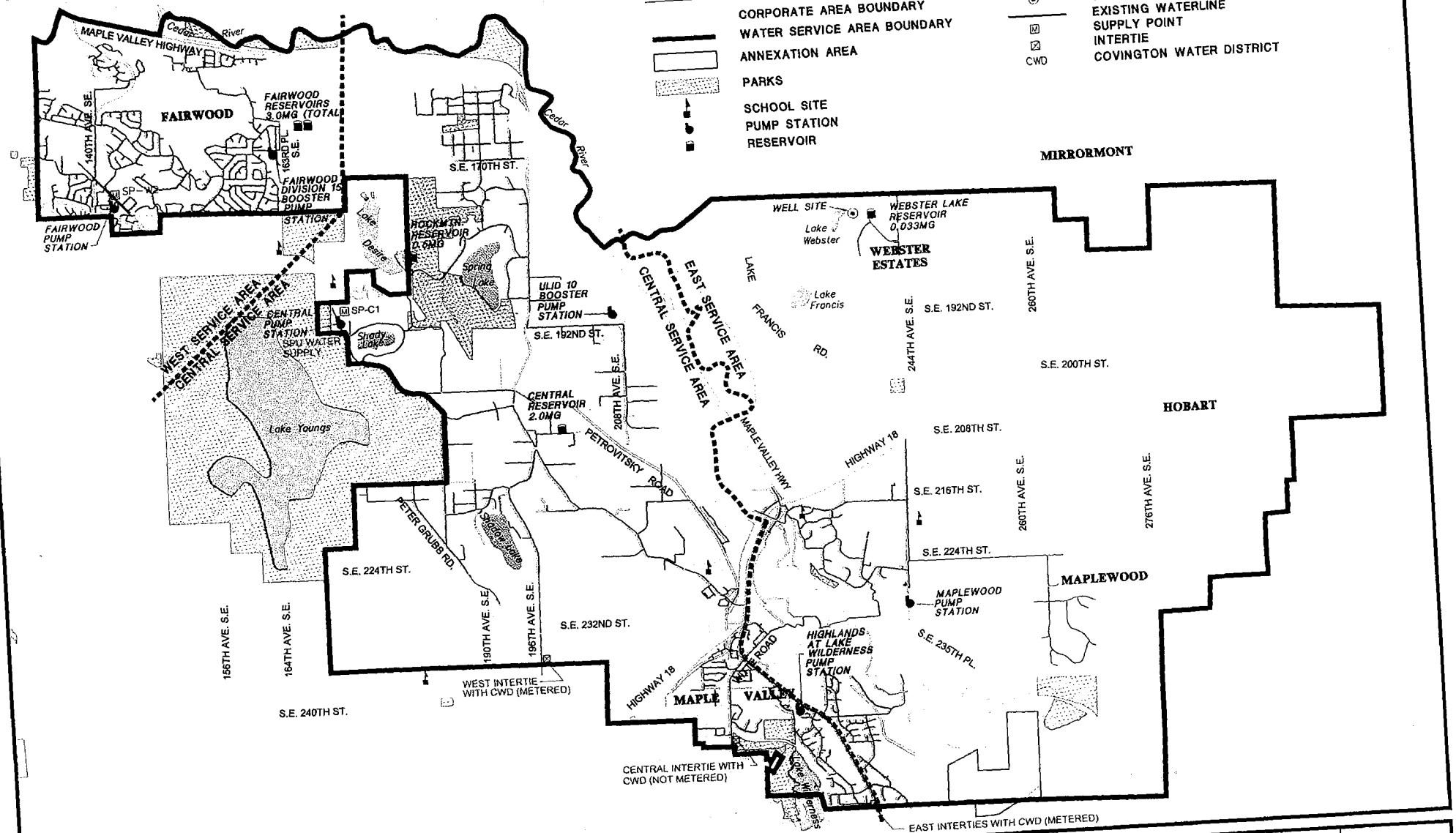

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0 3000 6000
Scale in Feet

CEDAR RIVER WATER AND SEWER
CRWS

Cedar River Water and Sewer District
Comprehensive Water System Plan

System Facilities Map

Figure No.
3-1

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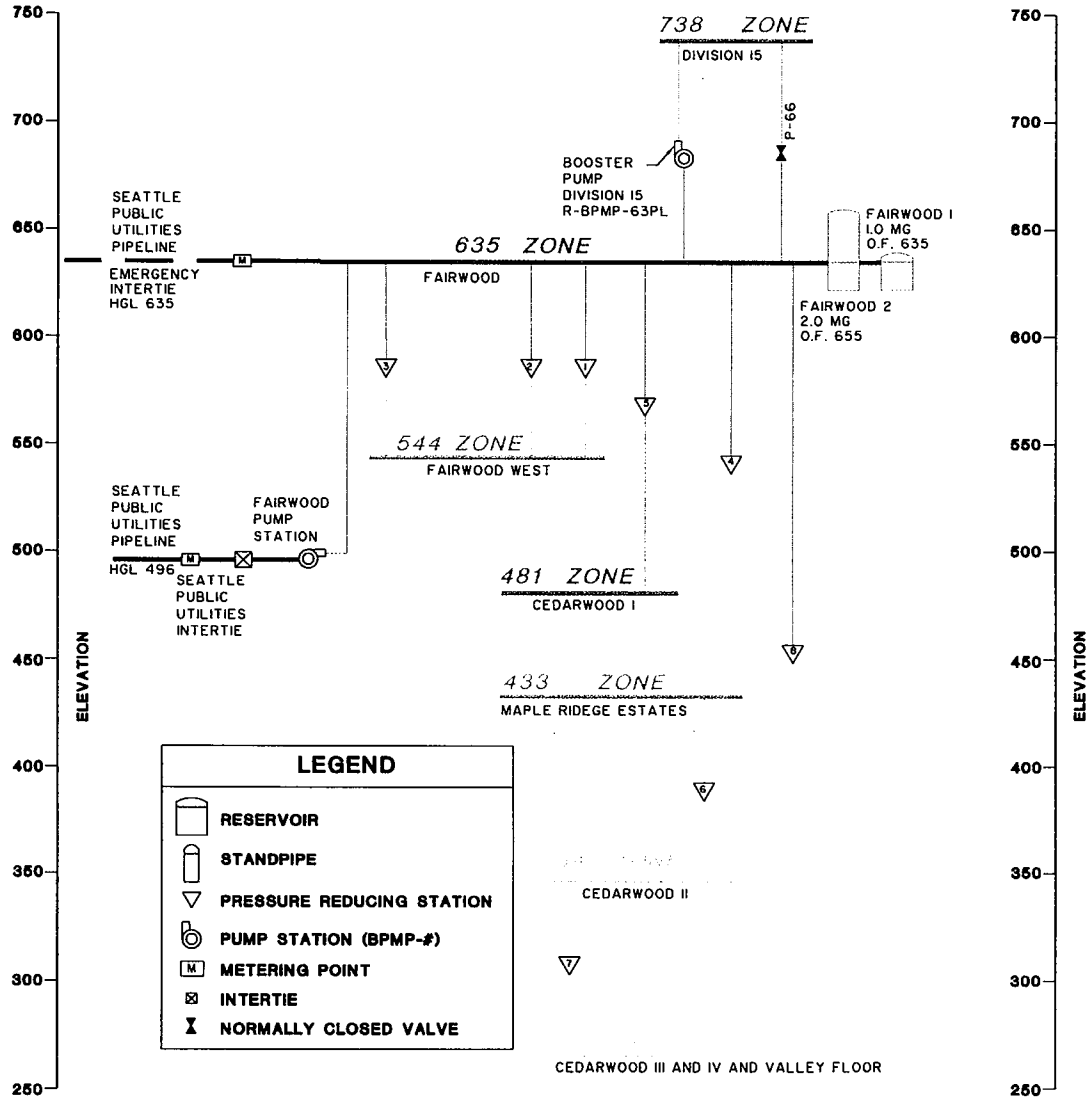

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CEDAR RIVER WATER AND SEWER

Cedar River Water and Sewer District
Comprehensive Water System Plan

West Hydraulic Profile

Figure No. 3-2

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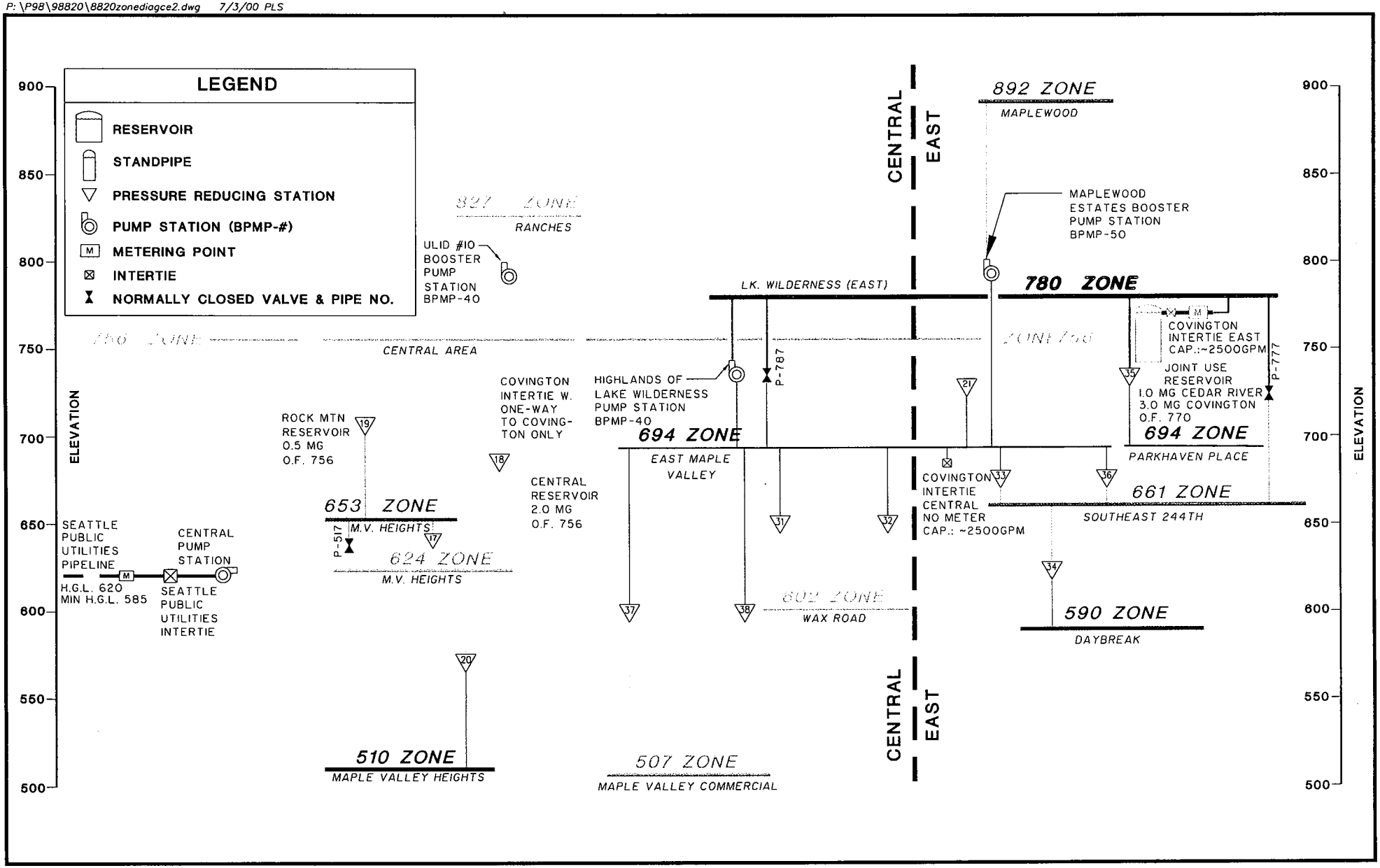

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CEDAR RIVER WATER AND SEWER

Cedar River Water and Sewer District
Comprehensive Water System Plan

Central-East Hydraulic Profile

Figure No. 3-3

3.2.2 Ground Water Wells

In 1996, the Webster Lake water system, which includes a ground water supply well, was completed. The well is located at 18302 240th Avenue Southeast. As indicated on the ground water permit (Permit No. G1-26357P) included in the Appendices, this facility is approved for 60 gpm and approximately 17 acre feet per year. In 1998, the well supplied 32 single family residences with approximately 7,100 CCF of water, or less than one percent of the District's total demand. The District has applied to DOE for a transfer of water rights to this well but no decision has been reached.

Additional ground water wells are located in the Maplewood Estates area (22704 262nd Avenue Southeast). The wells are currently not being utilized as a permanent source of supply but retain water rights for 160 gpm (34.0 acre feet per year). A copy of the water rights certificate (G1-23937C) is contained in the Appendices.

3.2.3 Interties

The District currently maintains two source of supply connections and one emergency supply intertie with the Seattle system. In addition, there are four interties between the Central and East Areas of the District and the Covington Water system. As described in Table 3-1, these connections provide for two way flow between the distribution systems. These also provide an interconnection with the reservoir jointly owned by Cedar River Water and Sewer District and Covington Water District. Cedar River owns one million gallons of capacity in this facility which is located within the Covington service area.

TABLE 3-1
CEDAR RIVER WATER AND SEWER DISTRICT
WATER SUPPLY AND INTERTIE CONNECTIONS

TO/WITH	LOCATION	METER SIZE	APPROX. CAPACITY (gpm)	HGL AT SUPPLY	AREA SERVED	PURPOSE & COMMENTS
Seattle (SP-W1)	141st Ave SE & SE 171st Way	8"	2,000	635'	W	Emergency use only (manual)
Seattle (SP-W2)	Lake Youngs Tunnel Right-of-Way Station 89 + 04	10"	3,000	620' (585' MIN)	W	Source of Supply
Seattle (SP-C1)	19201 Petrovitsky Rd. SE	10"	2,500	496' (470 MIN)	C-E	Source of Supply
Covington-West	23515 196th Ave. SE	8"	3,000	600'	C	One-Way to Covington
Covington-Central	Witte Rd. & SE 248th St.	NA	2,500	770'	C-E	No meter
Covington-East	25601 SR 169	12"	2,500	770'	C-E	Metered both ways

3.3 WATER STORAGE

Cedar River Water and Sewer District currently owns and operates five separate storage reservoirs and owns additional capacity in a reservoir which is jointly owned and maintained by Covington Water District. The combined storage capacity in the six reservoirs is 6.533 million gallons. Each reservoir is described below by location within the District and are described in detail in Table 3-2.

3.3.1 West Area

The West Area of the District is currently served by two reservoirs with a combined capacity of 3.0 million gallons. A 1.0 million gallon concrete reservoir (Fairwood 1) was built in 1970 and has an overflow elevation of 635 feet. In 1976, the District purchased

a surplus 2.0 million gallon steel reservoir (Fairwood 2) and located it next to the Fairwood 1 reservoir. The Fairwood 2 reservoir has an overflow elevation of 655 feet. The two reservoirs are run in parallel with the Fairwood 2 reservoir being controlled by telemetry controlling pumps and lever transmitter and the Fairwood 1 reservoir being controlled by altitude valves. At that point, an altitude valve shuts off the flow into the Fairwood 1 reservoir. Fairwood 2 reservoir continues to fill until elevation 655 is reached and an altitude valve shuts off the flow. Similarly, the Fairwood 2 reservoir empties until elevation 635 is met and the two reservoirs then empty simultaneously. Specific information regarding these reservoirs is provided in Table 3-2.

3.3.2 Central and East Areas

In 1966 the District obtained a Housing and Urban Development Grant to construct a 0.5 million gallon reservoir on Rock Mountain. This facility has an overflow elevation of 756 and serves the area within the District in the vicinity of Spring Lake and Shady Lake. An additional 2.0 million gallon reservoir (Central Reservoir) was constructed in 1984 and also has an overflow elevation of 756. This facility is located in the central portion of the Central Area and currently serves both the Central and East Areas of the District.

3.3.3 Webster Lake Area

A 33,000 gallon reservoir was constructed in 1997 to serve the Webster Lake area. This concrete facility stores water from the Webster Lake well and was designed to serve two specific residential developments consisting of a maximum of 42 homes.

3.3.4 Covington/Cedar River Joint Use Reservoir

In 1993, a 4.0 million gallon joint use reservoir was constructed with Covington Water District. The agreement for the joint use reservoir gives Cedar River Water and Sewer District the top 1.0 million gallons of water in the reservoir (from the overflow elevation of 770 feet to approximately 763 feet). Water beneath this elevation is considered unusable because it would require pumping to bring it into the Cedar River Water and

Sewer District system. The primary purpose of this facility to supply the Central and East Areas with an emergency supply for fire flow and high demand periods.

TABLE 3-2
CEDAR RIVER WATER AND SEWER DISTRICT
WATER STORAGE FACILITIES

RESERVOIR NAME LOCATION	SIZE (MG)	YEAR BUILT	OVER-FLOW ELEV.	DIMEN-SIONS	MATERIAL	AREA SERVED
Fairwood 1 16802 SE 165th St.	1.0	1970	635	93' DIA 20' HIGH	Concrete	West
Fairwood 2 16802 SE 165th St.	2.0	1976	655	93' DIA 40' HIGH	Steel	West
Rock Mountain 18059 E. Lake Desire Rd.	0.5	1966	756	48' DIA 40' HIGH	Steel	Central & East
Central 20015 SE 206TH Ave. SE	2.0	1984	756	68' DIA 80' HIGH	Steel	Central
Lake Webster Estates 18302 240th Ave. SE	0.033	1993	683.50	26' DIA 10' HIGH	Concrete	Webster Lake (East)
Covington/Cedar River 27033 262nd SE	1.0 (CR) 4.0 (Total)	1993	770	158' DIA 28' HIGH	Steel	Central & East
A 600,000 gallon reservoir is currently being designed for the MaGarvey Park development, which is located in the Central Area of the District. It is anticipated that the reservoir will be completed by 2005.						

3.4 PUMPING FACILITIES

Elevations within the District necessitate pumping of supply into the District's system, as well as for moving the water supply throughout the transmission and distribution systems. The hydraulic profiles shown on Figures 3-2 and 3-3 at the beginning of this Section provide an overview of the pumping required within each area of the District. Additional information regarding the specifics of each pump station is provided in Table 3-3. A general summary of pumping facilities and characteristics is contained in the following paragraphs:

3.4.1 West Area Pumping Facilities

The West Area has three pumping facilities. The Fairwood Pump Station is used to pump water from the Seattle Public Utilities metering location to the Fairwood reservoirs, located at a hydraulic grade of 635 feet. The Fairwood Division 15 booster pump station pumps water from a hydraulic grade of 635to a 738 zone to serve less than 20 single-family residential connections near Petrovitsky Park. The District also maintains a pump station near the two Fairwood reservoirs. This station is used to pump water to commercial buildings owner by the Kent School District and located northwest of Lake Desire between 163rd Place Southeast and 174th Avenue Southeast.

3.4.2 Central Area Pumping Facilities

The Central Area has three pumping facilities. The Central Pump Station is located at the SP-C1 Seattle Public Utilities' metering locations within the District (located near 141st Avenue Southeast and Southeast 171st Way). This metering location is at a hydraulic grade of approximately 620 feet and the station pumps water to the 756 zone. From the 756 zone, the ULID 10 Booster Pump Station pumps water to the 827 zone to serve the Ranches Development near Southeast 192nd Street and 208th Avenue Southeast. The East Lake Wilderness region in the 780 zone is served via the Highlands of Lake Wilderness Pump Station located in the 694 zone.

3.4.3 East Area Pumping Facilities

The District maintains one pump stations in the East Area. From the 694 zone, the Maplewood Estates Booster Pump Station supplies water to the area for which it was named in the 892 zone. There is also a fire pump at this location.

TABLE 3-3
CEDAR RIVER WATER AND SEWER DISTRICT
BOOSTER PUMP FACILITIES

NAME	LOCATION	AREA	NO. PUMPS	PUMP MAKE & MODEL	YEAR BUILT	MOTOR TYPE & PHASE	MOTOR VOLTAGE & RPM	HORSEPOWER & MANUFACTURER	GPM	GPM @ HEAD	RPM	CONTROLLER TYPE	TDH	PIPE SIZE
Fairwood Pump Station	14400 SE 171st Way	W	2	Submersible 4 Stage, Byron Jackson 12MQH 45TG	1981, Updated 1999	Variable Speed, 3phase	460 V 1800 RAM	100 HP Byron Jackson	1500 (#1) 1500 (#2)	1600 @ 160	1765	DC drive VFD, Robicon, 3 phase	300'	10" Out
Fairwood Division 15 Booster	16729 163rd Place SE	W	1	Centrifugal Peerless, PV	1979, Update Pump & Controller 2/94	Variable Speed, 3phase	230 V 3450 RAM	10 HP Baldor			3450	DC Drive VFD Allen Br., 1 phase		2" in 2" out
Fairwood Reservoir Booster (SKCACC)	16802 SE 165th St	W	1	Multistage Peerless, J100	1979, Updated Pumps & Controllers 1995	Single Speed, 1phase	230 V 3450 RAM	3 HP Baldor	30	30 @ 200	3450	Pressure Control On/Off, 1phase	200'	2" in 1.5" out
Central Pump Station Pumps 1 & 2	19201 SE Petrovitsky Rd	C	2	Centrifugal Peerless 6AE14	Spring 1993	Variable Speed, 3phase	460 V 1780 RAM	100 HP US Motor	1000+ each	1500 @ 190	1780	DC drive VFD, Robicon, 3 phase	195'	6" in 6" out
Central Pump Station Pump 3	19201 SE Petrovitsky Rd	C	1	Centrifugal Peerless 6AE11	Sept. 1997	Variable Speed, 3phase	460 V 1780 RAM	100 HP Baldor	1000+	1500 @ 190	1780	DC drive VFD, Robicon, 3 phase	195'	6" in 6" out
ULID 10 Booster	19230 208th Ave SE	C	1	Centrifugal Peerless, C820AM	1985, Update Controller 3/95	Variable Speed, 3phase	230 V 3450 RAM	15 HP US Motor	250	250 @ 150	3450	DC Drive VFD Allen Br., 1 phase	150'	2" in 2" out
Highlands of Lake Wilderness Booster	24391 321st Ave SE	C	2	Centrifugal Peerless 2AE11	1991, Update Motor & Controller 1995	Variable Speed, 3phase	460 V 3520 RAM	20 HP Magnetek	260 each	260 @ 140	3520	DC Drive VFD Allen Br., 3 phase	140'	3" in 2" out
Webster Lake Estates Booster	18302 240th Ave SE	WL	2	Centrifugal Peerless, PV	Fall 1996	Variable Speed, 3phase	230 V 3470 RAM	7.5 HP Marathon	95 each	95 @ 175	3450	DC Drive VFD Allen Br., 1 phase	175'	2" in 2" out
Maplewood Pump Station (Domestic Booster)	22707 262nd Ave SE	E	1	Centrifugal Aurora 413BF	1989, Update Motor & Controller 1995	Variable Speed, 3phase	460 V 3520 RAM	40 HP Marathon	140	140 @ 190	3250	DC Drive VFD Allen Br., 3 phase	190'	3" in 2" out
Maplewood Pump Station Auxiliary ("Fire Pump")	22707 262nd Ave SE	E	1	Centrifugal Aurora 411BF	Spring 1989	Diesel, Full Speed	--- 1750 RPM	Detroit Diesel	1000	1000 @ 225	1750	Fire Panel, Single phases	225'	6" in 4" out

3.5 TRANSMISSION AND DISTRIBUTION

As discussed earlier, from both an operational and physical standpoint, there are three primary areas of the District: the West, East and Central Areas. The following descriptions provide an overview of the transmission and distribution facilities serving each area. Table 3-4 provides a summary of the existing system by pipe size and pipe type while the following descriptions provide an overview of how the system is operated.

The District currently maintains 21 pressure reducing valves (PRVs) throughout the distribution system. The PRVs range in size from 2-inches to 12-inches in diameter and interconnect the District's 20 separate pressure zones and maintain an acceptable range of pressures throughout the system. Table 3-5 provides an overview of the pressure reducing valves within the system.

3.5.1 West Area

The West Area transmission and distribution system is comprised of pipes ranging in size from 4-inches to 18-inches and is constructed of a variety of materials, as detailed in Table 3-4. The pipes in the West Area are approximately 38% asbestos cement, 32% ductile iron, 14% cast iron and 16% PVC. There are seven separate pressure zones within the West Area of the District, ranging in hydraulic grade line (HGL) from 266 feet to 738 feet and serving elevations from approximately 75 feet in the low lying flood plains adjacent to the Cedar River to approximately 580 feet on the plateau. These facilities serve primarily single-family residential uses although Fairwood Shopping Center, the Fairwood Golf Course and two mobile home parks are also located within the West Area.

3.5.2 Central - East Area

The Central and East Area transmission and distribution system is comprised of pipes ranging in size from 2-inches to 20-inches which are constructed of the same variety of materials used in the West Area. The pipes in this area are approximately 36% asbestos cement, 53% ductile iron, 11% PVC and less than 1% cast iron. There are 12 separate pressure zones within the Central and East Areas ranging from a hydraulic grade line of

507 to 892. The rolling topography in the Central and East Areas, excluding isolated high elevations, ranges from approximately 300 feet near the Cedar River to approximately 665 feet. The Central - East Area is mainly rural in nature with single-family residence accounting for most of the connections.

3.5.3 Webster Lake Area

Two single-family developments were built in the Webster Lake Area around 1996. The mains in this area are all 8-inch ductile iron. There are no PRVs in this area.

When the system was designed, the developments were exempt from fire flow requirements per King County Ordinance #5828, Section 4 (the Webster Lake Design Report is on file at the District office). Although there are no hydrants in the area, they can easily be added to the 8-inch mains throughout the system. To fight fires in the area, the fire department has tanker trucks which carry enough water to extinguish a normal sized house fire. Once the tanker trucks use their water supply, they must travel approximately 1.5 miles south to Highway 18 to refill the trucks at a District hydrant. For additional fire protection, several of the residences have sprinkler systems.

TABLE 3-4
CEDAR RIVER WATER AND SEWER DISTRICT
PIPE INVENTORY BY SIZE AND TYPE (IN LINEAR FEET)

WEST AREA

PIPE DIAMETER (INCHES)	ASBESTOS CEMENT	DUCTILE IRON	CAST IRON	PVC	TOTAL
4	2,650				2,650
6	32,500				32,500
6		3,400	11,400	6,550	21,350
8	18,250	17,800	3,400	11,700	51,150
10		2,800	1,700	1,100	5,600
12	3,150	22,600	4,900	5,050	35,700
14		1,250			1,250
16		400			400
18		300			300
Total West Area	**56,550**	**48,550**	**21,400**	**24,400**	**150,900**

CENTRAL AND EAST AREAS

PIPE DIAMETER (INCHES)	ASBESTOS CEMENT	DUCTILE IRON	CAST IRON	PVC	TOTAL
2		350			350
3		2,200		2,300	4,500
4	4,600				4,600
6	29,000	3,100		1,300	33,400
8	40,600	114,650		16,100	171,350
10	3,750	1,800			5,550
12	38,900	46,600	700	17,350	103,550
16	1,250	7,250			8,500
Total Central & East Area	**118,100**	**175,950**	**700**	**37,050**	**331,800**

Note: Inventory based on system hydraulic model (approximate system in 1995 - to be updated for final plan).

TABLE 3-5
CEDAR RIVER WATER AND SEWER DISTRICT
PRESSURE REDUCING VALVES

NUMBER	LOCATION	SIZE	MAKE	MODEL	INITIAL PRESSURE SETTING (PSI)	ELEVATION (FEET)
W-1	13806 SE 161ST Pl.	6" 2"	Cla-Val Cla-Val	90G-01ABCS 2-90-01AS	37	452
W-2	13804 Fairwood Blvd.	6" 2"	Cla-Val Cla-Val	90G-01ABC 90G-01AS	48	433
W-3	13414 SE 168th St.	8"	Cla-Val	8900-01AE	46	405
W-4	14048 SE 158th Pl.	8"	Roll-Seal		62	290
W-5	15789 142nd Pl. SE	8" 2"	Cla-Val Cla-Val	690-01AB 2-90-01AS	58	347
W-6	140th Ave. SE & SE 154th Pl.	12" 2"	Cla-Val Cla-Val	12-690-01AB 2-90-01AS	58	213
W-7	140th Ave. SE & SR 169	12" 3"	Cla-Val Cla-Val			
W-8	15711 152nd Ave. SE	8"	Roll-Seal		60	128
C-17	18843 SE 163rd	6" 2"	Cla-Val Cla-Val	6-690-01AS 2-90-01AS	55	495
C-18	19032 SE 170th	6" 2"	Cla-Val Cla-Val	690-01AB 2-90-01AS	44	523
C-19	16310 188th Ave. SE	8" 2"	Cla-Val Cla-Val	No Tag 2-90-01AS	54	528
C-20	16120 193rd Ave. SE	6" 2"	Cla-Val Cla-Val		55	383
C-21	SE 231st St. & Hwy 18	12"	Roll-Seal		123	410
E-31	22023 Wax Rd.	8" 2"	Cla-Val Cla-Val	8-906-01ABKC 2-100-01	83	410
E-32	21927 SE 237th St.	8" 2"	Cla-Val Cla-Val	8-69001ABCS 2-90-01AS	75	400
E-33	SR 169 & 244th St.	8" 2"	Cla-Val Wilkens	8-90-01AB Wilkens	54	536
E-34	24225 242nd Way SE	8" 2"	Cla-Val Cla-Val	8-900-1ABCS 2-90-01AS	45	486
E-35	228th Ave. SE & SE 242nd Pl.	6" 2"	Cla-Val Cla-Val	6-90-01AB 2-90-01AS	68	538
E-36	237th Ct. SE & SE 251st St.	8" 2"	Cla-Val Wilkens	8-690-GOFAB Wilkens	59	525
E-37	23125 SE 216th St.	8"	Roll-Seal	08-S-E7-L-15	44	405
E-38	230th Ave SE & SE 218th St.	8"	Roll-Seal	08-S-E7-L-15	30	430

3.6 TELEMETRY SYSTEM

The District's telemetry system was upgraded in 1990, 1992 and 1999 and is a computerized monitoring system which allows for remote control of the District's two primary supply points from the Seattle system, pump stations and reservoirs. Functions monitored by the telemetry system include pump operation, pressure readings, flow measurements, intrusions, flooding, low fuel levels, and power and/or communication failure.

SECTION 4
MINIMUM DESIGN CRITERIA

4.1 INTRODUCTION

The concept and utilization of minimum design criteria are important to proper planning, design and operation of a water system. It is also paramount to the evaluation of the existing water system in order to determine present deficiencies and future improvement requirements. Cedar River Water and Sewer District operates within unincorporated King County and within the limits of the City of Maple Valley. As such, it is important that the District's standards be consistent with the requirements of these jurisdictions. The District must also comply with the minimum design criteria and standards put forth by the State of Washington Department of Health.

This section of the Plan summarizes the minimum design criteria used for system evaluation and design. The following water system components are addressed in this Section:

- Source and Supply,
- Transmission System,
- Distribution System,
- Storage, including equalizing, standby and fire storage,
- Water Quality,
- Control Systems, and
- Auxiliary Power Requirements.

4.2 STANDARDS AND REGULATIONS

A summary of the various regulations, standards and requirements utilized in development of performance and design criteria for the District is summarized in the following paragraphs. The performance and design criteria established for the District were selected and developed for consistency with the below described standards and to realistically address the needs and

characteristics of the District's current and future water system.

4.2.1 State Regulations

The State of Washington Department of Health's (DOH) "Water System Design Manual" (June 1999) is the primary document governing the sizing and design of public water systems in the State of Washington. This publication puts forth the minimum system, planning, and reliability considerations for operation of a public water system.

4.2.2 East King County Coordinated Water System Plan

The East King County Coordinated Water System Plan (CWSP) contains minimum design criteria standard requirements for those water service providers which are within the Critical Water Supply Service Area (CWSSA) established for the Plan. Cedar River Water and Sewer District is within said CWSSA and therefore subject to the minimum requirements put forth by the CWSP. The CWSP standards have been considered and incorporated into the minimum design criteria put forth herein.

4.3 REFERENCE DATUM

The datum used for planning of facilities in this study and for District water system design work is based on the King County Aerial Survey (KCAS) NAD 83/91.

4.4 DESIGN PERIOD

The period of design for this study is approximately 25 years. Although some of the facilities proposed herein may have reached capacity within the estimated design period, others will have much longer useful lives and will continue to provide adequate service to the community far beyond the specified design period. For example, new ductile iron pipes should have a useful life of 50 years or more while pumps/motors and electrical equipment may have a useful life of 15 years or less.

In planning water facilities with capacities adequate for the next 25 years, it is often necessary to accomplish development of the water system in phased segments according to established regional and localized needs.

4.5 WATER SUPPLY REQUIREMENTS

- The minimum source requirement standard has historically been 800 gallons per connection, or Equivalent Residential Unit (ERU), per day or as otherwise documented by the District and approved by the State Department of Health (DOH). The recently published DOH "Water System Design Manual", however, recommends a source capacity that allows the supply to meet the maximum day demand of the system while concurrently replenishing the depleted fire suppression storage within 72 hours. Section 5 of this Plan provides additional documentation regarding the maximum day demand and source of supply requirements for the District.

4.6 WATER PRESSURE

- New water mains or additions to existing mains shall provide an adequate design quantity of water at a positive pressure between 30 and 100 psi under peak hourly design flow conditions measured at any customer's water meter.

- The distribution system shall be designed to provide the required fire flow demands while providing pressures of at least 20 psi throughout the system during peak hourly design flow conditions.

- All new facilities should be designed to provide a minimum pressure of 40 psi at the customer meter under static conditions.

- Distribution system pressures of up to 100 psi are acceptable in small, low-lying areas not subject to high flow rates and surge pressures. However, when static pressures exceed 80 psi, individual pressure reducing valves (PRV's) are required on individual service lines in order to protect plumbing from excessively high pressures and to reduce water loss due to leakage. Individual PRVs shall be provided and maintained by the customer according to the Uniform Plumbing Code.

4.7 PIPE SIZING AND MATERIALS

- The size of distribution mains shall be such that the velocity will not exceed 8 feet per second under peak hourly demand conditions. Maximum velocities of 10 feet per second may occur under fire flow conditions or for short sections of main.

- Minimum pipe diameter is 8-inches nominal inside diameter, or as hydraulically justified by the District to accommodate domestic water and fire protection service.

- Water quality considerations must be taken into account when sizing pipelines. Looping of water mains shall be accomplished where feasible. Dead-end mains shall be avoided if at all possible.

- Pipe materials shall be cement lined, Class 50 (minimum), ductile iron pipe unless otherwise approved. All materials shall meet the accepted standards of the water works industry as specified by authorities such as the American Society for Testing and Materials (ASTM), the American Water Works Association (AWWA), and the American Public Works Association (APWA).

- Water system pipelines shall be constructed of "lead free" materials which have a lead content of less than 8%.

- Pipe fittings must be cement lined cast iron or ductile iron.

- Water source pumping facilities and storage facilities must be designed so that, in combination, they can supply the peak hourly demand in all parts of the system at a minimum pressure of 30 psi.

- Polyethylene encasing or cathodic protection shall be utilized as determined by the District in areas of corrosive soil conditions which may affect the life of the pipelines.

- Actual water main sizes must be established by the District and may require hydraulic network modeling.

- Fire flow modeling must be performed under the conditions of maximum day demand, maintaining a minimum system-wide pressure of 20 psi.

- Pipeline placement and pipe cover shall be as established in paragraph 4.14 of this section.

4.8 VALVES

- Valving shall be installed in a configuration which permits the isolation of lines for repair, while keeping as many customers as possible in service when performing repairs, flushing, new construction cut-ins or other operations.

- The maximum distance between valves shall be 800 feet.

- Additional valves may be required in order to assure the capability to isolate water mains for repairs, replacements or new connections and will be determined by the District on

a case-by-case basis.

- Pressure Reducing Valves (PRV's), or zone isolation valves, should be installed at pressure zone boundaries to permit future pressure zone realignment without the need for piping reconfiguration.

- A blow-off assembly or fire hydrant shall be installed on all dead-end runs and at designated points of low elevation to allow for flushing of the system. Blow-off and hydrant assemblies shall be installed within public right-of-way except where a written access and construction easement is provided to the District. In no case shall the location be such that a possibility of back-siphonage into the distribution system exists.

4.9 FIRE HYDRANTS

- The District operates within four Fire Districts. Specific consideration of the individual fire district regulations, such as hydrant port size, shall be made during design.

- Standard 5-1/4 inch Main Valve Opening (MVO) fire hydrants are required approximately every 600 feet in residential areas, unless otherwise approved.

- Standard 5-1/4 inch Main Valve Opening (MVO) fire hydrants are required approximately every 300 feet in commercial areas, unless otherwise approved.

- Additional fire hydrants may be required to insure adequate fire protection is provided for specific development proposals.

- The maximum length of a 6-inch hydrant lead shall be 50 feet. Hydrant leads over 50 feet shall be 8-inches.

4.10 CROSS CONNECTION CONTROL

The District's cross connection control standards are set forth in District Resolution #2722. This resolution adopts the American Water Works Association's standard practices. The need, size, and location of cross connection control assemblies shall be determined by the District. A copy of this resolution can be found in the Appendices. The District reserves the right to implement better or improved standard practices and is currently reviewing its current program to verify compliance with the State Department of Health's most recent revisions to cross connection control requirements.

4.11 STORAGE

Storage requirements are based on five components; operational storage, equalizing storage, standby storage, fire suppression storage and dead storage. Operational storage is the volume of storage devoted to supplying the water system while, under normal operating conditions, the source(s) of supply are in "off" status. Equalizing storage is required to supplement water supply sources during periods of high demand, at a minimum of 30 psi, and allow for storage of water during low demands. Standby storage provides a backup supply in the event that the District's sources are unavailable. Fire suppression storage is required to meet fire flow requirements over a specified period of time. Dead storage is the volume of stored water that is not available to all customers at the minimum design pressure. The sum of the equalizing, standby and fire suppression storage is equal to the operational storage. Each of the three main components, equalizing, standby and fire suppression storage, must be evaluated with regard to the operational storage requirements, or storage above the required hydraulic grade line available to deliver service at adequate pressures. Storage which does not meet this criteria is considered dead, or unusable.

The minimum requirements for each of the components of the total storage requirement are summarized below. The minimum amount of storage required shall be adequate to provide for

equalizing storage plus the larger of standby or fire suppression storage. The recommended storage volume is equal to the sum of the equalizing, standby and fire suppression storage components. Section 5 of this document includes a complete analysis of the District's water storage requirements and existing capacities.

4.11.1 Operational Storage

The following definition and brief explanation is presented as reference information. As defined previously, the operational storage is the volume of water available to supply the system under normal operating conditions while the source is considered "off". This volume varies according to the sensitivity of the water level sensors controlling the source pumps and the configuration of the tanks designed to provide the required volume while preventing excessive cycling of the pump motor(s). Because of the existing storage volume of Cedar River Water and Sewer District's reservoirs, in relation to the size and configuration of the District's pumping facilities, the operational storage component is considered part of equalizing storage.

4.11.2 Equalizing Storage

The volume of equalizing storage must be sufficient to meet hourly water system demands in excess of the rate of supply and must be at an elevation sufficient to meet these demands at a minimum delivery pressure of 30 psi. The amount of required equalizing storage is to be calculated in accordance with the DOH "Water System Design Manual".

4.11.3 Standby Storage

Standby storage is required in order to augment the available supply of water during a period of restricted flow from the supply source. Restriction of flow may be caused by a pumping equipment failure, supply line failure, maintenance or repair, or other

condition which causes interruption in supply. For single source systems, standby storage requirements are twice the average day demand for a system, deliverable at 20 psi. For a multiple source system, the standby storage is calculated as twice the average day demand, less the flow available with the largest source out of service, multiplied by the amount of time the remaining sources will be pumped each day. It is recommended that standby storage not be less than 200 gallons per connection per day.

4.11.4 Fire Suppression Storage

Fire suppression storage must be equal to the amount of water required to accommodate fire demand, based on the local fire protection authority, delivered at a minimum system pressure of 20 psi. Fire flow requirements are determined by the Fire Marshall having jurisdiction and generally conform to the procedures utilized by the Washington Surveying and Rating Bureau as set forth in a pamphlet entitled "Guide for Determination of Required Fire Flow" published by the Insurance Services Office, Municipal Survey Service and the Uniform Fire Code.

4.11.5 Dead Storage

Dead storage is the amount of water not available to all customers at the minimum design pressure. Dead storage is not considered when determining volumes to provide operational, equalizing, standby or fire suppression storage.

4.12 FIRE FLOW REQUIREMENTS

The amount of water required for fire-fighting purposes is specified in terms of rate of flow in gallons per minute and an associated time duration in minutes. Fire flows must be provided at a residual system pressure of at least 20 psi.

A variety of sources are available for estimating the District's future fire flow requirements including the East King County Coordinated Water System Plan, the DOH guidelines, the Uniform Fire Code and the Washington Surveying and Rating Bureau (WSRB). Although each of these provides guidelines for fire flow planning, final determination of fire flow requirements are determined during the building permit process.

A summary of the guidelines used for this planning process are as follows:

- Under regulations established by the East King County Coordinated Water System Plan, all water systems providing fire flow must be designed to deliver a minimum rated flow of 500 gpm in rural areas and 1,000 gpm in urban areas at a duration specified by the Fire Marshall.

- The Insurance Services Office (ISO) of the Municipal Survey Service provides guidelines for the determination of required fire flows. The Washington Surveying and Rating Bureau (WSRB) uses these guidelines to establish minimum fire protection requirements for existing civilian residential, commercial, industrial, and institutional facilities. The fire-fighting demand required for a specific building depends on its type of construction, floor area, height, and type of occupancy. Adjustments are made for number of stories, type of business performed in the building, presence of automatic sprinkler systems, and proximity of adjacent structures.

- The Uniform Fire Code also provides a standard for fire flow for municipalities that prescribe to that standard.

Fire flow requirements are determined on a case-by-case basis depending on the type of development in an area and the required fire flows for the particular facilities and structures

associated with that development. For estimating purposes and as a guide for fire flow requirements within the District, the minimum fire flows are 1,500 gpm for 2 hours in urban residential areas, 500 gpm for 2 hours in rural residential areas and 3,000 gpm for 3 hours in commercial areas and for schools. However, the District considers all existing and allowable land uses in planning for provision of adequate fire flows throughout the District. The fire flow demand for an area that contains more than one type of development is assumed to be equal to the highest fire flow requirement for the area.

4.13 GENERAL FACILITY PLACEMENT

- All piping, pumping, source, storage and other facilities shall be located in public right-of ways, dedicated utility easements or on District owned property.

- Wherever possible, pipelines shall be located in dedicated streets or in easements which have been granted to the District. A street is not dedicated until the plat which created it has been filed with the King County Recorder, or unless the County has a Deed of Record.

- Utility easements must be a minimum of 15 feet in width and piping shall be installed at least 5 feet from the easement's edge. Any exceptions to this minimum easement will be at the discretion of the District.

- Utility easements shall not be established so that they straddle any property line, unless approved by the District.

- Unrestricted access shall be provided to all public water system lines and their appropriate appurtenances and all public fire hydrants.

- Utilities shall be located in accordance with the standards and guidelines established by the District. Where existing utilities or storm drains are in place, new facilities shall conform to these standards as nearly as practicable and be compatible with the existing installations.

- Minimum cover over pipes (from the top of the pipe to the finished grade) for pipes 8-inches and smaller and for pipes 10-inches and larger shall be 42-inches and 48-inches, respectively. Since other utilities are usually installed before water utilities due to gravity constraints, the District may allow the minimum cover to be reduced at utility crossings.

- If possible, transmission and distribution mains shall be at least 10 horizontal feet from any existing or proposed waste disposal facility.

- The District follows the standards set by DOE regarding the vertical separation of utilities. The separation requirements between potable water and sanitary sewer are 10 feet of horizontal separation and 18-inches of vertical separation (from the bottom of the water main to the crown of the sewer main). Where practical, there shall be at least 5 feet horizontal separation from other utilities.

4.14 RELIABILITY CONSIDERATIONS

- Multiple water sources are recommended in conjunction with adequate reserve in gravity storage to allow for the interruption of one supply source while maintaining water supply to the entire system at the design rate.

- Pump stations are to contain multiple booster pumps of sufficient capacity to meet one-half of the peak day demands with the largest pump out of service.

- Auxiliary power is required where adequate gravity storage is not provided.

4.15 STANDARD PLANS AND SPECIFICATIONS

In accordance with WAC 246-290-120, Cedar River Water and Sewer District maintains standard plans and specifications on file with the State Department of Health. These standards address requirements for: the installation of hydrants, valves, fittings and meters; repair or replacement of system components with similar components; and/or maintenance or painting of surfaces not contacting potable water. The standard plans and specifications also constitute a waiver from formal submittal and approval of specific distribution main improvements provided that construction of such projects are certified by a registered professional engineer and provided that the District submits required documentation to DOH prior to placing the distribution pipeline into service. All other water system improvement projects require submittal to and approval from the State Department of Health. A copy of the updated Cedar River Water and Sewer District standards is included as an Appendix to this Plan.

4.16 WATER QUALITY STANDARDS

The maximum contaminant levels (MCLs) allowed in drinking water supplies are as put forth by the Washington State Department of Health (DOH) and the federal Safe Drinking Water Act (SDWA). The District recognizes that additional monitoring requirements are forthcoming and will comply with such requirements as they are implemented by the State of Washington. Similarly, the District recognizes the SDWA requires a variety of source monitoring for surface water supplies which is currently carried out by the Seattle Public Utilities to insure compliance. The District also publishes annual consumer confidence reports and lead and copper public education information containing current water quality data in accordance with DOH regulations. More information on the District's water quality and water quality standards can be found in the Appendices.

SECTION 5

SYSTEM ANALYSIS AND RECOMMENDED IMPROVEMENTS

5.1 GENERAL OVERVIEW

This Section presents the system analysis and recommended improvements portion of the planning process, including an evaluation of the District's existing water system as described in Section 3 and using the performance and minimum design criteria presented in Section 4. The capacity of the primary components of the water system, including source of supply, transmission facilities, pump stations, storage reservoirs, and the distribution system, is discussed in this Section with respect to the ability to meet the existing and projected needs of the District and its customers.

5.2 ANALYSIS METHODOLOGY AND OBJECTIVES

As an aid in identifying and analyzing the present and future demands of the water system and in establishing recommended improvements, the water system was modeled using the CYBERNET Version 3.1 hydraulic modeling system developed by Hastaed Methods of Waterbury, Connecticut. With this tool, various modifications, parameter changes, and improvements can easily be evaluated, expediting the identification of problem areas and the development of possible solutions. By having the computerized water system model, developer extensions and District improvements can be modeled as they occur, allowing cost effective design and construction of the most efficient system.

The CYBERNET program has the capability to simulate all components of a water system, including pipes, pumps, PRVs, reservoirs and check valves. Modeling the Cedar River Water and Sewer District's water system required two separate models, one for the West Area and one for the Central-East Area. These areas were modeled separately because the existing systems are currently not connected and each has its own source of supply and storage facilities. The modeling for the West Area required nearly 380 pipes and more than 300 nodes. The much larger Central-East Area required nearly 470 pipes and almost 400 nodes. The nodes serve as connection points for pipes and can be assigned demands to simulate water uses throughout the

District. All metering points, pumps, PRVs and reservoirs were included in the models.

The hydraulic computer models were calibrated by comparing model results with actual field flow tests recently completed by the District staff. The conditions present at the time of the actual flow tests were simulated insofar as possible in the computer models. Physical characteristics, such as PRV settings and friction loss factors for the various pipe materials were adjusted until the model results matched the field test results, within acceptable tolerances. Calibrating the models enable the model results to more accurately portray the existing transmission and distribution systems.

The models were used to identify areas of concern within the District. These would include areas of high or low pressure, high pipeline velocities and low available fire flows. The model was evaluated under average day demand conditions to determine if pressures within the system fell between 40 and 100 psi. For fire flows, a minimum pressure of 20 psi was imposed throughout the system and maximum day demand flows were used. A maximum pipeline velocity of 8 feet per second was imposed under domestic conditions and 10 feet per second under fire flow conditions. With the use of the above criteria, existing and potential problems were identified.

The source pressures used for each Seattle supply meter were taken from the minimum hydraulic grade line (HGL) supplied at each meter, as defined in the purveyor's contract between the Seattle Public Utilities and the District. The water surface elevations for the District's storage reservoirs were taken to be at the lower end of the reservoir operating ranges. Therefore, both Fairwood reservoirs were assumed to be at 635 feet. The Central and Rock Mountain reservoirs were assumed to be at 746 feet.

Water consumption for each of the regions was generated from historical billing records as well as from population and consumption projections presented in Section 2. Water use for larger facilities, also called high users, was determined from District billing records. The information was used to assign specific demands to the nodes representing these users in the models.

District billing information was also used to distribute the rest of the demands because the data is separated by type of user and by area. Once the high use and special water use areas were determined, the remaining water use was equally spread among the remaining nodes in the appropriate parts of the model. By using peaking factors, the model was able to generate flows for maximum day demand and peak hour demand.

The maximum day demand peaking factor was determined to be 2.25 and was calculated from the Seattle Public Utilities' 10-Peak Day Reports and District records. This represents the ratio of the maximum day demand to the average day demand. The peak hour peaking factor (the ratio between the peak hour demand and average day demand) was calculated to be 3.5. This was determined using the recommended formula for calculating peak hourly demands put forth in DOH guidelines. It consistent with actual District operational data and similar systems in the area.

It is recommended that the models be kept up to date as the water system changes with pipe line replacements, new developments, ULIDs, system upgrades, etc. If this is done on a continual basis, the models can easily be run to determine the potential impacts of other proposed system modifications and proposed new development.

5.3 PROJECTS UNDERWAY

The following projects represent significant water system improvement projects underway and were therefore considered in this analysis. Additional projects which are underway are either less significant in scope or are not considered critical to this overall analysis of the system.

- McGarvey Park: This proposed subdivision includes 500± lots and is estimated to be constructed in 2000-2003. The project is located in the northeasternmost portion of the Central Area. Proposed water system improvements include a new 600,000 gallon storage reservoir, a new pump station on the Fairwood reservoir site to pump to the new reservoir and a new constant pressure pump station to serve those lots in the development that are above an elevation which can be adequately served by gravity

flow from the new reservoir. The McGarvey Park development will provide an intertie between the West and Central Service Areas and will eventually allow transfer of water in both directions.

- Southeast Bain Road: This project, which includes approximately 3,400 linear feet of transmission main and a PRV, is intended to provide an additional connection between the Central reservoirs across the Cedar River valley to areas on the east side of the river.

- 244th Avenue Southeast Watermain Extension: This project includes approximately 8,000 linear feet of transmission main and is intended to provide a supplemental source of water to the Webster Lake Area of the District. Although the development is not completely built out, the consumption for the existing homes is currently nearing the annual water rights for the onsite source. This project will increase source capacity to the area. Fire flow capacity will be improved and will allow for the addition of a fire flow pump and hydrants in the Webster Lake system. A new reservoir to serve the Webster Lake and East Areas is also proposed as part of this project and a study will be completed to determine the appropriate size of the facility.

5.4 SOURCE

The supply requirements for the District are based on the guidelines established by the Washington State Department of Health's "Water System Design Manual" (1999 edition). Based on these guidelines, the District's water supply should be able to deliver the maximum day demand of the system while concurrently replenishing the depleted fire suppression storage within 72 hours. Table 5-1 summarizes the District's existing and future supply source requirements. As shown in the table, the Central-East Areas of the system may have difficulty meeting the expected demand shortly after 2010.

5.4.1 City of Seattle Supply Meters

As discussed in Section 3, the District presently has three metered connections with Seattle Public Utilities. The three meters are all located within the Lake Youngs tunnel

right-of-way. Two of the meters are used on a continuous basis, one serving the West Area and one serving the Central-East Area. The other metered connection serves as an emergency intertie with the Seattle Public Utilities system and flows into the West Area by gravity. During development of this Plan, some question regarding the ability to supply water from the SPU's Cedar River source have been raised. The District recognizes that verification of SPU's water rights or modifications of existing District water rights may be required prior to extending service into Range 7, Townships 22 and 23 North.

5.4.2 Ground Water

Cedar River Water and Sewer District currently maintains ground water well rights for three separate wells located in the District. These rights include then Webster Lake, Maplewood and Wonderland Mobile Home Park wells as described in paragraph 5.4.4. The following discussion includes description of the Webster Lake well and the Maplewood well. No discussion of the Wonderland Mobile Home Park well is provided but an application regarding a change in place of use from this recently acquired facility is currently pending.

5.4.2.1 Webster Lake Well

Cedar River Water and Sewer District currently has a permit for water withdrawal from the Lake Webster well with an annual limit of 17 acre-feet and a maximum instantaneous draw of 60 gallons per minute. The well was developed solely to serve the Webster Lake Estates and Ridge at Lake Webster.

In 1998, with the existing connections in this area (approximately 30 of the assumed maximum of 42 connection's) water use was very close to exceeding the annual water rights limits for the well. It is presumed that without action to either reduce water demands or augment supply to the area, the annual water rights for the well could be exceeded during the planning period. To encourage conservation and insure that water withdrawal from the well does not exceed

existing water rights, several programs and projects have been initiated. The District has met with the homeowner's associations for the two developments being served to discuss possible ways to reduce water demands. To encourage water conservation throughout the District, Cedar River has recently implemented an additional tier in its rate schedule which significantly raises rates for residential high water users. Although these water conservation measures are likely to reduce water use in the Webster Lake Area, a long term solution which will accommodate projected growth in the area is required. The District is currently proceeding with design of a water main from the Central Area which will, among other things, augment supply from the well. The homeowners may be assessed a surcharge to cover their share of the costs. The remaining costs will be recovered through future connection charges.

TABLE 5-1
CEDAR RIVER WATER AND SEWER DISTRICT
SOURCE ANALYSIS

								SOURCE (gpm)		
		ERU's	ADD (gpd)	MDD (gpd)	MDD (gpm)	PHD (gpm)	FSS (gpm)	Req'd [1]	Exist [2]	Surplus (Deficit)
1998	West	3,883	862,026	1,939,559	1,347	2,095	125	1,472	2,900	1,428
	Central	1,387	310,688	699,048	485	755	125	610		
	East	1,904	512,176	1,152,396	800	1,245	125	925		
	C-E TOTAL [3]	**3,291**	**822,864**	**1,851,444**	**1,286**	**2,000**	**125**	**1,536**	**3,000**	**1,464**
	Webster Lake [4]	28	14,364	32,319	22	35	0	22	60	38
	DISTRICT TOTAL	**7,202**	**1,699,254**	**3,823,322**	**2,655**	**4,130**	**250**	**3,030**	**5,960**	**2,930**
2000	West	4,033	879,194	1,978,187	1,374	2,137	125	1,499	2,900	1,401
	Central	1,485	326,700	735,075	510	794	125	635		
	East	2,012	533,180	1,199,655	833	1,296	125	958		
	C-E TOTAL	**3,497**	**859,880**	**1,934,730**	**1,344**	**2,090**	**125**	**1,594**	**3,000**	**1,406**
	Webster Lake	36	18,288	41,148	29	44	0	29	60	31
	DISTRICT TOTAL	**7,566**	**1,757,362**	**3,954,065**	**2,746**	**4,271**	**250**	**3,121**	**5,960**	**2,839**
2005	West	4,231	875,817	1,970,588	1,368	2,129	125	1,493	2,900	1,407
	Central	2,387	498,883	1,122,487	780	1,213	125	905		
	East	3,621	912,492	2,053,107	1,426	2,218	125	1,551		
	C-E TOTAL	**6,008**	**1,411,375**	**3,175,594**	**2,205**	**3,430**	**125**	**2,455**	**3,000**	**545**
	Webster Lake	42	20,244	45,549	32	49	0	32	60	28
	DISTRICT TOTAL	**10,281**	**2,307,436**	**5,191,731**	**3,605**	**5,608**	**250**	**3,980**	**5,960**	**1,980**
2010	West	4,425	885,000	1,991,250	1,383	2,151	125	1,508	2,900	1,392
	Central	2,684	542,168	1,219,878	847	1,318	125	972		
	East	4,911	1,188,462	2,674,040	1,857	2,889	125	1,982		
	C-E TOTAL	**7,595**	**1,730,630**	**3,893,918**	**2,704**	**4,206**	**125**	**2,954**	**3,000**	**46**
	Webster Lake	42	19,446	43,754	30	47	0	30	60	30
	DISTRICT TOTAL	**12,062**	**2,635,076**	**5,928,921**	**4,117**	**6,405**	**250**	**4,492**	**5,960**	**1,468**
2020	West	4,844	968,800	2,179,800	1,514	2,355	125	1,639	2,900	1,261
	Central	3,381	682,962	1,536,665	1,067	1,660	125	1,192		
	East	5,784	1,399,728	3,149,388	2,187	3,402	125	2,312		
	C-E TOTAL	**9,165**	**2,082,690**	**4,686,053**	**3,254**	**5,062**	**125**	**3,504**	**3,000**	**(-504)**
	Webster Lake	42	19,446	43,754	30	47	0	30	60	30
	DISTRICT TOTAL	**14,051**	**3,070,936**	**6,909,606**	**4,798**	**7,464**	**250**	**5,173**	**5,960**	**787**

Notes:

1 Required source assumed to be the amount required to replenish depleted fire suppression storage within 72 hours while supplying the maximum day demand of the system.

2 Existing source capacity equal to pumping capacity at SPU metering point for West, Central and East (based on field test results).

3 Central and East Areas are assumed as single source systems since the areas are connected and draw from the same SPU metering point.

4 Existing source for Webster Lake is set at the water rights limit for instantaneous flow which is also the current source pumping capacity.

Potential future wholesale sales are not considered.

5.4.2.2 Maplewood Well

Cedar River Water and Sewer District acquired the Maplewood well and associated 34 acre-feet annual withdrawal water rights in approximately 1987. Since the late 1980's the well has been used periodically although the Maplewood Estates development currently relies on Seattle Public Utilities water through the Maplewood Booster Pump Station as its primary source. A preliminary engineering report was prepared by Penhallegon Associates Consulting Engineers, Inc. (PACE) in June of 1999 to assess the feasibility and costs associated with developing the Maplewood test well into an active source well. This report is included as an Appendix to this Plan. The District recently drilled a test well on the Maplewood Well property and preliminary testing indicates a significant source of water is available. The PACE study addressed a plan to utilize the test well as a production well to the extent of the existing and possible water rights. To fully utilize the available water, transmission improvements to other portions of the District would be required. Activating the well to the extent of the existing water rights appears feasible and prudent. Additionally, the District is actively pursuing transfer of water rights for other existing wells to the Maplewood well. Consideration of applying for a change in place of use for the Maplewood well is also underway.

5.4.3 Backup Sources and Interties

Cedar River Water and Sewer District (Cedar River) currently has three interties with Covington Water District (Covington), all serving the Central and East Areas. The primary reason for these interties is to provide water to Covington although they can also provide a backup supply to Cedar River in emergency situations. The east intertie provides backup and fire flow from the joint-use reservoir located in Covington. However, due to current hydraulic zone arrangements and the location of isolation valves, water from the reservoir is only available to a very small portion of the East Area. A method for making the water available to a larger area of the District is presented later in this Section.

In addition to the existing interties with Covington, it is recommended that the District pursue constructing one or more interties with Soos Creek Water and Sewer District (Soos Creek). These interties would provide a backup supply to the West Area of the District and would also increase fire flow availability to the area. In Soos Creek Water and Sewer District's Comprehensive Water System Plan, four possible intertie locations with Cedar River are suggested:

Interties between Cedar River's 655 Zone and Soos Creek's 710 Zone

- 151st Avenue Southeast and Southeast 176th Street
- 159th Avenue Southeast and approximately Southeast 175th Street
- 163rd Avenue Southeast and Southeast 175th Place

Intertie between Cedar River's 756 Zone and Soos Creek's 710 Zone

- 179th Place Southeast and West Lake Desire Drive Southeast

In case of failure of the District's source of supply to the Fairwood pump station and/or to augment fire flow in the West Area, any or all of the first three possible intertie locations could serve as an emergency back-up supply to the West Area. Since Soos Creek serves at a higher hydraulic gradient at these proposed intertie locations, gravity flow (through PRVs) would be possible for flow from Soos Creek but pump stations would be required for Cedar River to provide a back-up supply to Soos Creek.

The fourth possible intertie location would allow gravity flow from the Cedar River 756 Zone to Soos Creek but would require a pump station from the Soos Creek 710 Zone to Cedar River's system. This intertie would provide a back-up source to the District's Central Area but is not recommended at this time since the Soos Creek source of supply, Lake Youngs, is the same as Cedar River's in this area, limiting the benefit of the intertie.

Please note that Cedar River Water and Sewer District and Soos Creek Water and Sewer District are both served by Seattle water from the Lake Youngs Reservoir and the proposed interties may require approval from SPU.

5.4.4 Existing Water Rights

The District currently has water rights permits for the Webster Lake well, Maplewood well and Wonderland Mobile Home Park wells. The District has applied for a transfer of water rights to Lake Webster and is waiting for a final decision from the Department of Ecology. Transferring other (private) water rights is another option which is presently being pursued. The previously mentioned Development of Maplewood Well Engineering Report (see Appendices) presents a discussion regarding current water rights issues and potential transfers which have been identified. The District recently acquired water rights associated with the Wonderland Mobile Home Park as part of its agreement to extend service to that area. There is currently a change of place of use application pending for this facility which identifies the place of use as the entire District service area as described i the East King County Coordinated Water System Plan. Table 5-2 below shows all of the District's existing water rights.

TABLE 5-2
CEDAR RIVER WATER AND SEWER DISTRICT
EXISTING WATER RIGHTS

LOCATION/DESCRIPTION/NOTES	INSTANTANEOUS YIELD (Q_i) Gallons per Minute	ANNUAL YIELD (Q_a) Acre-Feet
Webster Lake Estates Ground Water Well	60	17
Maplewood Estates Ground Water Wells (2) (Not being used to full capacity)	160	34
Wonderland Mobile Home Park	100	46

5.5 STORAGE

As stated in Section 4, the District's storage requirements are based on the following components: equalization storage, standby storage, and fire suppression storage. In addition to these primary storage components is operational storage, which is used to prevent excessive cycling of supply pump motors. Because of the configuration of Cedar River's supply and storage facilities, operational storage does not apply.

The minimum requirement for storage, as stated in Section 4, is to provide equalization storage and the larger of standby or fire suppression storage. To increase system reliability, it is recommended that facility sizes be based on the sum of the three storage components. Table 5-3 summarizes the minimum required and recommended storage needs of the District. It should be noted that the storage analyses for the District were done by pressure zone and considered the highest elevation that needs to be served within each zone, ensuring that lower elevations are also adequately served. Each of the individual storage components are analyzed below.

5.5.1 Equalization Storage

Equalization storage is required to supplement water supply sources during periods of high demand and allows for storage of water during low demand periods. The minimum pressure requirement of 30 psi must be maintained throughout the system at all times, even during periods of high demand. A common method for determining equalization storage is to utilize the formula shown below, from DOH's "Water System Design Manual":

$$ES = (PHD - Q_S) * 150 \text{ minutes (but in no case less than zero)}$$

where:

ES = Equalization Storage, gallons

PHD = Peak Hourly Demand, gpm

Q_S = Sum of all installed and active source of supply capacities, except emergency source of supply, gpm

This method was used in determining the equalization storage requirements for the West, Central and East Areas of the District. To increase reliability in the system, the largest pump in each area was considered to be off-line. For the Webster Lake Area the source capacity (Qs) was estimated to be equivalent to the maximum day demand for that portion of the system.

5.5.2 Standby Storage

Standby storage provides a backup supply of water in the event that the District's sources are unavailable. The recommended standby storage volume for a single source system is twice the average day demand and should be located above the elevation necessary to provide service at 20 psi to all the connections. For multiple source systems, the standby storage volume is determined using the following equation:

$$SB_{TMS} = (2 \text{ days})(ADD)(N) - t_m (Q_S - Q_L)$$

(It is recommended that SB_{TMS} not be less than 200 gallons/ERU)

where:

SB_{TMS} = Total standby storage component for a multiple source, gallons

ADD = Average Day Demand for the system, gpd/ERU

N = Number of ERUs

t_m = Time that remaining sources are pumped on the day when the largest source is not available, minutes (unless restricted otherwise, this is generally assumed to be 1440 minutes)

Q_S = Sum of all installed and continuously available source of supply capacities, except emergency sources, gpm

Q_L = The largest capacity source available to the system, gpm

Utilization of the above formula indicates that the District does not need any standby storage. For reliability considerations, however, it is recommended that 200 gallons per connection per day for two days or 400 gallons per connection, be used for the West, Central and East Areas. This will provide approximately two days worth of standby storage under normal consumption conditions. Since the Webster Lake Area has a higher average day demand than the rest of the District, 600 gallons per connection was used to provide approximately two days of standby storage under normal use conditions.

5.5.3 Fire Suppression Storage

Fire suppression storage is the water storage necessary to meet fire flow requirements over a specified period of time. As stated in Section 4, the requirements are set by the Fire Marshall having jurisdiction. Fire suppression storage calculations are based on fire flow requirements of 3,000 gpm for a period of three hours in all areas of the District. This is due to the fact that there are commercially zoned properties in all three of the major areas of the District and that even low density residential zoning allows for uses which typically require higher fire flows.

Since much of the water in the District's reservoirs lies at an elevation which is too low to provide adequate pressures to the District's customers, the total volume of the reservoirs cannot be considered as usable storage. Only that water which lies above the elevation necessary to provide a minimum of 30 psi (20 psi for fire and standby) in each zone was considered to be usable storage. Also, since the Fairwood reservoirs have different overflow elevations, it is assumed that the entire volume lying above the top elevation of the shorter reservoir is unusable because operating in this range causes water to be impounded in the lower reservoir and creates a potential for water quality problems.

As indicated on Table 5-3, the District currently maintains adequate storage to meet minimum requirements, but currently does not meet the recommended storage amounts for the West and Central-East Areas. This can be corrected by either constructing new reservoirs or by making the necessary improvements to transfer some of the unusable storage volume into usable storage volume. The District could easily accomplish this in the West Area by the addition of a recirculating pump between the two Fairwood reservoirs. The addition of the recirculation pump would provide a solution to potential water quality problems associated with impounded water. After the installation of the recirculating pump, the operating range of the reservoirs should be adjusted to increase the usable storage volume. Because this project is currently under design the additional storage is considered in the storage analyses for 2005 and beyond.

The above recommended changes would effectively increase existing storage capacity and delay the need for construction of additional reservoirs. With these improvements, the total volume of the Fairwood reservoirs would become usable and there would not be an anticipated storage deficiency in the West Area through buildout of the system.

The District's Capital Facilities Plan also calls for the study and investigation of the one million gallon Fairwood reservoir. There are several surficial cracks and indications that the tank may be leaking water. The District needs to determine the short term maintenance needs for the reservoir as well as its long term integrity. The study of the tank will, by necessity, include recommendations for taking it off line so that appropriate investigations can be made. It is also recommended that the District paint the Fairwood two million gallon reservoir and add security fences around both reservoirs.

The Central-East Area presently meets the minimum required storage capacity. Due to reliability considerations and to meet customer expectations, it is suggested that the District consider the recommended storage volume when analyzing the system for future needs. The Water System Capital Facilities Plan Improvements Map indicates three potential locations for new reservoirs in the East Area. When these facilities are designed, the exact size and location(s) of the facilities will be determined. For budgetary figures in the Capital Facilities Plan, the reservoirs are all assumed to have a capacity of one million gallons with ultimately four new reservoirs being required.

The McGarvey Park development, which is currently being designed, includes a 600,000 gallon reservoir which will also help serve the Central-East Areas of the District. It is anticipated that this project will be underway within the next five years so the additional storage volume was considered in the storage analyses of the year 2005 and beyond.

TABLE 5-3
CEDAR RIVER WATER AND SEWER DISTRICT
USABLE STORAGE ANALYSIS (gallons)

				COMPONENT REQUIREMENTS			TOTAL RECOMMENDED		TOTAL REQUIRED	
		ERU's	Existing Storage [1]	Equal [2]	Standby [3]	Fire [4]	Total Recommended [5]	Surplus (Deficit)	Total Minimum Required [6]	Surplus (Deficit)
1998	West	3,883	2,030,000	89,280	1,553,200	540,000	2,182,480	(-152,480)	1,642,480	387,520
	Central-East	3,291	1,640,000	225,003	1,316,400	540,000	2,081,403	(-441,403)	1,541,403	98,598
	Webster Lake	28	33,000	1,870	16,800	0	18,670	14,330	18,670	14,330
	TOTAL	7,202	3,703,000	316,153	2,886,400	540,000	4,282,553	(-579,553)	3,202,553	500,447
2000	West	4,033	2,030,000	95,539	1,613,200	540,000	2,248,739	(-218,739)	1,708,739	321,261
	Central-East	3,497	1,640,000	238,498	1,398,800	540,000	2,177,298	(-537,298)	1,637,298	2,702
	Webster Lake	36	33,000	1,866	21,600	0	23,466	9,534	23,466	9,534
	TOTAL	7,566	3,703,000	335,903	3,033,600	540,000	4,449,503	(-746,503)	3,369,503	333,497
2005	West	4,231	3,000,000	94,308	1,692,400	540,000	2,326,708	673,292	1,786,708	1,213,292
	Central-East	6,008	2,240,000	439,564	2,403,200	540,000	3,382,764	(-1,142,764)	2,842,764	(-602,764)
	Webster Lake	43	33,000	2,116	25,800	0	27,916	5,084	27,916	5,084
	TOTAL	10,282	5,273,000	535,988	4,121,400	540,000	5,737,388	(-464,388)	4,657,388	615,612
2010	West	4,425	3,000,000	97,656	1,770,000	540,000	2,407,656	592,344	1,867,656	1,132,344
	Central-East	7,595	2,240,000	555,959	3,038,000	540,000	4,133,959	(-1,893,959)	3,593,959	(-1,353,959)
	0	43	33,000	2,027	25,800	0	27,827	5,173	27,827	5,173
	TOTAL	12,063	5,273,000	655,642	4,833,800	540,000	6,569,442	(-1,296,442)	5,489,442	(-216,442)
2020	West	4,844	3,000,000	128,208	1,937,600	540,000	2,605,808	394,192	2,065,808	934,192
	Central-East	9,165	2,240,000	684,314	3,666,000	540,000	4,890,314	(-2,650,314)	4,350,314	(-2,110,314)
	Webster Lake	43	33,000	2,027	25,800	0	27,827	5,173	27,827	5,173
	TOTAL	14,052	5,273,000	814,549	5,629,400	540,000	7,523,949	(-2,250,949)	6,443,949	(-1,170,949)

Notes:
1 Existing Storage for 2005 includes addition of recirculation pump at Fairwood reservoirs and McGarvey Park 600,000 gallon reservoir.
2 Equalizing Storage for the West, Central and East is based on the formula in "Water System Design Manual" and assumes one pump out of service.
2 Equalizing Storage for Webster Lake is based on source capacity being set at Maximum Day Demand.
3 Standby Storage is based on requirement of 400 gallons/ERU for West, Central and East and 600 gallons/ERU for Webster Lake.
4 Fire Storage is based on 3,000 gpm for 3 hours.
5 Total Recommended Storage equals the sum of equalizing, standby and fire suppression storage.
6 Minimum Required Storage equals the sum of equalizing and the larger of fire suppression storage or standby storage. Fire suppression storage and standby storage are "nested".

5.6 PRESSURE ZONE CONFIGURATIONS

There are currently 20 pressure zones in the District. Many of the zones appear to have been developed on a case-by-case basis to accommodate individual developments as they occurred. As subsequent infill development occurred and the distance between these isolated areas lessened, several adjacent areas have emerged where the hydraulic grade line (HGL) of neighboring pressure zones differ by as little as 20 or 30 feet. The HGL difference prevents the water systems in the two zones from being connected without the use of a pressure reducing valve (PRV). Since PRV's are fairly expensive, the zone isolation feature in many instances is simply a closed gate valve, which essentially creates two dead-end mains and associated maintenance and water quality issues. As a result, there are some significantly sized areas that are dependent on a single PRV for their water supply. The following steps are proposed to simplify the pressure zones within the District, eliminate dead ends mains wherever possible, and provide better looping and more reliable service. The improvements should also provide a vehicle for the comprehensive expansion of existing pressure zones as further development in the District occurs.

- **Verify and Calibrate PRV Settings**: In areas which are served by more than one PRV, it is recommended that the elevation of the PRV's be surveyed in relation to each other so that they can be adjusted to the proper settings in order to operate in tandem. This will ensure that demands are drawn more equally through the PRV's and not solely through any one PRV.

- **Combine 624 and 653 Zones in Maple Valley Heights:** It is recommended that the 624 and 653 zones be combined into a single 635 zone in the Maple Valley Heights area. This can be accomplished by removing or opening the PRV at Southeast 163rd and 190th Avenue Southeast and resetting the PRV's at 188th Avenue Southeast and Southeast 163rd and at Southeast 170th and 190th Avenue Southeast. Minimum pressures in the newly created zone will be above 45 psi, or about 8 psi lower than those in the current 653 zone. Maximum pressures in the new zone will be about 100 psi. The newly created 635 zone will be hydraulically compatible with the Fairwood 635 zone

and could eventually be directly connected with that zone and its available storage.

- **Eliminate 738 (Pumped) Zone:** The proposed McGarvey Park development will include construction of a 756 zone system. These new facilities will facilitate abandoning the pumped zone in Fairwood Park (738 zone in the vicinity of 163rd Place Southeast). This will allow currently isolated mains in the area to be incorporated into the Fairwood 635 zone, thereby enhancing the looping characteristics and transmission capacity in that zone.

- **Decrease 827 (Pumped) Zone:** Once 756 zone mains are available in Southeast Petrovitsky Road, a loop can be extended north in 208th Avenue Southeast to the south end of the 827 zone. The 827 zone, which is served by a pump station (ULID 10 Booster Pump Station), could then be reduced in area by about half by installing a new PRV in 208th Avenue Southeast between 198th and 202nd and transferring customers to the 756 zone. The reduction in the size of the 827 zone would reduce the cost to pump water to the zone. The highest elevation customers transferred from the 827 to 756 zone would still have minimum pressures between 60 and 70 psi.

- **Combine the 661 and 694 zones into a single 685 zone in the south/central portion of the District:** This will provide a consolidated zone which can be extended and carried throughout the northeast portion of the District. The zones can be easily combined by adjusting the pressure settings in several PRV's. Also, the District's property in the Lake Forest Estates development could potentially serve as a storage reservoir site for this new zone. The property lies at an elevation that would support a ground level reservoir for a 685 zone. Construction of approximately 4,000 feet of transmission main would be required to reach this site.

- **Extend 756 Zone in Southern Portion of the Central-East Area:** It is recommended that the existing 12-inch main along Maple Valley-Black Diamond Road, from the PRV located at approximately Southeast 231st Street to the southern border of the District,

be changed to a 756 zone transmission main. The hydraulic gradient in the existing main is reduced to 694 feet at the PRV near 231st Street. The 694 zone along Maple Valley-Black Diamond Road is served by this main. Towards the southern end of the District, the hydraulic grade is increased again to 780 feet through the Highlands of Lake Wilderness Pump Station. This is also the location of the east intertie with Covington Water District. Since the overflow elevation of the joint use reservoir is 770 feet, Cedar River Water and Sewer District cannot currently utilize their portion of the storage reservoir. By lowering the hydraulic gradient in this area to 756 feet, water could flow from Covington Water District to Cedar River Water and Sewer District under emergency conditions, as was intended. However, in order for the District to be able to fulfill its contractual obligation to fill a 770 gradient reservoir with 756 gradient water, a small booster pump will be required near the east intertie. The booster pump will operate only in those instances when Cedar River is required to fill the joint use reservoir.

Creation of a 756 zone transmission main will also provide a location for extension of the 756 zone to the eastern portion of the District. Transformation to a 756 zone transmission main will require some reconfiguration of PRV's and closure of valves to isolate the 694 zone. This could be accomplished without a significant loss in hydraulic efficiency. Once the 756 zone transmission main is in operation, much of the Highlands of Lake Wilderness development, the currently pumped 780 zone, can be transferred to gravity feed from the 756 zone. This will reduce the pumping costs to the District.

5.7 TRANSMISSION & DISTRIBUTION SYSTEM

The purpose of the transmission and distribution systems is to convey water to customers within the District at adequate service pressures while providing fire protection and maintaining water quality. The distribution system should have sufficient hydraulic capacity to meet the peak hour demand at residual pressures that do not fall below 30 psi. Adequate hydraulic capacity must also be available to deliver fire flows during maximum day demand while maintaining a residual pressure of at least 20 psi throughout the entire system. The design criteria and the above

constraints were considered in evaluating the existing system using the hydraulic model to determine and establish the recommended improvements to the transmission and distribution system throughout the District.

In order to provide an appropriate level of redundancy in the system and to minimize water quality issues, looping of mains is required wherever feasible. The elimination of dead-end mains helps to provide greater circulation of water through the system and helps to alleviate the problems associated with stagnant water, such as low chlorine residual, poor taste and unpleasant odors.

Using the hydraulic model, it was determined that the system can currently provide the peak hour flow throughout the system. In analyzing fire flow capabilities for this Plan, the residential fire flow requirement used for evaluating the system was 1,500 gallons per minute for two hours. This is a standard that many local jurisdictions are adopting. For commercial areas, a minimum flow of 3,000 gpm for three hours was used. The theoretically available fire flows to various locations within the District, as determined from hydraulic modeling, are indicated on Figure 5-1. These flows are estimates under peak day operating conditions and are intended for planning purposes only. Actual field results tend to be higher than the modeled results due to changes in reservoir levels, lower demand conditions at the time of testing, time of day, etc.

5.7.1 West Area

The service area in the west is the most developed of the three main areas. Currently, the system serving the west is entirely separate from the other areas. The system serves multiple types of customers including a large commercial/retail area. The majority of the West Area falls within the Urban Growth Area Boundary.

While the source from the Lake Youngs pipeline for this area is in the westerly portion of the area, the storage reservoirs that serve the area are east of the main distribution system. This configuration makes it difficult for the tanks to efficiently serve the area because of the headloss through the lengthy transmission mains. Also, smaller diameter

distribution mains reduce available fire flows in the area. In order to deliver fire flows to the West Area, the main distribution line should be upgraded and sized to reduce headloss through the system. The transmission and distribution improvement projects proposed in the Capital Facilities Plan (Section 6) are primarily to increase the capacity of the system to deliver water from the reservoirs to the west part of the area. The addition of a recirculating pump between the two reservoirs in order to utilize the full height of the tanks for usable storage, as discussed in the storage analysis portion of this Section, will also significantly improve fire flows in this area. The recirculating pump would allow the zone to be operated at a higher hydraulic grade by serving from the top portion of the taller of the two tanks.

As discussed earlier, there is a new development proposed (McGarvey Park) that will be located on the border between the West and Central Areas. Once completed, the proposed pump station, transmission and distribution mains associated with the development will connect the West and Central Service Areas. This will allow the transfer of water between the areas and increase system reliability.

It is also recommended that the District pursue emergency interties with Soos Creek Water and Sewer District's system along the southern border of the West Area. A further study beyond the scope of this comprehensive plan should be done in cooperation with Soos Creek Water and Sewer District to determine the best locations for these potential interties and/or to verify the feasibility of the potential connection points suggested in the 1996 Soos Creek Water and Sewer District Comprehensive Water System Plan. The District also recognized that any new intertie may require approval from Seattle.

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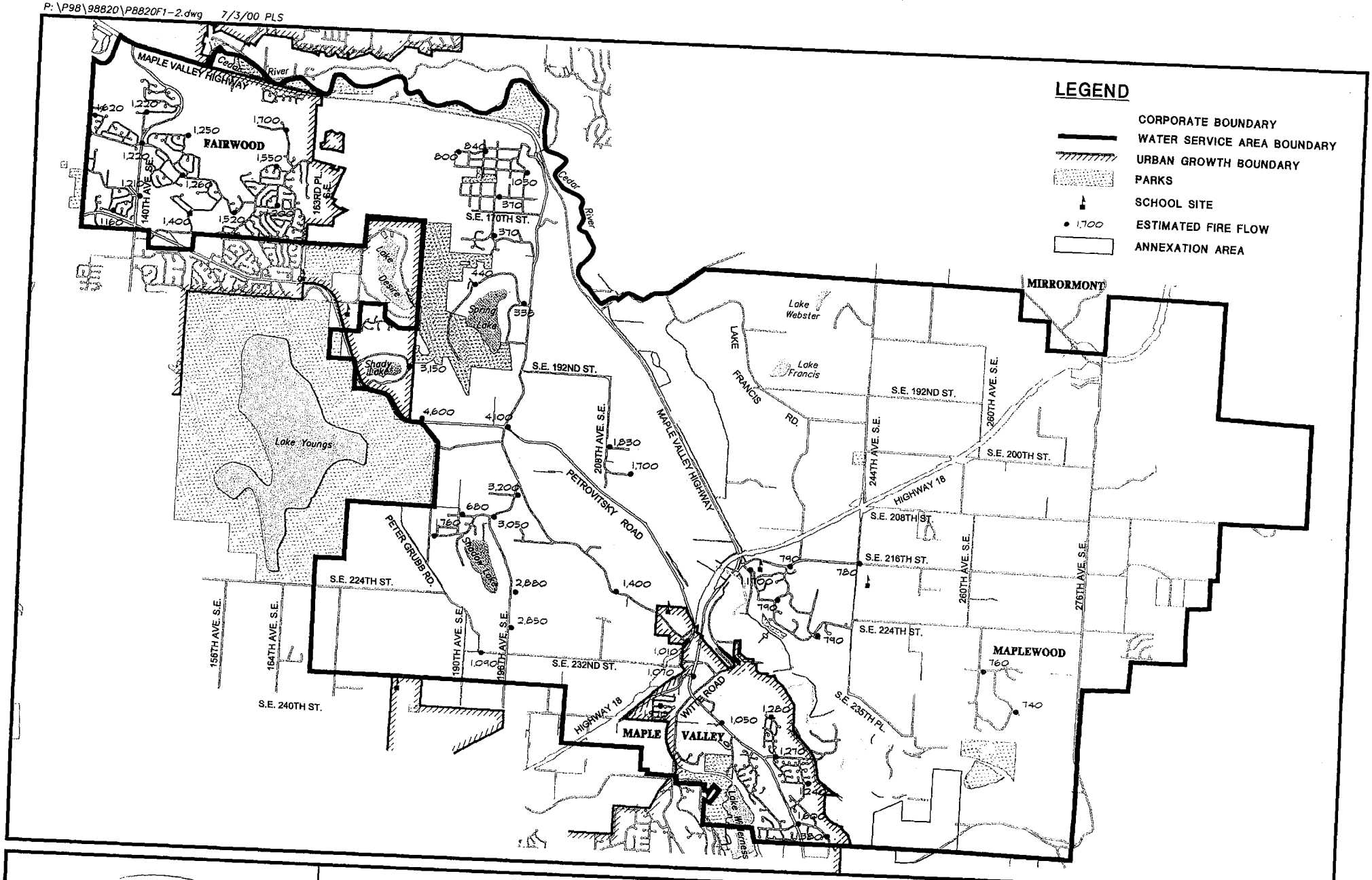

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0 3000 6000
Scale In Feet

CEDAR RIVER WATER AND SEWER

Cedar River Water and Sewer District
Comprehensive Water System Plan

Available Fire Flow Under Maximum Day Demand

Figure No.

5-1

5.7.2 Central Area

The Central Area can be described as the overall backbone of the water system. It contains the main source of supply from the Lake Youngs pipeline for both the Central and East Areas and also houses the majority of the storage for both areas. This portion of the District's system encompasses the original part of the District and the system serves largely residential and rural customers. Most of this area lies outside the Urban Growth Area Boundary (UGA) except that area which is within the City of Maple Valley. The water mains in the original area of the District were mostly replaced in 1996 and 1997.

The distribution system improvements proposed in this area are to improve transmission form the supply source and the storage tanks in the northern part of the area to the south and east parts of the area. The Capital Improvement Plan, contained in Section 6, proposes additional mains to improve the water transmission to these areas.

Large portions of the Central Area are undeveloped. Therefore, many of the proposed improvements will likely be accomplished by future developer extension projects. In addition to improvements for anticipated new developments, the District is studying the possibility of providing wholesale water to other purveyors by wheeling Seattle water through its system. As part of these studies, the District will determine the feasibility of wheeling water, including any required approvals from SPU, and what system improvements would be necessary.

5.7.3 East Area

Of the three main areas, the East Area has the largest potential for growth because a large portion of it is presently undeveloped. Although the majority of the area is rural, it also encompasses a portion of the City of Maple Valley which includes commercial/retail areas as well as higher density residential areas. There are several pressure zones in the East Area as a result of the Cedar River and the related topography.

The improvements proposed to the distribution system in this area are intended to improve reliability and reduce the vulnerability of the system. This could be done by providing additional crossings of Highway 18 and providing additional looping throughout the system. Increased reliability could also be accomplished by providing additional storage in the East Area (as previously discussed in this Section) and by increased transmission mains from the storage reservoirs to the main distribution system. Reconfiguring the pressure zones in this area, as recommended previously, will require additional system improvements and modifications. The undeveloped nature of the East Area indicated that many of the transmission and distribution mains and improvements will be accomplished by developer extensions in outlying areas.

Proposed improvements discussed in the Capital Facilities Plan include the possibility of using the Maplewood Well as an additional source in the East Area. In order to gain the most benefit from using this well, some improvements and changes to the distribution system would be required.

As described in paragraph 5.7.4, also included in the East Area improvements is the extension of a main to the Webster Lake Area is proposed to augment water supply in the Webster Lake Area. This will also provide service to additional properties in the vicinity, improve fire flows in the area and allow for connection to a future storage reservoir proposed for the Central-East zones. The District is proceeding with design of approximately 7,000 LF of 12-inch main to serve the area.

The Walsh Lake community and other existing and proposed facilities in the far east region of the District will be served by a main along Southeast 224th Street when they request service from the District.

5.7.4 Webster Lake Area

As discussed earlier, this distribution system was acquired and taken over in 1996 by Cedar River Water and Sewer District. It is presently capable of meeting only domestic

demand and the irrigation needs of the two served developments. There is interest in connecting this system to the East Area distribution system and the District has begun design of a 12-inch main to the area. There are currently no fire hydrants on this system. When the area is connected to the main Cedar River system, fire flow to the area will be greatly improved. However, several additions will be required in order to provide adequate fire flow. Also, the mixture of Lake Youngs Water and the water from the Webster Lake well may require special treatment facilities. An additional study beyond the scope of this comprehensive plan is recommended in order to determine the necessary improvements and changes to the distribution system necessary to connect the Webster Lake Area to the East Area system.

5.8 PUMPING FACILITIES

As mentioned in Section 3, the District currently has eight booster pump stations. The pump stations considered in this analysis are the pump stations that deliver the water supply from the SPU metering points to the reservoirs within the District. The other pump stations provide constant pressure pumping to smaller areas of the District and are in good condition.

Since the system relies primarily on gravity flow from the reservoirs, the pump station analysis falls under the same criteria as the source analysis. Along with the recommendation that the source be able to replenish the fire suppression storage within 72 hours while delivering the maximum day demand, it is also recommended that the maximum day demand be met with 18 hours of continuous pumping and that the average day demand be deliverable with the largest source pump off line. Table 5-4 indicates how the system responds to each of the criteria. Although the District currently does not have back-up power generators at any of the pump stations, a diesel powered fire pump is located at the Maplewood Booster Pump Station. The District is aggressively working to obtain back-up power generators and anticipates having them installed in early 2000. The paragraphs below provide a summary of the analysis of pumping facilities by area.

5.8.1 West Area

The pump stations in the West Area are known as the Fairwood Pump Station, the Fairwood Reservoir Booster Pump Station and the Fairwood Division 15 Booster Pump Station. The West Area is not deficient in pumping capacities through the anticipated buildout of the District. As stated previously, a back-up power supply is recommended and the District anticipates having it installed in 2000.

5.8.2 Central-East Area

The Central Pump Station and ULID 10 Booster Pump Station are physically located in the Central Area of the District while the Maplewood Pump Station and Highlands at Lake Wilderness Booster Pump Station are located in the East Area. The pump station analyses for the Central and East Areas are presented together. As shown on Table 5-4, the Central-East Areas are projected to become deficient in meeting one of the expected pumping capacity requirements, being able to meet the maximum day demand with 18 hours of continuous pumping, between 2005 and 2010. Shortly after 2010 it is anticipated that the system will have difficulty replenishing the fire suppression storage within 72 hours while delivering the maximum day demand.

Field tests were recently completed to verify the actual pumping capacity of the pumps in the Central Pump Station. The resulting data points do not fall on the established pump curves for the station. It is therefore recommended that the District perform more complete pump performance tests to create more accurate pump curves that can be used in future analyses. A recommendation of this Plan is that the District continue to monitor the performance of this station. A station upgrade is also recommended in the near future and included in the Capital Facilities Plan.

Another important pumping facility in the East Area is the Maplewood Estates Pump Station. The pump station consists of one variable speed domestic pump and one fire pump. The domestic pump has a capacity of approximately 140 gallons per minute and currently serves about 87 single-family residential connections. The pump station should

have the capacity to provide the peak hour demand to the 890 zone (the area that is or will be served by the pump station) until an 890 zone reservoir is constructed. After the reservoir is constructed the required pumping capacity will most likely decrease due to the available storage capacity. Fire flow for this area is already provided by the dedicated fire pump. Using the average day demand for the Maplewood Estates area in 1998 (about 268 gallons per ERU per day) and applying the applicable peaking factor, it was determined that the existing pump station has the capacity to serve approximately 215 ERUs at peak hour demand. Significant development in the 890 zone is not anticipated during the six year planning period of the Plan. Therefore, improvements are not recommended at this time. If and when development in the zone approaches 215 ERUs, the District should reevaluate the situation to determine what, if any, system improvements are needed.

5.8.3 Webster Lake Area

The Webster Lake Estates Booster Pump Station is not deficient in meeting any of the recommended standards. It is anticipated that the system will not become deficient through build-out of the area.

TABLE 5-4
CEDAR RIVER WATER AND SEWER DISTRICT
PUMP STATION CAPACITY ANALYSIS

Criteria 1 - Replenish Fire Storage within 72 Hours while Delivering Maximum Day Demand (gpm)	1998	2000	2005	2010	2015	2020
West						
Total Required	1,469	1,499	1,493	1,507	1,573	1,639
Existing	2,900	2,900	2,900	2,900	2,900	2,900
Surplus/(Deficit)	1,431	1,401	1,407	1,393	1,327	1,261
Central-East						
Total Required	1,538	1,594	2,455	2,954	3,229	3,504
Existing	3,000	3,000	3,000	3,000	3,000	3,000
Surplus/(Deficit)	1,462	1,406	545	46	(-229)	(-504)
Webster Lake						
Total Required	23	29	32	31	31	31
Existing	60	60	60	60	60	60
Surplus/(Deficit)	37	31	28	29	29	29

Criteria 2 - Deliver Maximum Day Demand with 18 Hours (or less) of Pumping (MG)	1998	2000	2005	2010	2015	2020
West						
Total Required	1.94	1.98	1.97	1.99	2.09	2.18
Existing	3.13	3.13	3.13	3.13	3.13	3.13
Surplus/(Deficit)	1.19	1.15	1.16	1.14	1.04	0.95
Central-East						
Total Required	1.85	1.94	3.17	3.89	4.29	4.69
Existing	3.24	3.24	3.24	3.24	3.24	3.24
Surplus/(Deficit)	1.39	1.30	0.07	(-0.65)	(-1.05)	(-1.45)
Webster Lake						
Total Required	0.03	0.04	0.05	0.04	0.04	0.04
Existing	0.06	0.06	0.06	0.06	0.06	0.06
Surplus/(Deficit)	0.03	0.02	0.01	0.02	0.02	0.02

Criteria 3 - Deliver Average Day Demand with Largest Source Pump Off-Line (gpm)	1998	2000	2005	2010	2015	2020
West						
Total Required	597	611	608	615	644	673
Existing	1,500	1,500	1,500	1,500	1,500	1,500
Surplus/(Deficit)	903	889	892	885	856	827
Central-East						
Total Required	572	597	881	1,202	1,324	1,446
Existing	2,500	2,500	2,500	2,500	2,500	2,500
Surplus/(Deficit)	1,928	1,903	1,619	1,298	1,176	1,054
Webster Lake						
Total Required	10	13	14	14	14	14
Existing	60	60	60	60	60	60
Surplus/(Deficit)	50	47	46	46	46	46

Notes: Annual water rights limitations not considered for Webster Lake.
A detailed analysis table can be foind in the Appendices.

5.9 SUMMARY OF DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

The following paragraphs summarize the system deficiencies described throughout this Section. Section 6 of the Plan contains the Capital Facilities Plan for the District.

5.9.1 Source

The analysis in this Plan indicates that the source requirements are adequate to meet the demands of the system through buildout for the West Area and through approximately 2011 for the Central-East Areas. Implementation of a stringent conservation program has been accomplished for Webster Lake and a water main to augment the existing well serving that area is currently being designed. It is recommended that the District continue to pursue the establishment of the Maplewood Well as an additional source within the East Area of the District. The District should also continue to pursue the construction of additional interties with neighboring purveyors.

5.9.2 Storage

Based on the current and estimated population and Equivalent Residential Units, the District currently meets the minimum storage requirements throughout the District. It is recommended that the District plan future system improvements based on meeting the total recommended storage volume. The addition of a recirculating pump between the Fairwood reservoirs in the West Area would improve water quality and convert all the storage in the reservoirs to usable storage. This would maintain surplus storage in the West Area through buildout. Additionally, structural integrity analysis of the one million gallon Fairwood reservoir is recommended, as well as painting the Fairwood two million gallon reservoir and adding security fences around the Fairwood one million gallon reservoir.

The Central-East Areas become deficient in meeting the minimum required storage in 2005 (the total volume considered includes the proposed McGarvey Park reservoir). The District should consider planning future improvements to meet the recommended storage volume for reliability considerations. Three possible locations for proposed

reservoirs in the East Area are indicated on the Water System Plan Map.

5.9.3 Pressure Zone Configurations

The pressure zone configuration within the District needs to be modified to simplify the zones and to provide more reliable service within the zones by better looping of mains. In general, the PRV settings need to be verified and adjusted, if necessary. It is recommended that several of the pressures zones be reconfigured by combining zones or opening/removing existing PRVs. It is also recommended that the existing 12-inch main in Maple Valley-Black Diamond Road be converted to a 756 zone transmission main to better utilize the capacity the District has in the joint use reservoir with Covington Water District. Several other recommendations, along with the zone reconfiguration, would allow the District to reduce the amount of water it currently pumps to its customers.

5.9.4 Transmission and Distribution System

In general, there are several projects recommended on the Capital Facilities Plan that would greatly enhance the District's looping characteristics, therefore increasing system reliability and fire flows. The District should also establish annual replacement programs to replace aging portions of the system, such as asbestos cement mains and small mains.

Since the West Area is isolated from the rest of the District, it is difficult to efficiently serve all the customers in the area. Recommended upgrades to the main trunk line would reduce headloss through the system while increasing fire flows to the western most customers in the District. As stated previously, the District should continue to pursue the establishment of at least one intertie with Soos Creek Water and Sewer District.

The primary recommendations for the Central-East Areas include upgrades to the main distribution system to allow for increased service to the south and east, the mainly undeveloped areas of the District. It is anticipated that many of the improvements will

be accomplished by Developers as those areas experience the anticipated growth.

Other specific recommended projects include a study to determine if the Maplewood Well could be used as an alternative water source. As stated previously, the extension of a main to the Webster Lake Area to help meet the demands on the system and to provide fire flow to the area is presently being design.

5.9.5 Pumping Facilities

The District's pumping facilities in the West and Webster Lake Areas are sufficient to meet the anticipated demands through buildout of the systems. The Central-East Areas are expected to become deficient by approximately 2010. As that time approaches and before making any upgrades to the pump station facilities, the District should reevaluate the situation to determine exactly what is needed based on actual growth rates and demand.

SECTION 6

CAPITAL FACILITIES PLAN

6.1 INTRODUCTION

This Section of the Plan outlines the recommended Capital Facilities Plan (CFP) for the District. Table 6-1 summarizes the recommended improvements and gives an estimated cost as well as scheduling and financing recommendations. The projects outlined herein are described in detail throughout the Plan and Section 6 provides detailed information.

6.2 PROJECT COST ESTIMATES

The cost estimates outlined herein are based on a variety of factors, the most important of which are engineering experience and documented costs of similar construction work. Other factors affecting cost estimates include the complexity of the project and the known and unknown constraints which may be associated with construction. Due to the general nature of many of the projects recommended herein, it is important to note that the actual design of the improvements and possible changes made during that design could significantly impact the cost of the project from the given estimate. Prior to the initiation of the projects outlined in the CFP, specific design criteria should be reviewed and cost estimates updated to reflect current conditions. The costs are adjusted to the local, fourth quarter 1998 Engineering News Record (ENR) index of 6948. The cost estimates presented include: construction costs, tax, overhead costs for project engineering, legal and administration services (35%) and a contingency factor (usually 20%). In areas where work is anticipated in easements, an additional contingency factor (10%) has been included to cover the specific costs associated with such work.

6.3 PROJECT SCHEDULING

A six year Capital Improvement Schedule has been developed for the years 2000 through 2005 and outlines the immediate project requirements for the District. The projects have been prioritized according to the needs determined by a combination of engineering analysis performed in this planning process, the District's existing Capital Facilities Plan and information provided by District staff. In addition to the six year improvement schedule, projects have been generally identified for the years 2005 to 2007.

It is recommended that this CFP be reviewed annually to confirm the actual construction program for the next year. Project priorities are anticipated to change in the future based on more current information, key community issues and available funding. Several of the projects identified in the previous sections of the Plan and in the later years of the CFP are dependent on the success and completion of other projects. It is important that the District staff review project priorities as additional studies and analyses are performed and that the established practice of reviewing project costs and priorities is continued.

TABLE 6-1
CEDAR RIVER WATER AND SEWER DISTRICT
CAPITAL FACILITIES PLAN

#	PROJECT DESCRIPTION	PROJECT FUNCTION	LENGTH (FEET)	SIZE	ESTIMATED COST	SCHEDULE & FUNDING
1	Pump Station Generators	Backup power for Central and Fairwood pump stations	-	-	$160,000	2000 Rates, GFC
2	Fairwood Reservoir Recirculation Pump	Pump to transfer water from 1.0 MG to 2.0 MG reservoir in West to better utilize storage and to improve water quality, overall pressures and fire flows	-	-	$150,000	2000 Rates, GFC
3	Fairwood 2.0 MG Reservoir Painting	Reservoir painting	-	-	$35,000	2000 Rates, GFC
4	Fairwood 1.0 MG Reservoir Investigation/Rehabilitation	Inspect and repair reservoir Add security fence	-	-	$100,000	2000-2001 Rates, GFC
5	Rock Mountain Reservoir Security and Upgrade	Prevent vandalism and protect property	-	-	$60,000	2000-2001 Rates, GFC
6	East Reservoir (E3) - 1.0 MG	Provide additional storage in the East Area	-	1.0 MG	$1,150,000	2000-2001 * Rates, Surcharge, GFC
7	Central Pump Station Upgrade	Upgrade station to meet anticipated system demands	-	-	$150,000	2000 Rates, GFC, PWTF

TABLE 6-1
CEDAR RIVER WATER AND SEWER DISTRICT
CAPITAL FACILITIES PLAN

#	PROJECT DESCRIPTION	PROJECT FUNCTION	LENGTH (FEET)	SIZE	ESTIMATED COST	SCHEDULE & FUNDING
8	Bain Road to 231st Connection along SR 169	Provide additional system looping and connection between Central and East Areas	3400	12"	$525,000	2000 Funded (1993 Bonds)
9	244th Extension to Lake Webster	Connect Lake Webster to East Area system and increase reliability to serve customers in existing developments	8,000	12"	$1,200,000	2000-2001
10	Fairwood Transmission Main Improvements to reservoirs	Add parallel 16" main to improve fire flows in the West Area	1,250	16"	$300,000	2000 Rates, GFC, PWTF
11	Abandon 184th Avenue Pump Station	Abandon old pump station	-	-	$75,000	2001 Rates, PWTF
12	Abandon Witte Road Pump Station	Abandon old pump station	-	-	$30,000	2000 Rates
13	SE 215th Main Replacement	Undersized mains	2,620	8"	$265,000	2000 Rates, GFC, PWTF
14	212th Avenue SE Main Replacement	Undersized mains	500	8"	$50,000	2000 Rates, GFC, PWTF

TABLE 6-1
CEDAR RIVER WATER AND SEWER DISTRICT
CAPITAL FACILITIES PLAN

#	PROJECT DESCRIPTION	PROJECT FUNCTION	LENGTH (FEET)	SIZE	ESTIMATED COST	SCHEDULE & FUNDING
15	225th Avenue SE Main Extension	8" main extension	500	8"	$50,000	2001 Rates, GFC, PWTF
16	Shadow Lake Estates Area Main Replacement	Undersized mains, increase fire flows	15,840	8"	$1,750,000	2001-2002 Rates, GFC, PWTF
17	Tahoma 9th Grade (Landsburg) School Extension	Extend service and fire protection (Total Cost $1,200,000±, District Contribution $470,000±)	14,000	12"	$470,000	2000 * DE, GFC
18	Fairwood Blvd. Main Upgrade (6" & 8" AC & CI) 156th Avenue SE to 140th Avenue SE	Improve fire flows in the West and provide a main trunk from tanks	6,900	12" or 16"	$1,380,000	2000-2001 Rates, GFC, PWTF
19	New District Office	Construction of new District office, including land acquisition	-	-	$3,000,000	2002-2003 Rates, GFC
20	12" Main on 196th Avenue SE from Petrovitsky to SE 193rd Street	Improve fire flows to Maple Valley Heights	2,900	12"	$420,000	2002 Rates, GFC, PWTF
21	Maplewood Estates Well Ground Water Source Development Ground Water Source Production Well East Area Supply Facilities	Provide backup source to East Area	 - - 5,000	 - - 12"	 $700,000 $300,000 $725,000	2000-2002 Rates, GFC

TABLE 6-1
CEDAR RIVER WATER AND SEWER DISTRICT
CAPITAL FACILITIES PLAN

#	PROJECT DESCRIPTION	PROJECT FUNCTION	LENGTH (FEET)	SIZE	ESTIMATED COST	SCHEDULE & FUNDING
22	Peter Grubb Road Extension	Provide loop to 196th Avenue and East Covington intertie	4,220	12"	$620,000	2001 Rates, GFC, PWTF
23	756 Zone Distribution Well/Transmission Main	Maplewood Well Transmission Main Utilize Alternate Source	20,000	12"	$3,000,000	2002-2003 Rates, GFC, PWTF
24	756 Zone Transmission Main Conversion (Maple Valley-Black Diamond Highway)	Enable utilization of joint use reservoir/consolidate zones	-	-	$200,000	2000-2001 Rates, GFC, PWTF
25	East Intertie Booster Pump	Allow filling of joint use reservoir	-	-	$100,000	2001 Rates, GFC, PWTF
26	SE 232nd Street to Witte Road Main	Provided needed loop in southern part of District and have the ability to wheel water to the south	10,500	12"	$1,600,000	2003-2005 Rates, GFC
27	Main from Central Reservoir to SE 210th Street	Alleviate pressure problems on 210th dead end and the restrictions caused on the rest of the system	810	8"	$90,000	2003 Rates, GFC

TABLE 6-1
CEDAR RIVER WATER AND SEWER DISTRICT
CAPITAL FACILITIES PLAN

#	PROJECT DESCRIPTION	PROJECT FUNCTION	LENGTH (FEET)	SIZE	ESTIMATED COST	SCHEDULE & FUNDING
28	Annual Miscellaneous Facility Replacement SE 171st Place from 136th Place SE 137th Avenue SE SE 166th Place SE 169th Street SE 172nd Street	Replace 4" AC pipe to improve fire flows	570 620 590 495 380	8" 8" 8" 8" 8"	$57,000 $62,000 $59,000 $50,000 $40,000	2003-2005 Rates, GFC, DE, PWTF
29	Asbestos Cement & Cast Iron Pipe Study	Study AC and CI pipes in order to prioritize improvements and monitor water quality	-	-	$100,000	2004-2005 Rates, GFC
30	Soos Creek Interties	Interties to provide supply in emergency situations (2 @ $100,000)	-	-	$200,000	2003-2004 Rates, GFC, PWTF
31	Shady Lake Water Main Replacement	Replace 6" AC main to provide transmission from Central Pump Station to Central & Rock Mnt. Reservoirs	3,300	12"	$500,000	2004 Rates, PWTF
32	Reservoir E4 - 1.0 MG	Provide needed additional storage in the East	-	1.0 MG	$1,150,000	ARBD DE, Rates, GFC, PWTF
33	Reservoir E5 - 1.0 MG	Provide needed additional storage in the East	-	1.0 MG	$1,150,000	ARBD DE, Rates, GFC, PWTF

TABLE 6-1
CEDAR RIVER WATER AND SEWER DISTRICT
CAPITAL FACILITIES PLAN

#	PROJECT DESCRIPTION	PROJECT FUNCTION	LENGTH (FEET)	SIZE	ESTIMATED COST	SCHEDULE & FUNDING
34	224th Extension to Walsh Lake Community	Connect Walsh Lake Community to main east area system	7,000	12"	$1,100,000	ARBD ULID, DE, PWTF
35	12" Main on Petrovitsky	Increase system reliability, provide a redundant back-bone main going south from the tanks and supply, assist in possible whole supply demand	9,870	12"	$1,430,000	ARBD DE
	TOTAL				**$24,553,000**	

Notes:
Changes in the capital improvements schedule may occur from time to time as actual development dictates the exact need and location of water system extensions and facilities, and as the District reviews its capital improvement needs in relation to available funds and project priorities.
DE = Developer Extension, PWTF = Public Works Trust Fund Loan, ARBD = As Required by Development, GFC = General Facilities Charge,
ULID = Utility Local Improvement District, * = Funded by 1999 Bond Sales

SECTION 7
FINANCIAL CONSIDERATIONS

7.1 INTRODUCTION

The purpose of this Section is to present a strategy for implementation of Cedar River Water and Sewer District's Comprehensive Water System Plan. The implementation strategy requires the subsequent discussion of financial considerations, developer extension policies, the District's construction standards, service area agreements, and legal considerations.

7.2 FINANCIAL CONSIDERATIONS

Financial recommendations are made based on estimates of future expenses, operating experience and plans for future projects. The major financial considerations in estimating expenses and revenue requirements are as follows:

- Administration, operation, maintenance and the day-to-day expenses of operating and maintaining the water system, including the cost of water supply.

- Debt service requirements to provide for repayment of interest and principal for all outstanding bonds for previous system improvements.

- Replacement and updating of existing facilities that require renewal because they are either obsolete or no longer serviceable.

- Financing capital improvements which are necessary to provide adequate service and extensions within the identified water service area boundary.

- Other requirements which are anticipated during the planning period.

7.3 FINANCIAL GOALS AND OBJECTIVES

The District has also established financial goals and objectives. Key goals and objectives considered in development of this Plan are as follows:

- Adequate funds should be maintained to cover day to day operations, planned capital expenditures, emergency reserves and debt service.

- Water rates should be cost based and equitable and set at a level to meet the full revenue requirements of the utility.

- Water rates should be stable in both their ability to provide adequate revenues to meet the utility's financial, operating and regulatory requirements and in the customer's perception of the rates from year to year.

- Grant funding should be utilized wherever possible.

- System extensions should be financed by developers requesting service, with latecomers charges for payback wherever appropriate.

- Capital projects should be coordinated with other jurisdictions whenever possible to reduce overall project costs.

7.4 SYSTEM FACILITY FUNDING

In order to better understand the methods available to finance capital water system improvements, a brief summary of the types of system facilities and typical funding mechanisms for each follows:

7.4.1 General Facilities

General Facilities include storage reservoirs, sources of supply, transmission mains, oversized pipes to serve large areas, etc. General facilities tend to be the most difficult

type of improvement to finance because they are needed before an area can be served water and often times before customers are available to assist in financing. These facilities are usually quite costly and properly planned facilities benefit large areas. In newly developing areas, General Facilities are typically financed by one of the following methods:

- Passing a General Obligation Bond approved by the voters.
- Forming a Utility Local Improvement District (ULID) and assessing the benefitted properties equitably.
- Requiring the initial developers to pay for the improvements with a pay-back arrangement (Latecomer Agreement) as the area develops.
- Funding the improvements and assessing a General Facility Charge (GFC) to each property within the benefitted area as development occurs. This charge must cover all costs incurred including interest on money and an allowance at a rate that will amortize the investment.
- Obtaining grants or low interest loans to assist in construction of these types of facilities.

In older, established service areas, financing these General Facilities improvements or replacement of facilities presents a different type of problem. The General Facilities were paid when the system was built and their costs were assessed against the property owners. As the system expands and new customers are connected, an area charge assessment can be levied against these properties or a connection fee can be imposed. This money, in addition to monthly rate funds for renewal and replacement, is often adequate to finance General Facility improvements. Theoretically, if the facilities charges and rates are adequate, sufficient funds will be available to make the needed General Facility improvements.

7.4.2 Local Facilities

Local Facilities include local distribution mains, pressure reducing stations, fire hydrants, valves, etc. These facilities benefit a smaller area than General Facilities. The costs of these improvements can be directly attributed to the properties within an identified area

which receive direct benefit from the improvements. Generally, Local Facilities are identified as the water line in front of a property, but may include other specific facilities required to provide service. Typical financing methods for Local Facilities are as follows:

- Formation of a ULID.
- Developer Extension Agreements.
- Local Facilities Charges (LFC's). These charges must be sufficient to cover the costs associated with the facility serving individual properties and are assessed at the time of new development, typically on a per lot or per front footage basis.
- Latecomer or Reimbursement Agreement.
- Grants, low interest loans or outside assistance, including District participation, to reduce local costs.

7.4.3 Individual Service Lines

The Individual Service Line is the line, starting at the customer side of the water meter, that runs from the main in the street to the building being served. The property owner is responsible for all construction costs of the service line, connection fees, inspection fees and all other costs associated with the installation. Exceptions to this might be if the District were to relocate service meters as part of a pipeline replacement project. In this case it might be appropriate to include the costs associated with relocation of the service pipe beyond the meter in the overall project cost.

7.5 AVAILABLE FUNDING SOURCES

As mentioned above, there are several available financing options. The funding method used for a specific project is usually dependent upon several factors including total project costs, users and beneficiaries, and the statutory limits of the public agency. Primary funding options available to the District are further described below.

7.5.1 Water Rates

The District's primary source of revenue is the money that it collects from monthly rates and charges to its customers. Water rates include both monthly base (meter) charges

and consumption charges. Revenues from water rates are intended to cover those costs which are not paid when the initial system is constructed or by other charges, assessments or fees. The rates must be adequate to cover the costs associated with the revenue rate base, which includes the below itemized cost elements:

- Operation expenses.
- Maintenance expenses.
- Water supply purchase and/or production costs.
- Customer accounting and collection expenses.
- Administrative and general expenses.
- Taxes.
- Debt service requirements.
- Renewal and replacement.

The District annually reviews its revenues and expenses to determine the adequacy of the existing rates. A budget is completed for the following year's expenses and projected revenues. Adjustments to the water rates are made based upon the budget review. Although a general review of all rates and charges has been accomplished concurrently with this Comprehensive Plan to insure that revenues are sufficient to cover anticipated costs, a rate study has not been accomplished. Existing District rates are presented later in this Section.

7.5.2 Connection Charges

Connection charges are those charges assessed to a newly developing (or re-developing) property. RCW 57.08.010 provides the authority to assess connection fees to newly connecting properties so that these property owners bear their equitable share of the cost of the water system. Connection charges represent the pro rata share of existing facilities and those identified in the Comprehensive Plan and planned over the next ten years, and other improvements which are directly attributable to improvements required by the property owner seeking connection to the system.

Connection fees are generally established as a one time charge assessed against developers or new customers to recover an equitable share of the value of the capacity in facilities that are or will be available to serve the new customer. Connection fees add equity to fund system improvements by requiring new customers to make initial contribution so that the rates of existing customers do not increase to fund system growth related expansions. Two types of connection fees which are typically assessed in Cedar River Water and Sewer District are further described in the following paragraphs.

7.5.2.1 General Facility Charges

General Facilities Charges (GFC's) are charges which provide an equitable means for new connections to pay their fair share of District-wide capital improvements or General Facilities. It is important that these charges be maintained so that the District's demand for new facilities are supported by growth within the District. The District GFC's were last reviewed and updated in 1996 (Goldsmith and Associates, Water and Sewer System Connection Charge Study, 1996 Update). It is recommended that these charges be reviewed and updated as a follow-up to this Comprehensive Plan and periodically thereafter.

7.5.2.2 Local Facilities Charges

Local Facilities Charges (LFC's) are assessed to cover the costs associated with the facilities in the immediate vicinity of the property which is seeking connection to the system. Local Facility Charges are typically limited to infill type development while developer financing (and/or latecomer fees) as described below are used in newly developing areas. It is recommended that these charges be reviewed and updated as a follow-up to this Comprehensive Plan and periodically thereafter.

7.5.3 Developer Financing

New facilities constructed in the District for the benefit of a new development should be financed by the developer of the presently unimproved property or the property to be redeveloped.

7.5.3.1 Developer Extension Fees

The developer may be required to pay all fees to construct the facilities to serve the new development or redeveloped property. All of the facilities must be approved by the District and must be constructed according to District standards.

7.5.3.2 Latecomer Fees

A latecomer's fee can be assessed when a new development intends to connect to the District's system through existing facilities that were initially paid for by a LID, developer extension or by the District in anticipation of increased demand. The latecomer's fee represents the latecomer's proportionate share of the cost of the facilities which were paid for by someone else.

Currently the District determines latecomer fees based on two components, the general facility charge (GFC) and the local facility charge (LFC). If the property is in a rural location, the LFC is based on property acreage. If the property is in an urban setting, a front footage LFC is charged. The urban developments also pay an extra per inch charge for the size of the pipe over the standard 8-inch size. It is recommended that the LFC fees be reviewed to consider the option of a fee that reflects a portion of the actual cost of the facility.

7.5.4 Combination Developer/District Financing

In some cases it may be necessary to require a developer to construct a larger facility than what is required for the development in order to provide for the comprehensive development of the District's water system. The District may enter into an agreement

with the developer to provide reimbursement for the extra cost associated with increasing the facility size. Oversizing should especially be considered when sizing mains over 8-inches in diameter in a single-family residential area.

7.5.5 Utility Local Improvement Districts (ULID's)

Water and sewer districts have the authority to establish utility local improvement districts (ULID's) and to levy special assessments, on an annual basis, for up to twenty years against the property owners within the identified local improvement district. ULID's must be supported by the majority of the properties within benefitted area established either by petition or District resolution. Projects funded through a ULID must have a special, identifiable benefit to the properties included in the assessment area and ULID assessments must be consistent with the relative benefit to each property. Initial funding for ULID projects is often provided by bond sales or loans.

7.5.6 Bond Financing

Major distribution lines, transmission mains, reservoirs, pump stations, source improvements and other major system improvements may be financed by the sale of general obligation (GO) or revenue bonds.

7.5.6.1 General Obligation Bonds

General Obligation bonds are secured by the issuer's power and obligation to levy property taxes, without limitation as to rate or amount, for the payment of bond service. GO bonds are generally the least costly because of the security of the unlimited taxing power. GO bonds can be issued for an entire District or for a "specific improvement district" that benefits from the financed facilities and become assessments again the affected properties. GO bonds are typically paid for by these assessments or other funds available to the District. A three-fifths voter approval rate is required to secure this financing.

7.5.6.2 Revenue Bonds

Revenue bonds are secured by the issuer's ability to generate non-tax revenue such as water rates, ULID assessments, connection charges, interest earnings, and miscellaneous fees and charges. Revenue bonds are typically used to allocate the project costs to those who will benefit from it. A minimum coverage pledge (ratio of net revenue to annual debt service) is required for revenue bonds but voter approval is not.

7.5.7 Grants and Loans

State and federal authorities have previously provided funds under various grant and loan programs for the engineering design and construction of major water system improvements. Currently, however, there are very limited opportunities to obtain such funds. Low interest Public Works Trust Fund (PWTF) loans are available from the Washington State Department of Community Development and are competitively awarded on the basis of need and Utility-wide management efforts. The PWTF loans are available for pre-construction, construction, and capital facilities planning efforts and the program has recently been expanded to include projects which support planned growth within the system. The pre-construction loans are issued for design, engineering, bid preparing, environmental studies, and the acquisition of right-of-ways for eligible facilities while construction loans are offered for repair, replace and improve the public infrastructure systems. The pre-construction and construction loan programs require a local match of ten to thirty percent with nominal interest rates depending on the level of local matching funds. The on-going capital facilities Planning Loan Program provides one time, no interest loans for planning efforts and does not require a local match.

Other types of grant and loan funding which may become available, such as funds provided by the State Revolving Fund and Rural Development Association, should be periodically researched to determine whether the District is eligible and/or if funding is appropriate.

7.6 FINANCIAL POLICIES

7.6.1 Developer Extension Policies

The District, as a municipal corporation, has a responsibility to the public to insure that water mains installed in public streets and easements are constructed in accordance with currently accepted standards for public works. Therefore, the District maintains developer extension regulations which set forth construction standards for extensions to the District's system. These standards are included in the appendices to this Plan.

7.6.2 General Facility Policies

General Facilities, for the most part, are constructed by the District as major capital improvements projects. If these improvements are financed as assessments against the properties within the District, or are paid for by only a portion of the area, then a charge is imposed for customers or developers seeking service from the District to cover their fair share of these costs. The District's current General Facilities Charges are outlined later in this Section.

7.6.3 Local Facilities Policies

Property owners or developers requesting water service from the District must pay for all costs associated with the design and construction of the local mains and extensions from the existing system. The normal method for this to occur is by signing an Agreement for Constructing Extensions to the Water System. This document establishes the procedures and requirements in constructing an extension to the District's facilities. Other acceptable methods of financing these improvements are the formation of a ULID or low interest loans or grants that may come available from time to time. The District may wish to allow a latecomer agreement for costly extensions to the water system. Such agreements allow a person or developer who initially installed and paid for a facility to be reimbursed by benefitting property owners who subsequently connect to the facility. Customers connecting to an existing District main should also pay their fair share of the District installed facility. This is typically accomplished by charging a Local Facility Charge (LFC). All facilities constructed through Developer Extensions will be

deeded to the District via a bill of sale, generally at no charge to the District.

7.6.4 Individual Service Line Policies

Financing for individual service lines is probably the least difficult to handle since the property owner must pay for the construction of the service line, connection fee, District inspection fee and all other costs associated with the installation. The cost of a residential water service connection depends on whether a full water service is required or if only a new meter is to be installed on an existing service. It also depends on the construction difficulties encountered during installation. It is recommended that only approved contractors, or the District's own maintenance personnel, be allowed to connect to the District's facilities. The cost for a water service must cover the following expenses: Cost of labor, materials and equipment required for installation; Cost of inspection; Permit cost; and, Costs of labor and associated benefits. The District also assesses a new customer fee and a closing fee to help offset billing set-up costs.

7.7 EXISTING DISTRICT METHODOLOGY

7.7.1 Project Financing

Historically, Cedar River Water and Sewer District has relied on a combination of developer financing and ULID's for construction of extensions to the water system, and on a combination of water rate revenues, connection charges, bonds and low interest loans for capital improvements to the system.

7.7.2 Rates and Charges

The District's present water rates are presented in Table 7-1. The current rates were determined by a rate review completed in 1999. They were effective for water consumption after October 16, 1999 and were approved by the District by Resolution 3789 on October 19, 1999. The District's rates are based on a inclining block rates to encourage water conservation.

7.7.3 Bond Financing

Cedar River Water and Sewer District recently sold $5.8 million in revenue bond financing. This funding will finance the ongoing Shady Lake sewer ULID project and various other water and sewer capital improvement projects. Bond payoff will be accomplished out of revenue generated from rates, charges, assessments and connection fees.

7.7.4 Loan Financing

The District has utilized low interest (Public Works Trust Fund) loan financing for several of its replacement projects in the past and intends to apply for more in the future. Projects which are most appropriate for PWTF financing have been identified in Section 6. Payback of Public Work Trust Fund Loans is typically accomplished out of revenues from rates, charges and connection fees.

7.7.5 District Budget

7.7.5.1 Revenues and Expenditures

Table 7-2 presents water utility revenues and expenses for the years 1994 through 1998. Table 7-3 indicates projected revenues and expenditures for 1999 and projected budgets for the next six years. Projected expenditures include all costs associated with operation of the system, including water quality monitoring, as well as estimated project costs for completing the most critical of the capital improvements projects identified previously in this document. Several assumptions have been made in developing the project budget in order to provide an accurate estimate of future revenues and expenditures. These assumptions are identified in the notes to Table 7-3 and are related to growth rates over the six year planning period and the costs associated with water production and system operation. Table 7-4 presents projected annual expenditures associated with the implementation of the Capital Facilities Plan contained in Section 6. Please note that the potential source of funds associated with the expenditures are identified in Section 6.

7.8 STANDARD DETAILS AND SPECIFICATIONS

The District's Standard Details and Construction Specifications are on file at the District Office and with the State Department of Health for review by any interested party.

7.9 ENVIRONMENTAL REVIEW

As part of this planning process, an environmental checklist has been completed and circulated for comments in accordance with the requirements of the State Environmental Protection Act. Copies of this documentation are included in the Appendices.

7.10 AGENCY REVIEW AND COMMENTS

In accordance with State Department of Health requirements, copies of this Plan have been circulated to the State Department of Health, King County, the District, and other interested parties for review and comment. Copies of comments and responses received to the Plan are included in the Appendices.

TABLE 7-1
CEDAR RIVER WATER AND SEWER DISTRICT
EXISTING WATER RATES AND CHARGES

Description of Rate or Charge	Rate/Charge
Connection Charges	
General Facility Charges	
Single-Family	$1,675
Multi-Family (Condos & Apartments)	$1,340
Mobile Homes	$1,340
Local Facilities Charges	
Rural Acreage & Transition Zones	$1,980 per acre
Front Footage (Urban)	$45.47 per foot
Front Footage Over 8-inches (Urban)	$2.55 per inch/foot
Monthly Meter Charges	
5/8-inch & 3/4-inch Meter	$ 8.75
1-inch Meter	$11.66
1-1/2-inch Meter	$23.53
2-inch Meter	$41.34
3-inch Meter	$74.04
4-inch Meter	$121.53
Over 4-inch Meter	Determined Case by Case
Multi-Family Billing Structure	
Base Water Charge	$4.72 per unit
Billing Charge	$2.75 per building
Water Usage Charges	
0 to 500 CF	$1.74 per 100 CF
500 CF to 1,500 CF	$2.58 per 100 CF
1,500 CF to 2,500 CF	$2.90 per 100 CF
Over 2,500 CF	$4.41 per 100 CF
Un-metered Water Sales (Hydro-Seeders)& Hydrant Meters	
Basic Charge	$8.75
Consumption Charge	$2.72 per 100 CF
Rental Charge - Hydrant Meters	$2.00 per day

Notes: Rates and charges effective on December 16, 1999 pursuant to District Resolution 3789. A complete fee schedule is on file at the District office.

Cedar River Water and Sewer District

Historical Financial Information

Financial Statement Data:

Balance Sheet:

	1994	1995	1996	1997	1998
Utility Plant	17,070,855	18,599,818	20,880,012	23,240,223	23,815,550
Restricted Current Assets	1,518,638	1,042,837	2,383,545	2,359,236	1,920,566
Current Assets	2,406,489	2,293,279	2,705,194	4,080,516	5,491,674
Other Assets	717,507	936,743	769,188	909,701	573,847
	21,713,489	22,872,677	26,737,939	30,589,676	31,801,637
ULID Assessments	1,713,825	1,713,825	1,713,825	1,713,825	1,713,825
CIAC	15,226,670	16,292,393	17,891,744	21,910,792	23,678,547
Appropriated RE	545,200	525,600	527,038	511,066	508,073
Unappropriated RE	(151,504)	(55,654)	161,360	464,421	797,822
Equity	17,334,191	18,476,164	20,293,967	24,600,104	26,698,267
Long-term Debt	3,445,000	3,130,000	5,198,526	4,782,288	4,247,824
Restricted Current Liabs.	438,543	730,452	549,730	560,002	496,055
Current Liabilities	269,408	249,844	373,800	330,985	359,491
Other Liabilities	226,347	286,217	321,916	316,297	-
	21,713,489	22,872,677	26,737,939	30,589,676	31,801,637

Income Statement:

Water Service	1,547,074	1,721,036	1,860,772	2,044,150	2,457,207
Sewer Service	1,135,333	1,250,361	1,338,701	1,473,065	1,563,982
Street Lights	102,247	107,024	109,761	111,049	111,178
Permit Income	11,688	11,279	16,322	36,003	49,858
Late Charges	45,308	47,629	49,957	52,433	43,581
Miscellaneous	11,754	11,791	28,298	12,614	22,573
	2,853,404	3,149,120	3,403,811	3,729,314	4,248,379
Supply	1,380,859	1,577,917	1,716,295	1,801,414	2,151,624
Distribution and Maintenance	289,444	327,349	318,784	337,062	390,966
General & Administrative	561,067	636,829	717,739	790,499	888,728
Depreciation	500,082	545,866	520,939	609,326	673,114
	2,731,452	3,087,961	3,273,757	3,538,301	4,104,432
Operating income (loss)	121,952	61,159	130,054	191,013	143,947
Investment Income	136,342	157,371	166,653	270,093	334,768
Assessment Interest	29,412	18,515	27,167	10,976	11,963
Interest on Lien Notes	8,387	502	2,922	82	1,322
Other Interest	23,199	36,525	34,084	5,669	375
	197,340	212,913	230,826	286,820	348,428
Interest on Debt	206,968	185,949	119,751	173,294	134,951
Amortization	7,253	11,873	22,677	29,422	27,016
Loss on Asset Dispostions				4,975	
	214,221	197,822	142,428	207,691	161,967
Net Income	105,071	76,250	218,452	270,142	330,408

TABLE 7-3
CEDAR RIVER WATER & SEWER DISTRICT
COMBINED WATER AND SEWER PROJECTED BUDGET

Description	1999 Projected	2000	2001	2002	2003	2004	2005
INCOME							
Income from Misc. Billouts	8,100	10,000	10,300	11,021	11,792	12,618	13,501
Delinquent Account Penalties	42,300	35,000	36,050	38,574	41,274	44,163	47,254
Final Notice Fee	4,253	4,000	4,120	4,408	4,717	5,047	5,400
Unmetered Water Sales	7,000	8,000	8,240	8,817	9,434	10,094	10,801
Metered Water Sales	2,706,119	2,735,558	2,872,336	3,073,399	3,288,537	3,518,735	3,765,047
Sewer Service Charges	1,417,264	1,689,766	1,887,339	2,019,453	2,160,814	2,312,071	2,473,916
Service Change Fees	12,000	11,000	11,330	12,123	12,972	13,880	14,851
NSF Check Fees	750	1,000	1,030	1,102	1,179	1,262	1,350
Shut off Fees	5,500	6,000	6,180	6,613	7,075	7,571	8,101
Sewer Permit Fees	25,000	10,000	10,300	11,021	11,792	12,618	13,501
Street Light Charges	111,000	111,000	111,500	119,305	127,656	136,592	146,154
TOTAL INCOME	**$ 4,339,286**	**$ 4,621,324**	**$ 4,958,725**	**$ 5,305,836**	**$ 5,677,244**	**$ 6,074,651**	**$ 6,499,877**
EXPENSES - SUPPLY							
Purchased Water	869,111	972,210	1,020,820	1,092,277	1,168,737	1,250,548	1,338,087
Street Light Power Cost	83,000	90,000	93,600	100,152	107,163	114,664	122,691
Wastewater Treatment (Metro)	1,214,256	1,090,976	1,218,537	1,303,835	1,395,103	1,492,760	1,597,253
Total Expenses - Supply	$ 2,166,367	$ 2,153,186	$ 2,332,957	$ 2,496,264	$ 2,671,002	$ 2,857,973	$ 3,058,031
EXPENSES - DIST. & MAINT.	$ 500,509	$ 528,600	$ 549,744	$ 588,226	$ 629,402	$ 673,460	$ 720,602
EXPENSES - General & Admin.	$ 930,852	$ 1,007,908	$ 1,058,364	$ 1,132,449	$ 1,211,721	$ 1,296,541	$ 1,387,299
TOTAL EXPENSES	**$ 3,597,728**	**$ 3,689,694**	**$ 3,941,065**	**$ 4,216,940**	**$ 4,512,125**	**$ 4,827,974**	**$ 5,165,932**
NET INCOME FROM OPERATIONS	**741,558**	**931,630**	**1,017,660**	**1,088,896**	**1,165,119**	**1,246,677**	**1,333,945**
LESS DEPRECIATION	650,000	670,000	696,800	745,576	797,766	853,610	913,363
NET INCOME AFTER DEPRECIATION	**91,558**	**261,630**	**320,860**	**343,320**	**367,352**	**393,067**	**420,582**

NOTES: Projected Budgets are established for 2000 and 2001 based on actual expenditures for 1999 and projected increases by budget category. 7% annual increase in revenue and expenditures is assumed for 2002 and beyond to acount for growth (4%) and inflation(3%).

TABLE 7-4
CEDAR RIVER WATER AND SEWER DISTRICT
CAPITAL FACILITIES PLAN - PROPOSED BUDGET

#	PROJECT DESCRIPTION	EST. COST	Annual CFP Requirement					
			2000	2001	2002	2003	2004	2005
1	Pump Station Generators	$160,000	$160,000					
2	Fairwood Reservoir Recirculation Pump	$150,000	$150,000					
3	Fairwood 2.0 MG Reservoir Painting	$35,000	$35,000					
4	Fairwood 1.0 MG Reservoir Invest./Rehab.	$100,000	$25,000	$75,000				
5	Rock Mtn Reservoir Security and Upgrade	$60,000	$30,000	$30,000				
6	East Reservoir (E3) -1.0 MG	$1,150,000	$200,000	$950,000				
7	Central Pump Station Upgrade	$150,000	$150,000					
8	Bain Rd to 231st Connect. along SR 169	$525,000	$525,000					
9	244th Extension to Lake Webster	$1,200,000	$200,000	$1,000,000				
10	Fairwood Transmission Main Improvements	$300,000	$300,000					
11	Abandon 184th Avenue Pump Station	$75,000		$75,000				
12	Abandon Witte Road Pump Station	$30,000	$30,000					
13	SE 215th Main Replacement	$265,000	$265,000					
14	212th Ave SE Main Replacement	$50,000	$50,000					
15	225th Ave SE Main Extension	$50,000		$50,000				

TABLE 7-4
CEDAR RIVER WATER AND SEWER DISTRICT
CAPITAL FACILITIES PLAN - PROPOSED BUDGET

#	PROJECT DESCRIPTION	EST. COST	Annual CFP Requirement					
			2000	2001	2002	2003	2004	2005
16	Shadow Lake Estates Area Main Replace.	$1,750,000		$250,000	$1,500,000			
17	Tahoma 9th Grade (Landsburg) School Extension	$1,200,000 ($470,000 Dist)	$470,000					
18	Fairwood Blvd. Main Upgrade (AC & CI) 156th Ave SE to 140th Ave SE	$1,380,000	$690,000	$690,000				
19	New District Office	$3,000,000	$200,000	$200,000	$1,300,000	$1,300,000		
20	12" Main on 196th Ave SE from Petrovitsky to SE 193rd	$420,000			$420,000			
21	Maplewood Estates Well Source Development Production Well East Area Supply Facilities	 $700,000 $300,000 $725,000	$100,000	$600,000	 $1,025,000			
22	Peter Grubb Road Extension	$620,000		$620,000				
23	756 Zone Distribution Well/Transmision Main	$3,000,000		$250,000	$1,250,000	$1,500,000		
24	756 Zone Transmission Main Conversion Maple Valley Black Diamond Hwy	$200,000	$100,000	$100,000				
25	East Intertie Booster Pump	$100,000		$100,000				
26	SE 232nd Street to Witte Road Main	$1,600,000				$400,000	$600,000	$600,000

TABLE 7-4
CEDAR RIVER WATER AND SEWER DISTRICT
CAPITAL FACILITIES PLAN - PROPOSED BUDGET

#	PROJECT DESCRIPTION	EST. COST	Annual CFP Requirement					
			2000	2001	2002	2003	2004	2005
27	Main from Central Reservoir to SE 210th Street	$90,000				$90,000		
28	Annual Misc. Replacement							
	SE 171st Pl from 136th Pl SE	$57,000						
	137th Avenue SE	$62,000				$119,000		
	SE 166th Place	$59,000						
	SE 169th Street	$50,000					$109,000	
	SE 172nd Street	$40,000						$40,000
29	Asbestos Cement & Cast Iron Pipe Study	$100,000					$50,000	$50,000
30	Soos Creek Interties	$200,000				$100,000	$100,000	
31	Shady Lake Water Main Replacement	$500,000					$500,000	
32	Reservoir E4 - 1.0 MG	$1,150,000						
33	Reservoir E5 - 1.0 MG	$1,150,000						
34	224th Extension to Walsh Lake Community	$1,100,000						
35	12" Main on Petrovitsky	$1,430,000						
	TOTAL	**$24,553,000**	$3,680,000	$4,990,000	$5,495,000	$3,509,000	$1,359,000	$690,000

Notes:
Changes in the capital improvements schedule may occur from time to time as actual development dictates the exact need and location of water system extensions and facilities, and as the District reviews its capital improvement needs in relation to available funds and project priorities.
DE = Developer Extension, PWTF = Public Works Trust Fund Loan, ARBD = As Required by Development, GFC = General Facilities Charge, ULID = Utility Local Improvement District

SECTION 8

OPERATIONS PROGRAM

8.1 GENERAL DISTRICT INFORMATION

8.1.1 District Address and Telephone Number

Cedar River Water and Sewer District
18300 SE Lake Youngs Road
Renton, WA 98058-8058
Telephone (425) 255-6370 Fax (425) 228-4880

8.1.2 State Identification Number

State Department of Health Identification Numbers : 418007-CRWSD
05217-LK.WEBSTER

State Department of Health Contact : Mr. Bob James

8.2 DISTRICT ORGANIZATION AND MANAGEMENT

Cedar River Water and Sewer District is authorized under RCW Title 57 to operate and maintain a public water utility system. The District operates under a commissioner system wherein three commissioners are elected by the citizens of the District. By resolutions, the Board of Commissioners makes and establishes policies that govern the operation of the District. The District holds regular public meetings twice each month.

The overall responsibility of day-to-day operation of the District falls under the authority of the District's General Manger who reports directly to the Board of Commissioners. The District staff currently totals thirteen people and three commissioners, identified on Table 8-1.

Engineering, legal and financial counsel for the District is provided by outside consultants approved by the Board of Commissioners. These consultants report to and coordinate with the District's Managers and/or other staff as directed. The District's current consultants are also listed on Table 8-1.

TABLE 8-1
CEDAR RIVER WATER AND SEWER DISTRICT
EMPLOYEES AND DISTRICT REPRESENTATIVES

NAME	TITLE/POSITION	CERTIFICATION
Brooks, Bill	Maintenance Tech.	WDM-IT, WTP-OIT, WWTP-OIT, SCO
Hunkeler, Kirk	Operations Manager	SCO, WDMIII, CCS, WDSI
Krall, Larry	Construction Inspector	SCO, CCS, WDMIII, WDSII
Mattson, Teresa	Financial Administrator	
Olson, Keith	Maintenance Tech.	WDMII, WTPOIT, WTPII, CCS, BAT, SCO
Quesnoy, Bruce	Meter Reader	WDMIII, WTPOIT, SCOI
Reedy, Todd	Maintenance Tech.	CCS, WDMIT
Remillard, Daryl	Maintenance Tech.	WDSII, WDMIII, CCS, SCO
Sheadel, Ronald	General Manager	
Smith, Mary	Customer Service Rep.	
Thompson, Dave	Utility Foreman	SCO, CCS, WDMII, WDSII
Torgerson, Jeff	Maintenance Tech.	WDMI, WTPOIT, WWTPOIT, CCS, SCO
Vance, Sean	Utility Billing/Human Resources	
Canter, William	Commissioner	
Snyder, Lorraine	Commissioner	
Terwillegar, Charles	Commissioner	
Penhallegon Associates Consulting Engineers, Inc.	Consulting Engineer	
Jonson & Jonson, P.S.	District Attorney	
Benson & McLauchlin	District Accountant	

WDM = Water Distribution Manager, WTP = Water Treatment Plant Operator, WWTP = Wastewater Treatment Plant, SCO = Sewer Collection Operator, CCS = Cross Connection Control Specialist, WDS = Water Distribution Supervisor, BAT = Backflow Assembly Tester, IT = In-Training, OIT = Operator In-Training

8.3 PERSONNEL CERTIFICATION

The District encourages operations personnel to obtain applicable state certification and supports membership in professional organizations as well as the attendance of personnel at appropriate safety and technical seminars and conferences. Table 8-1 indicates the current certifications held by District staff.

8.4 ROUTINE OPERATION AND MAINTENANCE

Routine operations involve the activities required to ensure that facilities are functioning efficiently and meeting quality and pressure requirements as well as water system demands. Routine maintenance includes making daily rounds to visually check system facilities and reservoir reading devices on a regular basis, monitoring flow, service and main line repairs, meter repairs and calibration and responding to customer inquiries, as necessary. Additionally, preventative maintenance, such as regularly servicing pumps and motors, exercising valves and hydrants, cleaning and painting reservoirs, and flushing pipelines, is required to ensure adequate overall operation and maintenance of the system. Table 8-2 generally outlines the District's routine operations and maintenance practices and schedule for primary system components. The practices are generally described in the following sections. District staff are also responsible for new construction inspection, especially for developer extension projects.

The District maintains a small works roster of Contractors, established by Resolution 2247, from which staff can use to provide assistance when District personnel are not available or when the project costs exceed the statutory limits.

Continuous, automatic surveillance of the District's supply points and reservoirs is provided by the telemetry system used by the District. This system alleviates the need for maintenance staff to constantly monitor the system under normal operating conditions. Routine checks by personnel are scheduled for the primary system components, as shown on Table 8-2.

The District is also a member of the "One Call System" for which the District has a 24 hour to and from response time. This system, which was established by the major utilities providers in

the Puget Sound region, provides coordination and assistance for preventing damage to existing facilities during maintenance work or new construction. The District also has a dedicated phone line for receiving messages from the Utilities Underground Location Center.

8.4.1 Main Cleaning Program

The District cleans mains on an as needed basis for issues that relate to water quality. The District is actively pursuing looping of mains and system operations improvements to further reduce the need for main cleaning and to help contribute to the District's water conservation effort (1% reduction annually for 10 years).

8.4.2 Valves and Hydrants

It is a goal to have all system hydrants turned at least once a year by District staff and representatives from the local fire departments to ensure proper operation.

8.4.3 Distribution Pipelines

The distribution pipelines are maintained on an as needed basis. District staff respond to reported leaks and turbid water.

8.4.4 Pump Stations

District staff inspect the pump stations at least once a week year round.

8.4.5 Storage Reservoirs

The reservoirs are inspected weekly, at a minimum. Every two to three years the reservoirs are cleaned and the interior coatings are inspected.

8.4.6 Pressure Reducing Valves

The pressure reducing valves are calibrated as necessary to ensure proper operation.

In addition, the District repairs service lines, mains, meters and fire hydrants as needed. If a service line has been repaired more than twice it is normally replaced. The District updates

meter services by completely changing old meters and fittings with new equipment, including the newest electronic reading equipment. The District facilities are constantly monitored electronically to ensure proper operation, accuracy and intrusion.

TABLE 8-2
CEDAR RIVER WATER AND SEWER DISTRICT
ROUTINE MAINTENANCE AND OPERATIONS

FACILITY	PROGRAM
Mains	Clean and repair as needed
Valves	Turn annually
Hydrants	Check annually and repair as needed
Distribution System	Maintained as needed Respond to reported leaks and turbidity issues
Pump Stations	Inspected at least weekly
Storage Reservoirs	Inspected at least weekly
Pressure Reducing Valves	Calibrated as necessary
Meters	Replaced as needed

8.5 WATER QUALITY MONITORING

8.5.1 Responsibility

As a wholesale customer of Seattle Public Utilities' regional water system, Cedar River Water and Sewer District relies on Seattle Public Utilities for all testing of raw water quality, water quality during the treatment processes and the quality of the water entering the transmission system from the plant. The District is responsible for the completion of routine bacteriological, inorganic, organic, chemical and radionuclide testing in accordance with all applicable requirements of the EPA and the State Department of Health. Many of these water quality testing services are currently provided by Seattle Public Utilities. The District has the responsibility of testing its ground water wells.

Cedar River Water and Sewer District is responsible for maintaining the quality of water delivered by Seattle Public Utilities. This is achieved by the District's cross connection control program, routine flushing of lines, and disinfection of new or disturbed pipelines. Testing for chlorine residual is performed by the District staff as required to insure that water quality levels are maintained throughout the system.

In addition, the District is responsible for lead and copper monitoring and any retesting associated with coliform positive or invalid (unsatisfactory) samples obtained during routine coliform monitoring and for any notifications which may be required as a result of violations of the established maximum contaminant levels. Documentation of lead and copper monitoring results is included in the Appendices.

8.5.2 Routine Sampling

Routine coliform and chlorine residual water quality samples for the District's primary supply are taken by Seattle in accordance with the State Department of Health requirements. The number of routine samples taken within the District has been calculated as part of the Regional Reduced Monitoring Program as approved by DOH. Seattle draws fourteen bacteriological samples within the District per month. Details regarding routine bacteriological sampling have been provided in the District's Coliform Monitoring Plan, which has been submitted to and approved by the State Department of Health.

Other water quality monitoring which is required by the State Department of Health and accomplished by Seattle or the District is coordinated between the appropriate agencies. Copies of Seattle Public Utilities' recent water quality reports for the Cedar River water supply system and other appropriate water quality data is on file at the District office.

8.5.3 Follow-up Sampling and Notification

In the event of a repeated violation of the established maximum contaminant levels or the need for replacement coliform samples due to a coliform positive result or an invalid

sample, additional sampling is the responsibility of the District. Follow-up sampling is accomplished in accordance with and from the locations identified in the District's Coliform Monitoring Plan. All sampling and public notifications associated with the follow-up testing is performed in accordance with WAC 246-280-300 through 330.

8.5.4 Other Water Quality Testing

Cedar River Water and Sewer District tests all new and repaired pipelines and facilities for water quality and chlorine residual immediately following construction activities and prior to acceptance and use of the facility. Samples are taken by District staff and sent to a State approved testing laboratory for analysis.

TABLE 8-3
CEDAR RIVER WATER AND SEWER DISTRICT
WATER QUALITY TESTING

LOCATION	TEST	LAST TESTED	SCHEDULE	COMMENTS
Webster Lake	Bacteriological	On-Going	District draws 3 samples per month	
Cedar River System	Bacteriological	On-Going	Seattle draws 14 samples per month by agreement with DOH	Only required to do 70% of 20 samples
Cedar River System	TTHM	On-Going	1 sample per quarter	
Webster Lake	Lead/Copper	1999		District tested
Cedar River System	Lead/Copper	1997	Next test in 2003/2004	District tested
Cedar River System	AC	May 1999	2002-2004	
Webster Lake	SOC/VOC	Nov., Dec. 1998	SOC - July 2000	
Cedar River System	HAA5	On-Going	Not required	Coming in future

8.6 EMERGENCY RESPONSE PLAN

In the event of an emergency condition during normal business hours, emergency response is coordinated by the District's General Manager. In the event of water system emergency after hours, the District employs a 24 hour answering service which contacts on-call District personnel to ensure a prompt District response is made. The District is working to install automatic phone dialers which would be activated by failure detections, such as low water pressure or low tank levels, and would continuously call a series of District staff. A specific alarm message would be conveyed to the staff and this process would continue until a response had been made. The District anticipates this system to be installed in 2000. Table 8-4 presents the District's general emergency call-up list to be used in emergency situations.

8.6.1 Vulnerability Assessment

Response in an emergency situation depends on the severity of the emergency. Table 8-5 presents an overall assessment of the vulnerability of major system facilities and identifies system components which should be inspected and/or verified for proper operation in the event of various types of emergency situations.

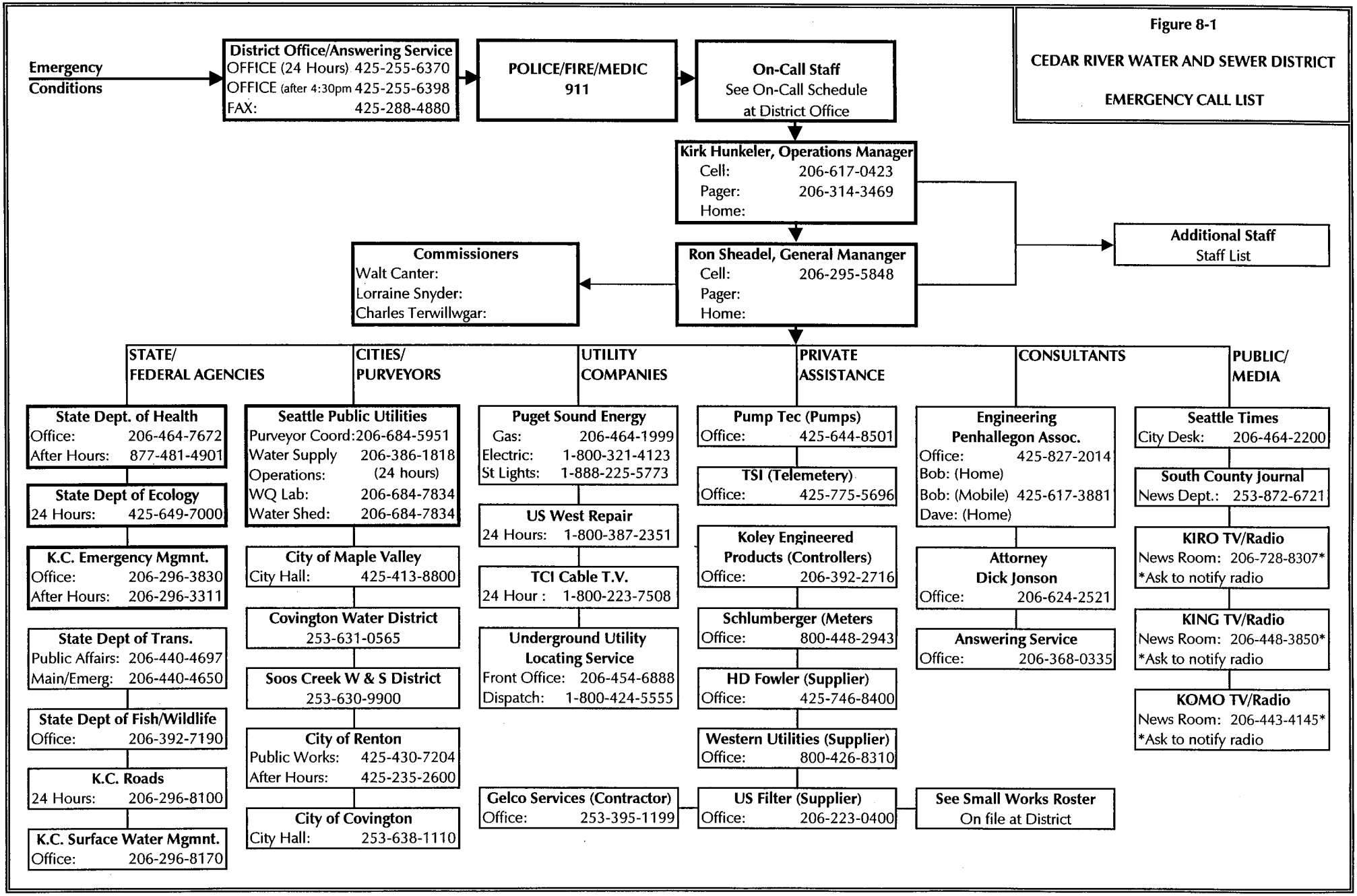
TABLE 8-5
CEDAR RIVER WATER AND SEWER DISTRICT
WATER SYSTEM COMPONENT VULNERABILITY MATRIX

	PRIMARY FACILITIES					
EMERGENCY	STRUCTURES	PUMP STATIONS	WELLS	STORAGE	MAINS	CONTROL SYSTEM
Freeze/Drought	X	X	X	X	X	X
Earthquake	X	X	X	X	X	X
Volcano	X	X		X		X
Flooding	X		X		X	
Landslide	X				X	
Vandalism	X	X	X	X		X
Plane Crash	X	X	X	X	X	X
Vehicle Crash	X	X				
Toxic Spill		X	X	X	X	
Power Outage		X	X			X

Figure 8-1

CEDAR RIVER WATER AND SEWER DISTRICT

EMERGENCY CALL LIST



8.7 EQUIPMENT, TOOLS AND SUPPLIES

The District's equipment, tool and supplies are kept in the District's 3,200 square foot storage garage or in the 10,000 square foot storage yard. A large work room is part of the office building and is used for storage and shop facilities. The storage yard includes on-site fuel storage and pumps.

A summary of the District owned equipment is presented in Table 8-6.

TABLE 8-6
CEDAR RIVER WATER AND SEWER DISTRICT
DISTRICT OWNED EQUIPMENT

YEAR	MAKE	MODEL	SERIAL #
1980	Ford	L700 Dump Truck	D9701
1986	Ford	3/4 Ton Pick-Up D	45429
1987	Ford	1 Ton Pick-Up	54064
1989	Trailking	Trailer	11891
1991	Jeep	4X4 Wrangler	28195
1993	Ford	F450 1 Ton Dump Truck	57897
1993	Ford	Explorer Truck	38864
1993	Ford	F250 Pick-Up	57896
1996	Ford	F47 Super Duty Pick-Up	52201
1978	Chevrolet	Jet Truck	170363
1998	Ford	Ranger	15127
1998	Case	580 K Backhoe (2)	
1998	Atias	Copco Air Compressor	
1985		Asphalt Roller	
1998	Case	580K Backhoe	EXSTENDOHOE

The District also maintains supply of waterworks materials including pipe, fittings, valves, hydrants, couplings, casings, culverts, and other miscellaneous items.

8.8 CROSS CONNECTION CONTROL PROGRAM

The District's cross connection control program is established by District Resolution 2772 in accordance with WAC 246-290-490 and the State Department of Health. A copy of the resolution is provided in the Appendices. As shown on Table 8-1, the District staff currently includes seven certified cross connection control specialists.

8.9 OFFICE OPERATIONS AND BILLING

Cedar River Water and Sewer District uses remote reading meters throughout the District. Electric receptacles are usually mounted on mailboxes, posts or meter box lids. The data is stored in the meter register and is transferred to a hand held computer with an adapter. District staff drive by and plug the adapter into the receptacles, transferring the data into a hand held computer. Back in the office, this information is downloaded and turned into bimonthly bills for the District customers. This type of meter reading system has been used by the District since 1967 and allows for fast, efficient meter reading, evidenced by the fact that the District only needs to employ one meter reader. This electronic read system is upgraded as technology changes.

In 1998 the District purchased new billing software, helping to facilitate the billing procedure. The software now used by the District is produced by Sensus Softech's Oasis Suite. The latter part of 1998 and the early part of 1999 were spent transferring data and configuring the new system. The program is also connected to Crystal report writer which has the ability to produce many different reports which are useful to District staff and consultants. The billing system is set up to track customer accounts by class (single-family, multi-family, commercial, irrigation, mobile home park, school), location within the District (west, central, east, Webster Lake), and by meter size.

The District staff also produces reports in accordance with Department of Health, Department of Revenue, Department of Retirement Systems, Department of Labor and Industries, Department of Ecology, the City of Seattle, King County, and the Employment Securities Department standards, regulations and time-lines.

8.10 RECORDS KEEPING

The following types of records are maintained by the District on an ongoing basis:

- AutoCad documentation of existing lines/as-builts
- Monthly tracking of water use/customer counts
- Maintenance procedures
- Assessment of Fees
- Potential Cross Connections

APPENDICES

WATER QUALITY DATA

SEATTLE PUBLIC UTILITIES

1999 ANNUAL ANALYSIS OF CEDAR & TOLT WATER SUPPLIES

Samples Collected: MAY 18, 1999

Cedar Distribution = South of the ship canal & lower elevations North of ship canal.

Tolt Distribution = Higher elevations North of the ship canal.

Water Quality Parameter	State Board of Health Max. Contaminant Level	CEDAR	TOLT
Primary Standards *	**MCL**		
Antimony	6 ug/L	ND	ND
Arsenic	50 ug/L	ND	ND
Asbestos $	7million fibers/L (>10um long)	ND	ND
Barium	2000 ug/L	ND	ND
Beryllium	4 ug/L	ND	ND
Cadmium	5 ug/L	ND	ND
Cyanide	200 ug/L	ND	ND
Chromium	100 ug/L	ND	ND
Fluoride	4 mg/L	0.97	0.92
Nickel	100 ug/L	ND	ND
Mercury	2 ug/L	ND	ND
Nitrate-Nitrogen	10 mg/L	0.03	0.14
Nitrite-Nitrogen	1 mg/L	ND	ND
Selenium	50 ug/L	ND	ND
Thallium	2 ug/L	ND	ND
Trihalomethanes, Total~	100 ug/L	26.9	49.2
Turbidity, ^	5 NTU	0.7	0.2
	Residential Action Level		
Copper	1300 ug/L @	263	969
Lead	15 ug/L @	11.1	30.9
Secondary Standards **	**MCL**		
Chloride	250 mg/L	5.0	3.1
Color	15 std. units	ND	ND
Copper	1000 ug/L	ND	ND
Fluoride	2 mg/L	0.97	0.92
Iron	0.3 mg/L	0.04	0.045
Manganese	50 ug/L	ND	ND
Silver	100 ug/L	ND	ND
Solids,Total Dissolved	500 mg/L	40.5	32
Specific Conductance	700 umhos/cm	58.9	47.7
Sulfate	250 mg/L	1.5	1.8
Zinc	5 mg/L	ND	ND
Other Parameters	**Units**		
Alkalinity, Total (as CaCO3)	mg/L	16.4	14.1
Aluminum	ug/L	19	19
Calcium, (as CaCO3)	mg/L	18.8	11.5
Hardness, (as CaCO3)	mg/L	22.5	12.9
Hardness, (as CaCO3)	grains/gal.	1.31	0.75
Magnesium	mg/L	0.91	0.33
Oxygen, Dissolved	mg/L	11.0	12.2
pH, range ++	pH units	7.5 - 8.5	7.4 - 8.6
Phosphorus, Total	ug/L	6.5	3
Potassium	mg/L	0.25	0.14
Silica, Reactive	mg/L	6.9	5.8
Sodium	mg/L	2.81	4.70
Temperature, annual range	deg. C.	5 - 20	5 - 20
Total Organic Carbon	mg/L	0.9	1.4

@ Measured at 90th percentile of overnight standing residential samples from homes with copper pipes and lead solder-1997.
Source waters were ND for copper & lead.

* Health stds.: Supplier subject to public notification.

** Aesthetic stds.: Supplier not subject to public notification.

ND not detected

~ Average of the last 4 quarters testing, through 6/99.

^ As measured at point of intake to distribution system.

++ January-May 1999, 10-90th percentile

$ Test results 12/15/95 - analysis not required in 1999

Seattle Public Utilities Water Quality Laboratory, 800 S.Stacy St., Seattle 98134

WATER QUALITY MONITORING RESULTS FOR 1999

CEDAR RIVER WATER					COVINGTON WATER		WEBSTER LAKE	
Detected parameter & Units	MCLG	MCL	Average	Range	Covington 222 Pl. SE Well Field	Covington Witte Well Field	Webster Lake Well	Typical Sources
CLARITY (Measured Before Treatment)								
Turbidity NTU	NA	TT	0.7	0.2-3.7	NA	NA		Soil Runoff
INORGANIC AND ORGANIC PARAMETERS (Measured After Treatment)								
Fluoride,ppm	4	4	1.0	0.9-1.1	<.2(9/99)	<.3 (9/99)	N/D	Water additive which promotes strong teeth
Nitrate ppm	10	10	0.1		.7 (9/98)	.2(9/99)	1.4	Erosion from natural deposits
Chloroform ppb one sample *	unregulated	unregulated	6		NA	N/A	N/D	By-product of drinking water disinfection
Bromodichloromethane ppb one sample *	unregulated	unregulated	1		NA	N/A	N/D	By-product of drinking water disinfection
Total Trihalomethanesppb	0 ppb	100 ppb	26.5	21.5to32.6	3.9 (10/99)	.7(10/99)	NA	By product of drinking water disinfection
MICROBIAL PARAMETERS (Measured in the Distribution System)								
Total Coliform, %positive samples-Combined distribution system	0	>5%	0	0	0	0	0	Naturally present in the environment

\# Test results 11/25/97; Not Required until 1999- 2001 monitoring period

* Test results 2/17/97; not required until 1999-2001 monitoring period

DEFINITIONS

MCL: Maximum Contaminant Level: The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

MCLG: Maximum Contaminant Level Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

TT: Treatment Technique: A required process intended to reduce the level of a contaminant in drinking water.

AL: Action Level: The concentration of a contaminant, which, if exceeded, triggers treatment, or other requirement, which a water system must follow.

NA: Not Applicable

ND: Not Detected

1mg/l = 1000ugl

For water samples: 1 part per million (PPM)=1mg/l

1 part per billion (ppb)= 1ug/l

Turbidity: A measure of waters clarity, has no direct health effect but indicates overall quality of the water.

Laucks Since 1908
Testing Laboratories, Inc.
940 South Harney St., Seattle, WA 98108 (206) 767-5060 FAX (206) 767-5063

Chemistry, Microbiology, and Technical Services

INORGANICS CHEMICALS (IOCS) REPORT FOR SAMPLE 0001513-01

System ID No.: 05217E System Name: Webster Lake Estates
Lab Sample No.: 08167585 Date Collected: 01/24/00 DOH Source No: S01
Multiple Source Nos.: _____ Sample Type: B Purpose: C
Date Received : 01/24/00 Date Reported: 02/14/00 Supervisor: BL
Date Digested: 01/24/00 Date Analyzed: 02/08/00 Analyst: N/A
County: King Group: A
Sample Location: 05217E
Send Report To: Cedar River Water& Sewer D Bill To: Cedar River Water& Sewer D

DOH #	ANALYTES	RESULTS	UNITS	SRL	TRIGGER	MCL	METHOD/ANALYST
	* * * * * * * EPA REGULATED * * * * * * *						
4	Arsenic	ND	MG/L	0.010	0.050	0.050	EPA 200.8/HN
5	Barium	ND	MG/L	0.10	2.0	2.0	EPA 200.7/DS
6	Cadmium	ND	MG/L	0.0020	0.0050	0.0050	EPA 200.7/DS
7	Chromium	ND	MG/L	0.010	0.10	0.10	EPA 200.7/DS
11	Mercury	ND	MG/L	0.0005	0.0020	0.0020	EPA 245.1/MO
12	Selenium	ND	MG/L	0.0050	0.050	0.050	EPA 200.8/HN
110	Beryllium	ND	MG/L	0.0030	0.0040	0.0040	EPA 200.8/HN
111	Nickel	ND	MG/L	0.040	0.10	0.10	EPA 200.8/HN
112	Antimony	ND	MG/L	0.0050	0.0060	0.0060	EPA 200.8/HN
113	Thallium	ND	MG/L	0.0020	0.0020	0.0020	EPA 200.8/HN
116	Cyanide	ND	MG/L	0.050	0.20	0.20	SM 4500CN E/SS
19	Fluoride	0.2	MG/L	0.20	2.0	4.0	EPA 300.0/JP
114	Nitrite - N	ND	MG/L	0.50	0.50	1.0	EPA 300.0/JP
20	Nitrate - N	1.4	MG/L	0.50	5.0	10	EPA 300.0/JP
161	Total Nitrate / Nitrite	1.4	MG/L	0.50	5.0	10	EPA 300.0/JP
	* * EPA REGULATED (secondary) * *						
8	Iron	ND	MG/L	0.10	0.30	0.30	EPA 200.7/DS
10	Manganese	ND	MG/L	0.010	0.050	0.050	EPA 200.7/DS
13	Silver	ND	MG/L	0.010	0.050	0.050	EPA 200.8/HN
21	Chloride	ND	MG/L	20	250	250	EPA 300.0/JP
22	Sulfate	ND	MG/L	10	250	250	EPA 300.0/JP
24	Zinc	ND	MG/L	0.20	5.0	5.0	EPA 200.7/DS
	* * * * * * * STATE REGULATED * * * * * * *						
14	Sodium	5.3	MG/L	5.0			EPA 200.7/DS
15	Hardness	53	MG/L	10			SM 2340B/DS
16	Conductivity	120.	UMHOS/C	10	700	700	SM 2510B/KB
17	Turbidity	ND	NTU	0.10	1.0	1.0	EPA 180.1/GN
18	Color	ND	COLOR	5.0	15	15	SM 2120B/GN
26	Total Dissolved Solids (TDS)	NA					
	* * * * * * * STATE UNREGULATED * * * * * * *						
9	Lead	ND	MG/L	0.0020		0.015*	EPA 200.8/HN
23	Copper	ND	MG/L	0.20		1.3*	EPA 200.8/HN
	* * * OTHER (optional) * * *						
171	Orthophosphate	NA					
172	Silica	NA					
402	Aluminum	NA					
403	Alkalinity	NA					
404	Magnesium	5.7	MG/L	0.10			EPA 200.7/DS
405	Calcium	12.	MG/L	0.50			EPA 200.7/DS

NOTES:

SRL (State Reporting Level): indicates the minimum reporting level required by the Washington Department of Health (DOH).

Trigger Level: DOH Drinking water response level. Additional sampling required. Contact regional DOH office for additional information.

MCL (Maximum Contaminant Level): If the contaminant amount exceeds the MCL, contact your regional DOH office immediately.

N/A (Not analyzed)
ND (Not detected)
* These are Federal Action Levels, not MCLs

This report is submitted for the exclusive use of the person, partnership, or corporation to whom it is addressed. Subsequent use of the name of this company or any member of its staff in connection with the advertising or sale of any product or process will be granted only on contract. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.

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Laucks Testing Laboratories

Drinking water sample information (WSI) for inorganic chemical analysis

(for proper credit, please fill out all the boxes below, instructions on back page)

1. System Name:	2. System ID #:	3. Source #:	4. Class: (Please Circle)	5. County
Webster Lake Estates	05217E	S01	(A) B	King

6. Sample Taken:
- ☒ Before treatment
- ☐ After treatment
- ☐ Unknown

Not Treated

7. System name for this source: Webster Lake Estates

8. What is the purpose of this sample? (Check one of the following)
- ☒ Compliance
- ☐ Investigation
- ☐ Other purpose (cannot use for compliance monitoring)

Do you want your report to go to the Department of Health for compliance purposes?
Please check: ☒ YES ☐ NO

☐ Check here if this sample is being submitted for approval of a new source.

9. Date collected:	10. Time of collection:	11. Collected by:
1/24/2000	12 : 30 AM (PM)	LARRY KRALL Telephone: (425) 255 6370

12. Specific location where sample was taken:

13. Send results to: (Please print or type.)

CEDAR RIVER
WATER & SEWER DISTRICT
18300 S.E. Lake Youngs Rd.
Renton, WA 98058-9799
425-255-6370

Name
Street address
City, state, zip
Telephone: (____)_____

14. Party to pay for testing: (Please print or type.)

CEDAR RIVER
WATER & SEWER DISTRICT
18300 S.E. Lake Youngs Rd.
Renton, WA 98058-9799
425-255-6370

Name
Street address
City, state, zip
Telephone: (____)_____

15. Test request

Group tests
- ☒ Complete Inorganics at $250.00 (28 tests listed below)
- ☐ Copper/lead only at $22.00
- ☐ Partial list (please check the tests you want from the list below)

If individual tests are desired, use the list below

Tests at $15.00 Each

☐ Barium	☐ Manganese	☐ Turbidity	☐ Nickel
☐ Cadmium	☐ Silver	☐ Color	☐ Chloride
☐ Chromium	☐ Sodium	☐ Fluoride	☐ Sulfate
☐ Iron	☐ Hardness	☐ Nitrate	☐ Total Dissolved Solids
☐ Lead	☐ Conductivity	☐ Nitrite	☐ Copper
☐ Zinc			

Note: TDS analysis is performed only if conductivity fails.

Tests at $23.00 Each

☐ Antimony	☐ Beryllium	☐ Mercury	☐ Arsenic
☐ Cyanide	☐ Selenium	☐ Thallium	

Please note that our minimum charge is $35.00 and standard turnaround time is 10 working days. Please include your payment with sample submittal.

16. Remarks: (water quality problems, address for extra copies, etc.)

FOR LABORATORY USE ONLY

LAB NUMBER:	DATE RECEIVED:	LABORATORY COMMENTS
_____	____/____/____	

Laucks Since 1908
Testing Laboratories, Inc.
940 South Harney St., Seattle, WA 98108 (206) 767-5060 FAX (206) 767-5063
Chemistry, Microbiology, and Technical Services

Certificate of Analysis

CLIENT: Cedar River Water & Sewer Dis
18300 S E Lake Youngs Rd
Renton, WA 98058

Work Order# : 00-01-513
DATE RECEIVED : 01/24/00
DATE OF REPORT: 02/14/00

ATTN : Kirk Hunkeller

Work ID : Webster Lake Estates
Taken By : client
Transported by: cleint
Type : water

SAMPLE IDENTIFICATION:

	Sample Description	Collection Date
01	05217E	01/24/00 12:30

Unless otherwise instructed all samples will be discarded on 04/14/00 with the exception of samples which are consumed during the analysis, such as microbiological samples.

Respectfully submitted,
Laucks Testing Laboratories, Inc.

J. M. Owens

RECEIVED
FEB 17
CEDAR RIVER WATER & SEWER DISTRICT

This report is submitted for the exclusive use of the person, partnership, or corporation to whom it is addressed. Subsequent use of the name of this company or any member of its staff in connection with the advertising or sale of any product or process will be granted only on contract. This company accepts no responsibility except for the due performance of inspection and/or analysis in good faith and according to the rules of the trade and of science.

Printed on Recycled Paper

CROSS CONNECTION CONTROL RESOLUTION

CEDAR RIVER WATER AND SEWER DISTRICT OF KING COUNTY, WASHINGTON

RESOLUTION NO. 2772

A RESOLUTION adopting the August, 1980, American Water Works Association manual entitled Accepted Procedure and Practice in Cross Connection Control, Third Edition, as the District's cross connection control policy.

WHEREAS, pursuant to WAC 248-54-785, public water purveyors are required to develop and implement cross connection control standards; and the District Manager has recommended that the August, 1980, American Water Works Association manual entitled Accepted Procedure and Practice in Cross Connection Control, Third Edition, be adopted as the District's cross connection control policy, which manual is approved pursuant to WAC 248-54-285; and the Board of Commissioners believes it is in the best interest of the District to adopt such manual as District policy, now, therefore,

BE IT RESOLVED that the Board of Commissioners hereby adopts the August, 1980, American Water Works Association manual entitled Accepted Procedure and Practice in Cross Connection Control, Third Edition, as the District's cross connection control policy.

PASSED BY THE BOARD OF COMMISSIONERS OF CEDAR RIVER WATER AND SEWER DISTRICT OF KING COUNTY, WASHINGTON, at its regular meeting held August 7, 1990.

President and Commissioner

Commissioner

Commissioner

ATTEST:

Secretary and Commissioner

MISCELLANEOUS REPORTS AND ANALYSES

Penhallegon Associates Consulting Engineers, Inc.

Engineering • Planning • Surveying • Consulting

June 10, 1999

Mr. Ron Sheadel
Cedar River Water & Sewer Dist.
18300 S.E. Lake Youngs Rd.
Renton, WA 98058-9799

Subject: Development of Maplewood Well Engineering Report

Dear Ron,

At your request we have conducted preliminary engineering studies to assess the feasibility and cost of developing the Maplewood's test well into an active District well. The goal of this short study is to develop a plan of action and budgetary cost estimate to utilize existing and potential future water rights for the District's test well which was drilled in May and June of 1994.

Background

Cedar River acquired an existing well and associated water rights at the time the District took over the operation of the Maplewood Estates subdivision. This water right which was originally issued to the Weyerhaeuser Real Estate Company is for 160 gpm peak flow (Q_i)and a yearly withdrawal (Q_a)of 34.0 acre feet. At the time this area was assumed by the District, the Maplewood Estates was served by an existing Maplewood well at this site. In the late 1980's, use of the well was curtailed (although it is still periodically used) after the District constructed a booster station to serve the Maplewood Estates Area using City of Seattle Cedar River Water. At about the same time the District began pursing additional water rights for the Maplewood Well Site. Studies were carried out over a five (5) year period and culminated in an 8-inch test well being drilled approximately 700 feet deep. After testing of the deep aquifer the test well casing was pulled back. This resulted in an 8-inch casing being installed to about 530 feet of depth and a 20 foot, 8-inch telescoping, 30-slot, stainless steel well screen was placed at a depth of about 530 to 550 feet. The well below this depth was backfilled with bentonite and imported pea gravel (655 to 550 feet below the top of the well). Testing of this well then took place. The results of various testing that took place between August 30, through September 23, 1994 indicated the well has a transmissivity of about 3,630 ft2/d.

750 Sixth Street South, Kirkland, Washington 98033
Phone: (425) 827-2014 • Fax: (425) 827-5043

Conclusions indicate a production well drilled on site could produce between 900 and 1500 gpm at a pumping water level of 250 - 350 feet below ground surface. The volume of the two production wells was estimated to approach 2500 gpm.

The water taken from the well was tested and met all drinking water standards for the water taken at the 530 - 550 elevation. Deep water contained elevated levels of manganese, however, this water was sealed off and is not being used with the present well configurations. A recent report by Golder Associates recommends further baseline studies on the well. They recommended a step draw down test and a larger pumping test of the deep acquire, with full recovery monitoring to confirm potential well yields of over 1000 gpm

Project Objectives

The District is considering installing a well pumping system in the 8-inch test well to accomplish the following objectives:

1. Provide for additional testing as recommended by Golder Associates.

2. Allow utilization of the District's existing 160 gpm and 34 acre feet water right.

3. Provide capacity for an additional 150 gpm and 240 acre feet water right that the District may be able to acquire or transfer.

The remainder of this report addresses alternatives and recommendations to meet these objectives.

Proposal

It is proposed that either a deep well turbine or a submersible type pump be installed in the 8-inch test well. The well pump should be sized to operate by pumping directly to the Maplewood Estate System. It is assumed that the water quality is suitable without treatment except for chlorination and fluoridation. A pressure tank of suitable size to provide a 30 minute chlorine detention time will be needed prior to the water entering the distribution system. The Maplewood Estates has a hydraulic gradient line (HGL) of about 892 feet. The ground elevation at the well is about 715 feet and the well has a static water level at about 150 feet below the top of the well and a draw down of 37.1 feet based on a 72 hour test at a 405 gpm per the 1994 testing. Being conservative and assuming a water surface of 200 feet below the top of the well, we recommend the pump intake be set at 250 feet below the top of the well for a pump size at 300 - 400 gpm.

Based on this we recommend the following well pump sizing design.

Head Conditions

Static above ground 892-715 =	177 ft.
Static below ground	200 ft.
Frictional losses (estimated)	25 ft.*
Total dynamic head	402 ft. ±

* Need to be verified with any treatment requirements

If the well pump is discharging to atmospheres for additional well testing, the approximate Total Dynamic Head (TDH) would be about 225 feet.

The well needs to operate under current and possible future water rights conditions. The District may also wish to investigate transfer of an existing water right (Tahoma School District) to the Maplewood Estates facility. A summary of existing and possible future water right conditions follows:

	Peak Flow (gpm)	Yearly Usage (Acre-Feet)	No. Days Operation at Peak Flow (Days)
Existing Water Rights	160	34	48 ±
Tahoma S.D. Transfer	150	240	362 ±
Combined Water Rights	310	274	200 ±

Under existing water right conditions the well can pump 160 gpm for 48 days per year. With the combined Tahoma School District well water right, the well could pump 310 gpm for 273 days.

Based on the above information, we recommend the District install 310 +/- gpm well pump (± 50 HP) with a design head of 402 +/- feet. By installing a throttle valve to operate the well pump at 160 gpm during initial water rights conditions, the valve can be opened to operate under future conditions up to 310 +/- gpm When discharging to atmosphere, the well will produce 400 - 500 gpm for further testing purposes.

Treatment Issues

Based on past water quality testing, the water from the Maplewood Estates is expected to be of excellent quality and not require any treatment or filtration with the exception of chlorination and fluoridation. It is assumed chlorination would consist of sodium chloride feeder arrangement and a minimum 30 minute detention tank on site prior to the water entering the local distribution system. It is assumed fluoridation would consist of a small chemical feed pump and fluoride handling facilities. For budgeting purposes, it is assumed the existing building structure on the Maplewood site would house the treatment equipment and process. It is assumed a closed vessel would be used to provide adequate chlorine detention. An alternate system of designing the well so it pumps to a clear well tank and repumping the water from the clear well to the system could also be considered in final design. The minimum detention volume is about 10,000 gallons.

System Wide Issues

The Maplewood Estates area currently obtains the majority of its water through the Maplewood Estates Booster Station. This system is currently a closed system and does not currently feed to any other service area of the District. The average existing demand in the Maplewood system varies between 3 - 10 gpm It is therefore not feasible to operate the Maplewood well at 160 - 310 gpm without other system modifications.

In order to operate the Maplewood well on a full time basis, we recommend an intertie be made either in or near the Maplewood Estates Booster Station. This intertie would consist of a pressure reducing/pressure sustaining valve that would allow flow from 892 (Maplewood zone) to the District's 694 zone area. We estimate the average flow in the 694 zone is currently 130 +/- gpm. Summer flows will be significantly more than this. Therefore, based on existing water rights, the 160 gpm for 48 days during the peak summer demand period will provide the majority of the water for the 892 and 694 zones. The Maplewood Estates Booster Station would be set to operate during this period only in the event a low pressure was sensed in distribution system. If additional water rights were transferred to the well that increased the yearly usage, the 160 gpm rate could be extended for a longer period of time including year-round use. If the well capacity was increased beyond the 160 gpm under current demand situation, additional transmission main improvements would be necessary such that the water could be supplied into the District's 756 storage zone. These improvements would make it possible for the District to utilize all of the well water the Maplewood Estate well could produce. Evaluation of these transmission main improvements is beyond the scope of this well study. However, the District may wish to consider these options in its water comprehensive plan currently under development.

Water Rights

This study assumes water rights for the Tahoma School would be transferred to the District. The point of use of the two water rights would include the Maplewood Estates and Tahoma Junior High School for which the rights were issued. The point of use may also extend outside these areas and to this extent a revision to the area of use for these rights may be needed. Further investigation of this is recommenced.

Order of Magnitude Cost Estimate

The estimated cost to develop this well is as follows:

1.	New Well & Well House Complete (assume submersible)	$45,000
2.	Site Piping & Improvements	7,500
3.	Treatment Improvements (assume utilizing existing building)	30,000
4.	10,000 Gallon Pressure Tank @ $4/Gal	40,000
5.	Telemetry Controls	7,500
6.	Electrical Improvements (assume power to site is adequate)	10,000
7.	892 to 694 Intertie & Maplewood Estates Booster Mod.	20,000
	Subtotal	$160,000
	Contingencies (15%)	24,000
	Tax (8.2%)	15,100
	Admin/Engineering/Legal	46,000
	Estimated Total Budget	$245,100

Cost of Well Water

Based on this order of magnitude cost, the estimated cost of the water produced is roughly estimated as follows:

Well Water Cost Comparison Based on Water Right Alternatives (Cost in $/CCF)			
	Alternate 1 160 gpm/34 AF	Alternate 2 160 gpm/250 AF	Alternate 3 310 gpm/274 AF
Initial Cost *	$1.10	$.15	$.08
Operation & Maint. 4 hr./wk @ 40 = 160 + misc = $200/wk	.10 (7 wks)	.10 (5 wks)	.07 (48 wks)
Electrical Costs	.10	.10	.09
Chemical Costs	.10	.10	.08
	$1.40/CCF	$.50/CCF	$.33/CCF

* Amortized over 15 years
Depreciation not included

If you have any questions, please let us know.

Sincerely,

PENHALLEGON ASSOCIATES
CONSULTING ENGINEERS, INC.

Martin L. Penhallegon, P.E.
District Engineer

cc: Commissioners
Kirk Hunkeler
Dick Jonson

P:\P99\99409\Doc\0610RonSheadel.wpd

CEDAR RIVER WATER AND SEWER DISTRICT
DETAILED PUMP STATION CAPACITY ANALYSIS

	1998	2000	2005	2010	2015	2020	
WEST	313.93	320.88	319.65	323.00	338.32	353.64	Annual Demand (MG)
	0.86	0.88	0.88	0.88	0.93	0.97	Average Day Demand (mgd)
	597.28	610.50	608.16	614.54	643.68	672.83	Average Day Demand (Day)
	1.94	1.98	1.97	1.99	2.09	2.18	Max Day Demand (mgd)
	1,343.88	1,373.63	1,368.36	1,382.71	1,448.29	1,513.87	Max Day Demand (gpm)
	540,000.00	540,000.00	540,000.00	540,000.00	540,000.00	540,000.00	Fire Suppression Storage (gal)
	125.00	125.00	125.00	125.00	125.00	125.00	Replenish Fire (72 Hours) (gpm)
	1,468.88	1,498.63	1,493.36	1,507.71	1,573.29	1,638.87	Total (gpm)
	2,900.00	2,900.00	2,900.00	2,900.00	2,900.00	2,900.00	Existing (gpm)
	1,431.12	1,401.37	1,406.64	1,392.29	1,326.71	1,261.13	Surplus (gpm)
	3.13	3.13	3.13	3.13	3.13	3.13	18 Hours of Existing (MG)
	1.20	1.15	1.16	1.14	1.05	0.95	Surplus (MG)
	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	Existing without Largest Pump (gpm)
	902.72	889.50	891.84	885.46	856.32	827.17	Surplus (gpm)
CENTRAL	113.50	119.27	182.12	197.89	223.59	249.30	Annual Demand (MG)
	0.31	0.33	0.50	0.54	0.61	0.68	Average Day Demand (mgd)
	215.94	226.92	346.50	376.50	425.40	474.32	Average Day Demand (gpm)
	0.70	0.74	1.12	1.22	1.38	1.54	Max Day Demand (mgd)
	485.87	510.57	779.62	847.13	957.15	1,067.21	Max Day Demand (gpm)
	540,000.00	540,000.00	540,000.00	540,000.00	540,000.00	540,000.00	Fire Suppression Storage (gal)
	125.00	125.00	125.00	125.00	125.00	125.00	Replenish Fire (72 Hours) (gpm)
	610.87	635.57	904.62	972.13	1,082.15	1,192.21	Total (gpm)
EAST	187.29	194.60	333.07	433.75	472.34	510.93	Annual Demand (MG)
	0.51	0.53	0.91	1.19	1.29	1.40	Average Day Demand (mgd)
	356.34	370.24	633.69	825.25	898.67	972.09	Average Day Demand (gpm)
	1.15	1.20	2.05	2.67	2.91	3.15	Max Day Demand (mgd)
	801.76	833.05	1,425.81	1,856.81	2,022.00	2,187.20	Max Day Demand (gpm)
	540,000.00	540,000.00	540,000.00	540,000.00	540,000.00	540,000.00	Fire Suppression Storage (gal)
	125.00	125.00	125.00	125.00	125.00	125.00	Replenish Fire (72 Hours) (gpm)
	926.76	958.05	1,550.81	1,981.81	2,147.00	2,312.20	Total (gpm)
CENTRAL-EAST	1,537.63	1,593.62	2,455.44	2,953.94	3,229.15	3,504.41	Total (gpm)
	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00	3,000.00	Existing (gpm)
	1,462.37	1,406.38	544.56	46.06	-229.15	-504.41	Surplus (gpm)
	3.24	3.24	3.24	3.24	3.24	3.24	18 Hours of Existing (MG)
	1.39	1.31	0.06	-0.65	-1.05	-1.45	Surplus (MG)
	2,500.00	2,500.00	2,500.00	2,500.00	2,500.00	2,500.00	Existing without Largest Pump (gpm)
	1,927.72	1,902.83	1,519.81	1,298.25	1,175.93	1,053.60	Surplus (gpm)
WEBSTER LAKE *	5.30	6.73	7.50	7.24	7.25	7.26	Annual Demand (MG)
	0.01	0.02	0.02	0.02	0.02	0.02	Average Day Demand (mgd)
	10.08	12.80	14.27	13.77	13.79	13.81	Average Day Demand (gpm)
	0.03	0.04	0.05	0.04	0.04	0.04	Max Day Demand (mgd)
	22.69	28.81	32.11	30.99	31.04	31.08	Max Day Demand (gpm)
	0.00	0.00	0.00	0.00	0.00	0.00	Fire Suppression Storage (gal)
	0.00	0.00	0.00	0.00	0.00	0.00	Replenish Fire (72 Hours) (gpm)
	22.69	28.81	32.11	30.99	31.04	31.08	Total (gpm)
	60.00	60.00	60.00	60.00	60.00	60.00	Existing (gpm)
	37.31	31.19	27.89	29.01	28.96	28.92	Surplus (gpm)
	0.06	0.06	0.06	0.06	0.06	0.06	18 Hours of Existing (MG)
	0.03	0.02	0.02	0.02	0.02	0.02	Surplus (MG)
	60.00	60.00	60.00	60.00	60.00	60.00	Existing without Largest Pump (gpm)
	49.92	47.20	45.73	46.23	46.21	46.19	Surplus (gpm)

* Annual Water Rights limitations not considered.

WATER RIGHTS DOCUMENTATION

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PERMIT

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
September 25, 1991	G1-26357	G1-26357 P	

NAME
Charles Melgin

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
23727 SE 190th	Maple Valley	WA	98038

The applicant is, pursuant to the Report of Examination which has been accepted by the applicant, hereby granted a permit to appropriate the following described public waters of the State of Washington, subject to existing rights and to the limitations and provisions set out herein.

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	60	17

QUANTITY, TYPE OF USE, PERIOD OF USE

Community domestic supply - continuously (34 homes)

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION–WITHDRAWAL

1300' south and 1300' west of the NE corner of Section 34, Township 23 north, Range 6 east W.M.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
NE¼ NE¼	34	23	6E	8	King

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)
17		Webster Lake Estates

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

A portion of the north ½ of Section 34 and the south ½ of Section 27, Township 23 north, Range 6 east W.M. King County, Washington, described as follows:

Beginning at the east quarter corner of said north ½ of Section 34;
thence north 88°30'24" west 2783.32 feet along the centerline of said section;
thence north 01°17'42" west 989.09 feet;
thence north 06°13'54" east 764.17 feet;
thence north 33°12'38" east 189.78 feet;
thence south 74°52'22" east 1444.57 feet;
thence north 73°44'36" east 823.18 feet;
thence north 24°38'21" west 895.67 feet;
thence north 17°08'55" east 571.74 feet;
thence north 01°43'35" east 794.96 feet to a point on the north line
of the south ½ of the SE ¼ of said Section 27;
thence south 88°16'25" east 718.26 feet to the NE corner of the SE ¼ of the SE ¼ of said Section 27;
thence south 01°30'24" west 1314.10 feet along the east line of Section 27 to the southeast corner thereof;
thence south 01°29'57" west 2653.93 feet along the east line of the northeast quarter of said Section 34 to the point of beginning.
And Lots 1, 2, 3 and 4 KCSP 380093R;
Lots 1, 2, 3 and 4 KCSP 380092R all in the NW ¼ Section 35, Township 23 north, Range 6 east W.M. King County, Washington.

DESCRIPTION OF PROPOSED WORKS

Well 137' X 6"; 60 gpm pump, 26,000 gallon storage tank, 3" watermain from well to tank, 8" watermain fror tank to connections.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	June 19, 1994	June 19, 1998

PROVISIONS

An approved measuring device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508 64-020 through WAC 508-64-040. Meter readings shall be recorded monthly and this data shall be maintaine and be made available to the Department of Ecology upon request.

Static water level (SWL) shall be measured at least once each month. Measurements shall be taken after th pump has been shut off and the water level in the well has been stabilized. The data shall be maintained an made available to Ecology upon request. However, Ecology's Water Resources Section (NWRO) shall be notified if the SWL is determined to be below the level normally recorded at that time of year.

This permit is subject to the implementation of the minimum requirements established in the Interim Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology and Conservation Programs, July 1990.

Prior to issuance of a water right certificate, permit holder shall provide to Ecology Northwest Office a detailed legal description of all property on which water is used and a plan of the system including the distribution as-built.

A certificate of water right will not be issued until a final investigation is made.

This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or fail to give notice to the Department of Ecology on forms provided by that Department documenting such compliance.

Given under my hand and the seal of this office at Bellevue, Washington,

this 19th day of June, 1992.

Department of Ecology

ENGINEERING DATA
OK

by

James R. Bucknell, Section Supervisor, Water Resources

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

CERTIFICATE OF WATER RIGHT

☐ Surface Water (Issued in accordance with the provisions of Chapter 117, Laws of Washington for [illegible] amendments thereto, and the rules and regulations of the Department of Ecology.)

☒ Ground Water (Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
September 4, 1981	G1-23937	G1-23937P	G1-23937C

NAME
WEYERHAEUSER REAL ESTATE COMPANY

ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
CB-1	Tacoma	Washington	98477

This is to certify that the herein named applicant has made proof to the satisfaction of the Department of Ecology of a right to the use of the public waters of the State of Washington as herein defined, and under and specifically subject to the provisions contained in the Permit issued by the Department of Ecology, and that said right to the use of said waters has been perfected in accordance with the laws of the State of Washington, and is hereby confirmed by the Department of Ecology and entered of record as shown.

PUBLIC WATER TO BE APPROPRIATED

SOURCE
Two wells

TRIBUTARY OF (IF SURFACE WATER)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	160	34.0

QUANTITY, TYPE OF USE, PERIOD OF USE
Community domestic supply - continuously (85 homes)

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION OR WITHDRAWAL
Well #1 - 1825 feet north and 750 feet east of SW corner of Sec. 13

Well #2 - 1200 feet south and 1030 feet east of NW corner of Sec. 13

LOCATED WITHIN SMALLEST LEGAL SUBDIVISION	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	W.R.I.A.	COUNTY
#1 - NW¼SW¼; #2 - NW¼NW¼	13	22	6 E	8	King

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

The NW¼NW¼, together with the S½NW¼, together with the SW¼ of Sec. 13, T. 22N., R. 6E.W.M., King County, Washington.

S. F. No. 7361—(Rev. 6-70).

CERTIFICATE RECORD NO. - , PAGE NO. G1-00387C

STATE OF WASHINGTON, COUNTY OF King

CERTIFICATE OF GROUND WATER RIGHT

(Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology thereunder.)

THIS IS TO CERTIFY *That* STEPHEN J. KOLCSEY

of Renton, Washington, *has made proof to the satisfaction of the Department of Ecology of a right to the use of the public ground waters of the State of Washington from* a well

located within W½NW¼SW¼

Sec. 23, *Twp.* 23 *N., R.* 5 E *W.M.,*

for the purpose(s) of community domestic supply

under and specifically subject to provisions contained in Ground Water Permit No. 10507

issued by the Department of Ecology and that said right to the use of said ground waters has been perfected in accordance with the laws of Washington, and is hereby confirmed by the Department of Ecology and entered of record in Volume - *at page* G1-00387C; *that the priority of the right hereby confirmed dates from* January 4, 1971; *that the quantity of ground water under the right hereby confirmed for the aforesaid purposes, is limited to an amount actually beneficially used for said purposes, and shall not exceed* 100 gallons per minute; 46 acre-feet per year, continuously, for community domestic supply

7305140419

A description of the lands to which such ground water right is appurtenant is as follows:

That part of the NE¼SE¼, Sec. 22, and the W½SW¼, Sec. 23, in T. 23 N., R. 5 E.W.M., described as follows: beginning at a point on the southerly right of way line of Chicago-Milwaukee-St. Paul & Pacific Railroad (Pacific Coast Railroad) 273.58 feet easterly of the west line of said Sec. 23; thence south 12°15' west to the said west line of Sec. 23; thence north to the southeast corner of said NE¼SE¼, Sec. 22; thence west 345.6 feet; thence north 12°15' east 1093.3 feet, more or less, to said right of way line; thence southeasterly 410 feet to point of beginning; LESS roads.

The right to use of water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390 and 90.44.020.

This certificate of ground water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and seal of this office at Olympia, Washington, this 2nd *day of* May, *19* 73.

STATE OF WASHINGTON DEPARTMENT OF ECOLOGY

Engineering Section

OK

JOHN A. BIGGS, *Director*
Department of Ecology

by R. Jerry Boller

R. JERRY BOLLER
Assistant Director

Ground Water Permit No. 10507

Certificate of Ground Water Right

Recorded in the Department of Ecology, Olympia, Washington, in Book No. – *of Ground Water Right Certificates, on page* G1-003870, *on the* 2nd *day of* May *19* 73.

STATE OF WASHINGTON,
County of ..... } *ss.*

I certify that the within was received and duly recorded by me in Volume ..... *of Book of Water Right Certificates, at page* ..... *on the* ..... *day of* ....., *19*.....

.....

STATE PRINTING PLANT, OLYMPIA, WASHINGTON

RECORDED AT REQUEST OF

1973 MAR 14 PM 1 16

DIRECTOR
RECORDS & ELECTIONS
KING COUNTY, WASH.

FILED FOR RECORD AT REQUEST OF

Name Ed Holmes

Address Hicks-Bruce Realty

Bothell, Wash.

WATER CONSERVATION PLAN

CONSERVATION

INTRODUCTION

Cedar River Water and Sewer District recognizes that regional population increases have placed significant demands on the Puget Sound region's water supply and understands the importance of conservation efforts in regards to water supply management practices. In response to this, the District maintains a pro-active stance in water conservation, as detailed in the following section. The District further recognizes the importance of regional conservation coordination and supports the development of regional as well as local water conservation programs. Cedar River Water and Sewer District endorses and participates in the conservation programs through the Seattle Public Utilities and the Conservation Committee of the Water Purveyors Group. As such, it is committed to a 1% annual reduction in water use by ongoing and potential conservation programs.

The District's long range conservation program is intended to be utilized by the District staff in their daily operations and activities and should serve as a guideline for reducing the overall water demand within the District. This water conservation plan is not intended to be used as a response to a water shortage emergency. A separate Water Shortage Contingency Plan has been created to handle emergency situations and is on file with the District.

CONSERVATION ACTIVITIES

The District currently employs or is considering initiating several types of conservation activities as part of its long range conservation planning effort. The conservation activities described below have all been identified as potential conservation activities in the State Departments of Health and Ecology's handbook "Conservation Planning Requirements" (March 1994). Cedar River Water and Sewer District is classified as a medium sized system, having between 1,000 and 10,000 connections, and has or is considering implementing the following conservation activities recommended for utilities of this size.

Public Education

Public education includes school outreach, speakers' bureaus, program promotions and participation in theme shows and fairs. Cedar River considers participation public events and/or

school outreach programs as requested. The District also distributes materials, mainly developed by others, relating to water conservation efforts. The District office maintains a supply of various conservation materials available for interested parties and occasionally includes educational brochures as billing inserts or as supplemental periodic mailings. For the most part, the District's conservation information comes from Seattle Public Utilities, the American Water Works Association or other similar organizations. Consumption history is provided on all bills for accounts in existence for at least one year.

Technical Assistance

Technical assistance includes any of the following activities: purveyor assistance, customer assistance, technical studies and bills showing consumptive history. Any customer may receive technical assistance, upon request, from one of the qualified District staff. Specific conservation activities which may be proposed for individual development proposals could also be coordinated with the land use agencies having jurisdiction.

System Measures

System measure efforts which are in place to promote conservation include source meters, service meters and unaccounted for water/leak detection. The District currently has master source meters from Seattle Public Utilities, the District's main water supplier, and at the Lake Webster well site, both of which are maintained and tested periodically. All District customers are metered and the District has a meter replacement program which includes annual testing and replacing of meters. The District also has irrigation meters available for interested customers. Unaccounted for water within the District is monitored continuously and averaged six percent from 1994 through 1998.

The District has worked closely with the customers served by the Lake Webster well system to develop a self-imposed water conservation program, which includes staggered/reduced irrigation, to reduce water consumption in that specific area of the District. The District continues to monitor this area and determine the success of the self-imposed conservation measures. Based on the results, the District many consider imposing stricter measures.

Incentives and Other Measures

There are several other ways in which the District promotes water conservation by all customers of the District. A brief summary of incentives and other measures are listed below:

- **Distribution of single-family and multi-family conservation kits:** The District has participated in the regional effort, headed by the Seattle Public Utilities (SPU), to distribute water conservation kits to all residential customers. These kits include low flow shower heads, faucet aerators, toilet flow restrictors and toilet tank leak detection tablets.

- **Implement "conservation pricing" in rate design:** The District's inverted block rate structure promotes conservation by increasing the cost of water as the consumption increases. In 1999, an additional consumption block was added at the high end of the rate structure to assist in conservation.

- **Assist in the financing of existing utility retrofits:** Although the District does not directly finance a retrofit program, it with SPU to promote the regional low flow toilet and washing machine rebate program.

- **Seasonal Demand Management:** Through program promotion and pricing strategies, the District encourages seasonal demand management to help control peak season use by its customers. The District supports landscaping regulations by the agencies governing building and landscaping codes. In addition, the District is cognizant of conservation during the peak demand period in all of its water and sewer system operations.

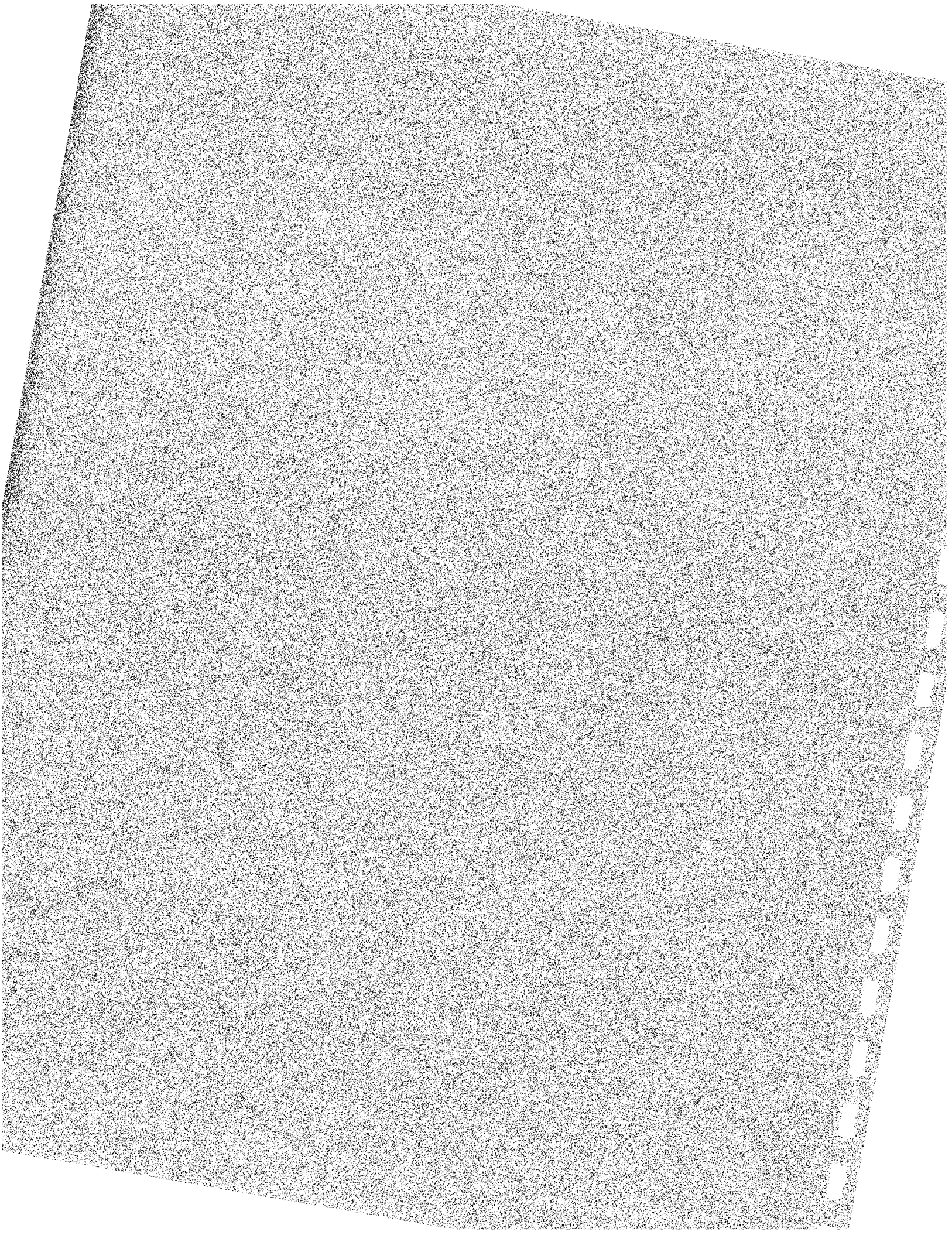
- **Water Reuse:** The District recognizes the potential importance of water reuse in future conservation efforts and water supply planning. As such, Cedar River is an active participant in and supports regional efforts at identifying potential water reuse opportunities.

- **Data Collection and Monitoring:** The primary goal of the water use data collection effort, as it relates to conservation, is to determine the average amount of water used on either a per capita or connection basis, depending on the type of connection. The District achieves this by monthly review of water use records and comparison to previous years. Water use by customer classification is identified in order to identify annual and specific trends for summer and winter water use. This data, coupled with information regarding weather and implementation of any new conservation programs, provides the District with a mechanism for monitoring overall water conservation efforts.

REGIONAL CONSERVATION PLAN

Cedar River Water and Sewer District is an active participant in "The Regional 1% Water Conservation Plan" sponsored by the Seattle Public Utilities. This program was established in response to the Conservation Potential Assessment Report prepared for SPU in May 1998. The initial report identifies and analyzes many possible conservation measures in detail including estimated cost versus water conservation potential for different conservation activities. The Report could be used as an additional resource when choosing more specific or additional conservation measures. The Plan establishes a goal of reducing residential and commercial water consumption by 1% a year for the next ten years and suggests more specific conservation measures that could be implemented to help achieve the goal. The 1% Initiative is currently in its first year of implementation. Possible expansion of the program will come after an initial evaluation is completed by SPU. This 1% decrease in demand over the next ten years has been factored into the District demand projections, presented in Section 2 of the Plan. A copy of the Plan is on file at the District office.

INTERLOCAL AGREEMENTS



COPY

ORIGINAL

AGREEMENT FOR JOINT OWNERSHIP, CONSTRUCTION AND OPERATION OF WATER STORAGE AND TRANSMISSION FACILITIES

THIS AGREEMENT is made by and between Cedar River Water and Sewer District of King County, Washington, ("Cedar River"), a municipal corporation, and Covington Water District of King County, Washington, ("Covington"), a municipal corporation (collectively the "Parties").

R E C I T A L S

A. Purpose of Agreement. This Agreement provides for (1) Cedar River and Covington to jointly construct, own, operate and maintain a four million gallon water storage reservoir ("Reservoir") and pumping, transmission and intertie facilities as described on Exhibit A attached hereto and incorporated by this reference (such facilities and Reservoir are hereinafter referred to as the "Joint Facilities" or "Project"); and (2) the terms and conditions pertaining to the price and volume of water which may be purchased from either party by the other.

B. Background. The following facts and circumstances are relevant to this Agreement:

1. Cedar River has, by Resolution No. 1762, as amended by Resolution No. 1785, adopted a water system comprehensive plan providing for a one million gallon water storage reservoir to serve that portion of Cedar River's service area located to the east of State Highway 18 (hereafter referred to as the "East Area"). Such plan has been approved in accordance with the requirements of RCW 57.16.010.

2. Covington has, by Resolution No. 703, adopted a water system comprehensive plan providing for a water storage reservoir to be located in the northeast portion of its service area (hereafter referred to as the "Northeast Area"), along with transmission and pumping facilities to connect such reservoir to other parts of its service area. The comprehensive plan has been approved in accordance with the requirements of RCW 57.16.010.

DUPLICATE ORIGINAL

Covington intends to revise and update its comprehensive plan to meet water supply forecasts which will include increasing the size of such water storage reservoir to three million gallons.

3. Cedar River and Covington have previously entered into an agreement ("Boundary Agreement"), adopted by joint Resolution No. 439, dated November 4, 1976, of Covington and by Resolution No. 1078, dated October 27, 1976, of Cedar River, as amended by agreement dated April 2, 1979, by Cedar River and February 28, 1979, by Covington, and as further amended by joint Resolution No. 973 of Covington, dated December 7, 1983, and No. 1922 of Cedar River, dated January 11, 1984, which resolutions provide in part, the following:

(a) Establishment of a common North/South boundary between the water service areas of the Parties at S.E. 256th Street;

(b) Cooperation in the planning and construction of a hydraulically compatible emergency intertie between their water systems;

(c) Cooperation in the provision of temporary and permanent water service to areas located in the vicinity of said boundary.

4. Cedar River and Covington have jointly authorized and funded an engineering study ("Study") prepared by Economic and Engineering Services, Inc. ("EES") dated October, 1989, for the purpose of cooperatively planning for the water service needs of the East Area of Cedar River and Northeast Area of Covington. A summary of the Study is attached hereto as Exhibit B which is incorporated by reference. The Study has identified a hydraulically compatible pressure zone located in the East Area of Cedar River and the Northeast Area of Covington and has recommended the construction of the Reservoir in the Northeast Area of Covington as part of the Joint Facilities. The Study concludes that the Joint Facilities would (i) provide Cedar River's East Service Area with sufficient fire flow and storage

to meet its existing and future needs, and (ii) provide Cedar River with an alternate source of water supply if the City of Seattle Water Department ("Seattle") approves such alternate supply. The Study further concludes that the Joint Facilities would (i) provide Covington's Northeast Area with sufficient fire flow and storage to meet its existing and future needs and (ii) benefit Covington by providing it with an alternate water supply from Cedar River if Seattle approves. The Parties are expected to realize substantial cost savings in construction of the Joint Facilities because they will alleviate the Parties' need to build individual water storage facilities of smaller, less efficient sizes.

5. The Parties desire the opportunity of purchasing a back-up interruptible supply of potable water from each other at the intertie locations.

6. Cedar River's sole source of water supply is from Seattle. Covington acknowledges that Cedar River is prohibited by Cedar River's water supply contract ("Seattle Contract") with Seattle from, under any circumstances, selling or transmitting water to Covington without the prior written consent of Seattle. Covington accepts the risk of Seattle's denial of such permission and will, nevertheless, perform its obligations under this Agreement. Covington will directly seek such permission from Seattle and Cedar River will cooperate in that regard; provided that, Cedar River will have no obligation to take any action which would jeopardize its existing rights to receive a sufficient amount of Seattle water to serve its customers.

C. Goals. The goals of this Agreement are (1) to insure and increase the reliability of the parties' water systems in meeting domestic and emergency water supply demands, and (2) to realize cost savings through the Parties joint ownership, operation and maintenance of the Joint Facilities. NOW, THEREFORE,

IN CONSIDERATION of the mutual covenants herein contained, the Parties hereby agree as follows:

1.0 Conditions Precedent. The parties obligations hereunder for performance of the terms and covenants of this Agreement are conditioned upon the occurrence of all the following events on or before June 15, 1991:

A. Issuance of an opinion by EES that the respective water system comprehensive plans of the Parties allow for the construction of the Joint Facilities without further amendment; provided that, in the judgment of EES, if such opinion cannot be given, then such condition may be met by, on or before such date, (i) the adoption of a resolution amending the water system comprehensive plan by the appropriate Board of Commissioners which resolution, will in the opinion of EES, allow for such construction and (ii) the application to the governmental agencies having jurisdiction for approval of such amendment.

B. Issuance or execution of all franchises, permits and easements by King County, the City of Kent, the State of Washington and private parties, if any, required for the installation of the Joint Facilities.

C. Approval of all applications to the governmental agencies having jurisdiction for all land use permits required for construction of the Joint Facilities.

D. Preparation and circulation to affected parties and agencies of an Environmental Checklist describing the Project and its impacts and a Determination of Non-Significance prepared in accordance with RCW 43.21C without any party making an appeal thereto within the time limits prescribed by applicable statutes, regulations or resolutions.

E. Execution by the Parties of an agreement with EES and/or the engineering firm of Hammond, Collier, Wade & Livingstone ("HCWL") providing for engineering services for the preparation of plans, designs and specifications ("Plans") for the construction and completion of the Joint Facilities, inspection

services and required consulting services in respect thereto.

F. Approval by Seattle allowing (i) an intertie of the water systems of the parties and (ii) the sale or transmission of water from either Party to the other as provided under this Agreement.

The Parties agree to use their best efforts to cause the foregoing conditions to become satisfied on or before June 15, 1991. Such date may be extended by the written agreement of the Parties.

2.0 Ownership of Property and Facilities and Waiver of Partition.

2.1 Ownership Interests. The ownership interest of the Parties in and to the Joint Facilities shall be as follows:

	Covington	Cedar
Reservoir	75%	25%
18" Transmission line through Kent water shed, including intertie flow meters and telemetry for same (collectively "Transmission Line")	50%	50%

The facilities which are a part of the Joint Facilities and which are not listed above shall be 100% owned by the respective Party within whose boundary such facilities are located. The Parties shall each own an undivided interest as tenants-in-common in real property (including easements, franchises and right of way permits), improvements and fixtures constituting the Reservoir and Transmission Line.

2.2 Reimbursement Obligation. Covington shall adopt a front footage connection charge ("Front Footage Charge") calculated to recover the cost of that portion of the Project which consists of the eighteen (18) inch water transmission line located outside of the Kent Water Shed, the twelve (12) inch water line on Witte Road and the twelve (12) inch water line on the Maple Valley - Black Diamond Road. Covington

shall charge and collect the Front Footage Charge from all property owners connecting to such facilities under the authority of RCW 57.08.010 (3). Upon receipt of every Front Footage Charge during the term of this Agreement, Covington shall immediately pay over to Cedar River such amount multiplied by the percentage of cost sharing as shown in Table 2 to Exhibit B in respect to each of such facilities in order to reimburse Cedar River for its contribution to the cost thereof.

2.3 Limited Responsibility to Third Parties. The duties, obligations and liabilities of the Parties are intended to be several and not joint or collective, and none of the Parties shall be jointly or severally liable for the acts, omissions, or obligations of any of the other Parties. No provision of this Agreement shall be construed to create an association, joint venture, partnership, or impose a partnership duty, obligation or liability, on or with regard to any one or more of the Parties. No Party shall have a right or power to bind any other Party without its or their express written consent except as expressly provided in this Agreement.

2.4 Party's Access to Project. Each Party and its designees shall have the right to go upon and into the Project at any time subject to the rules and regulations of public authorities having jurisdiction thereof and to the necessity of efficient and safe construction and operation of the Project.

2.5 Purchase of Interest in Reservoir Site. Within thirty (30) days of advertisement for construction bids on the Project, and no later than fifteen (15) days prior to the commencement of construction of the Joint Facilities, Covington shall sell, and Cedar River shall purchase, a one-quarter (1/4) undivided interest as tenant-in-common in the 2-1/2 acre site ("Site") upon which the Reservoir is to be constructed and which is described on Exhibit C hereto and incorporated by reference.

A. Price. The price shall be Ten Thousand Nine Hundred Forty-Five Dollars ($10,945.00).

B. Payment. The price shall be paid all cash at closing.

C. Condition of Title. Title to the Site shall be free and clear of all encumbrances of any kind except those approved by Cedar River. Covington shall provide Cedar River with an ALTA owners title insurance policy from First American Title Insurance Company on closing, the cost of which shall be considered an additional shared expense. Each Party shall bear its own costs of such closing.

D. Closing. This transaction shall be closed in the offices of First American Title Insurance Company, Bellevue, office, on or before the date specified in Section A above. At time of closing each Party shall furnish the funds, papers and documents as customarily required to be so furnished, including a statutory warranty deed from Covington to Cedar River. Upon closing Cedar River shall be entitled to possession of the property conveyed herein as a tenant-in-common.

E. Price Adjustment. If at any time during the term hereof Covington constructs one or more additional reservoirs on the Site, prior to the commencement of construction thereof it shall pay Cedar River an amount in cash based on the then current appraised value of the Site multiplied by the fraction of one-fourth (1/4) less the fraction one million divided by the total number of gallons of water storage on the Site after such reservoir(s) is completed (for example: if Covington builds an additional 2 million gallon reservoir on the Site the calculation shall be: [1/4 minus 1,000,000/6,000,000] multiplied by the appraised value = amount due Cedar River). The Parties shall jointly choose an MAI appraiser to appraise the Site and shall each pay one-half the cost of the appraisal.

F. Waiver of Partition. So long as the Project, or any part thereof as originally constructed, reconstructed or added to, is used or useful to the Parties' water supply systems or to the end of the period permitted by applicable law,

whichever first occurs, the Parties waive the right to partition whether by partition in kind or sale and division of the proceeds thereof and agree that during such time they will not resort to any action at law or in equity to partition and further that for such time they waive the benefit of all laws that may now or hereafter authorize such partition of the properties comprising the Project.

3.0 Construction of Joint Facilities.

3.1 Permits. The Parties shall use their best efforts to obtain the necessary approvals and permits for construction of the Joint Facilities.

3.2 Plans and Specifications. The Plans shall be prepared by EES and/or HCWL and shall contain sufficient detail to construct the Joint Facilities in conformance with the water system comprehensive plans of the Parties. The Plans shall be subject to the approval of the governing bodies of each Party.

3.3 Supervision of Design, Bidding and Contract Administration.

A. Control Board. There shall be a control board ("Control Board"), consisting of the manager of each of the Parties, having the duties and authority described herein. The Control Board may, by unanimous vote of both of its members, adopt rules of procedure governing its operation. Decisions shall be made only by unanimous approval. In the event of a deadlock in any matter requiring the approval or recommendation of the Control Board, Robert Wubbena of EES or his successor as mutually agreed upon by the Parties, shall temporarily act as a third member thereof whose vote shall resolve such deadlock.

B. Meetings. Meetings of the Control Board, other than regularly scheduled meetings, may be called by either member on written notice to the other member sent by certified mail at least seven (7) days before the date of the meeting. No meeting with EES or HCWL or their successor or other consultants working on the Project with one member of the Control Board may

occur without reasonable prior notice to the other member.

C. Powers and Duties of Control Board.

(1) The Control Board shall supervise EES, HCWL and other consultants in the planning, design and construction of the Project.

(2) From time to time as determined by the Control Board, and on request of either of the Parties, the Control Board shall meet with the governing bodies of the Parties for the purpose of reporting on the progress of the Project.

(3) The Control Board shall:

(i) Review and approve the Plans prepared by EES, HCWL and/or other consultants and forward such Plans to the governing boards of each Party for approval pursuant to Section 3.2;

(ii) Determine the timing of the various stages of the Project;

(iii) Approve calling for bids for the construction of the Project subject to approval of the governing board of each Party pursuant to Section 3.5;

(iv) Recommend to each Party's governing board selection of the successful bidder for each construction contract for the Project;

(v) Approve the form of each contract for construction of the Project; and forward such contract(s) to the governing board of each Party for approval pursuant to Section 3.5;

(vi) Review and recommend to the governing board of each Party each order for changes to the Contracts for construction;

(vii) Determine and recommend to the governing board of each Party acceptance of

the work performed under each contract for construction; and

(viii) Recommend execution by the governing body of the Project Administrator of vouchers for the issuance of warrants for payment of the costs of construction to be drawn on the Joint Construction Fund described in Section 3.6C.

3.4 Project Administrator. Cedar River is designated as the administrator ("Project Administrator") during the construction of the Project subject to the control of the Control Board. Cedar River shall keep adequate records in respect to the Project and maintain and account for all receipts and disbursements in respect to the Project. Cedar River shall be reimbursed by Covington for its actual costs incurred in providing such administration services, including a reasonable amount for overhead, which amounts shall be part of the Costs of Construction as defined in Section 3.6 A.(2).

3.5 Construction Contract. Upon approval of the Plans by the Parties, the issuance of all necessary permits, comprehensive plan amendments, if necessary, and the obtaining of all necessary property rights, easements and franchises, the Parties shall direct EES and/or HCWL to prepare a contract and specifications for construction of the Project, which contracts shall be subject to the review and approval of the Parties. The Parties shall award contracts for the construction, operation and maintenance of the Project in a manner designed to result in the least over-all cost consistent with standards of high quality. Contracts may be lump sum or unit price, and may also contain incentive and liquidated damages clauses. The parties shall advertise for bids and award contracts or reject all bids after appropriate evaluation and review in accordance with applicable laws of the State of Washington. The lowest qualified bidder shall be selected by the Parties or all bids shall be rejected

and such contract readvertised for bid. Upon selection of the successful bidder by the Parties a construction contract shall be let in the name of the Parties and shall specify each Party's respective limited percentage of liability hereunder to such contractor. Neither Party shall be jointly and severally liable thereunder.

3.6 Costs and Payments. Each Party shall pay its share of the Cost of Construction of the Project in accordance with the following terms and conditions:

A. Definitions. The following additional definitions shall apply herein:

(1) "Joint Annual Costs" means all costs of maintenance of the Reservoir and Transmission Line included in any budget or revised budget approved under Section 4.4.

(2) "Costs of Construction" means all costs allocable to the planning, acquisition and construction of the Project. Without limiting the generality of the foregoing, such costs shall include:

(a) Preliminary investigation and development costs, engineering, contractors' fees, labor, materials, equipment and supplies, operator and other personnel training, testing, legal costs and all other costs properly allocable to construction.

(b) All costs of insurance obtained pursuant to Section 7 and applicable to the period of construction.

(c) All costs relating to injury and damage claims arising out of the construction of the Project less proceeds of insurance maintained in accordance with Section 7.

(d) All federal, state and local taxes legally required to be paid in connection with the construction of the Project, except any tax assessed or charged directly against any individual Party unless such tax was assessed or charged to the individual Party on behalf of the Project.

(e) The cost of all services, including an allocation of administrative and general expenses, performed by or at the request of the Control Board or the Project Administrator and which are directly applicable to Project construction.

(3) "Ownership Share" means the percentage specified in Section 2.1 and Table 2 to Exhibit B hereto or such percentage adjusted pursuant to Sections 10, 11 and 12.

B. Sharing of Costs. Each Party agrees to pay its Ownership Share of the Costs of Construction.

C. Establishment of Joint Account. Cedar River shall cause to be established in the office of the King County Treasurer a separate account entitled "Cedar River Water & Sewer District/Covington Water District Joint Construction Fund" (hereafter referred to as the "Joint Construction Fund"). This account will be used solely for receiving and disbursing funds for all costs of the Project. Subject to the approval thereof by the Control Board, vouchers will be prepared and approved by the governing body of Cedar River and submitted to the King County Treasurer for issuance of warrants payable from the Joint Construction Fund. All excess amounts in the Joint Construction Fund shall be invested and re-invested in the manner provided by law subject to the approval by resolution of the governing body of Cedar River.

D. Financing. Each Party shall, not later than the date of acceptance of one or more bids for construction of the Project, deposit in the Joint Construction Fund an amount not less than the total sum of its Ownership Share of the estimated Costs of Construction. Investment income accruing in the Joint Construction Fund shall remain in such fund to provide a surplus for contingencies. Such income shall be allocated between the Parties in accordance with the net amounts of each on deposit therein.

E. Adjustment for Final Cost. Upon completion of construction of the Project, the Control Board shall prepare a statement of all of the Costs of Construction including general and administrative expenses as defined above and prepare a final accounting of the amount due or to be credited to the Parties.

F. Excess Costs. In the event the Control Board estimates that Cost of Construction will exceed the funds on hand in the Joint Construction Fund, the Control Board shall certify to each Party the amount, and the Ownership Share due from each, to pay such excess and each Party shall deposit its Ownership Share in the Joint Construction Fund within twenty (20) days after receipt of such certification or within seven (7) days after the next regularly scheduled Board of Commissioners meeting, whichever first occurs.

3.7 Notice to Proceed. The Project contractor shall be given notice to proceed as provided under the construction contract following completion of the deposits required in paragraph 3.6D above.

4.0 Maintenance and Repairs.

4.1 General. Following completion of construction of the Joint Facilities, the Parties shall maintain them in a manner consistent with prudent municipal utility practice subject to the provisions set forth below. The Joint Facilities lying within a Party's boundaries shall be maintained, repaired, refurbished and replaced by such Party at its sole expense, provided that, the Reservoir and Transmission Line shall be maintained, repaired, replaced and refurbished as set forth below and each Party shall pay its Ownership Share of the Joint Annual Cost thereof.

4.2 Maintenance and Operation Agency. Covington shall:

A. Maintain, repair and operate the Reservoir and Transmission Line;

B. Have the power, authority, and responsibility set forth in Sections 4.3 through 4.6 below, subject to the

control of the Control Board; and

C. Assemble and keep all records concerning its operation and maintenance and the cost thereof, such records to be provided by Covington to Cedar River and the Control Board at their request.

4.3 Maintenance Schedule. The Reservoir and Transmission Line shall be maintained and repaired as follows:

	Activity	Interval
1.	Inspect reservoir coating system - internally and externally.	Annually
2.	Inspect, test and lubricate all isolation, air vacuum and control valves.	Annually
3.	Test and calibrate intertie flow meter.	Bi-annually
4.	Test and calibrate telemetry information and control capabilities.	Quarterly
5.	Repair any component working improperly.	As needed
6.	Sitework (mow lawn, etc.).	As needed
7.	Inspection.	Weekly

4.4 Budget/Records. At least thirty (30) days prior to the end of each calendar year, Covington shall submit to Cedar River for approval a budget for the Joint Annual Costs applicable to the next calendar year for the Reservoir and Transmission Line. Covington shall keep a record indicating the maintenance schedule of all components' and the actual maintenance and repairs performed in respect to the Reservoir and Transmission Line. Such records shall be available to Cedar River and the Control Board at all times during normal work hours.

4.5 Contracts. All contracts affecting the maintenance, repair, refurbishment or replacement of the Reservoir and Transmission Line shall be entered into the name of

Covington and Cedar River and the parties limited percentage of liability therefor shall be specified therein. Vouchers for claims payable for such maintenance or repairs shall be approved by the Control Board. Covington shall be reimbursed as part of the maintenance costs for any administrative expense reasonably incurred by it in carrying out its duties under Sections 4.2, 4.3 and 4.4. Covington shall have the full power and authority to carry out maintenance and repairs subject to the approval of the Control Board.

4.6 Costs. Covington shall coordinate all maintenance and repair activities and utilize personnel and equipment from the Parties, as they are reasonably available and most cost effective. With respect to the Joint Annual Costs, the labor cost for providing maintenance and repairs to the Reservoir and Transmission Line shall be computed using the rates charged to customers of the Party providing the personnel. Materials used in such repair and maintenance shall be charged at the actual cost plus fifteen percent (15%). A computation of the costs incurred in performing the maintenance and repairs by each Party shall be accomplished quarterly and submitted to the Control Board for approval for payment from the Joint Facilities Maintenance Fund established pursuant to the following Section.

4.7 Establishment of Joint Maintenance Account. Covington shall cause to be established in the office of the King County Treasurer a separate trust account entitled "Covington Water District/Cedar River Water & Sewer District Joint Facility Maintenance Fund" (herein referred to as the "Joint Facilities Maintenance Fund".) This account shall be used solely for receiving and disbursing funds for the costs of maintenance, repairs and replacements of the Reservoir and Transmission Line. Subject to the approval of the Control Board, vouchers will be prepared by Covington and submitted for issuance of warrants payable by the King County Treasurer from the Joint Facilities Maintenance Fund.

4.8 Payment. Each Party shall deposit into the Joint Maintenance Fund its Ownership Share of the Joint Annual Costs by the twentieth (20th) day of the month following the month in which the bill is received, after which time the bill will be delinquent. Delinquent charges shall accrue interest on the unpaid balance at the rate of twelve percent (12%) per annum from the date of delinquency until paid.

4.9 Damage to the Project. If the Project suffers damage or destruction resulting from causes other than ordinary wear, tear or deterioration and if the Parties do not unanimously agree that the Project shall be ended pursuant to Section 11, EES, HCWL or such other civil engineering firm as may be agreed upon by the Parties shall be promptly engaged to prepare and submit plans and a budget for the repair or rebuilding of the Project, and the Parties shall proceed to repair the Project. Each Party shall pay its Ownership Share, as budgeted, into the Joint Construction Fund prior to the award of any contract for such repair or rebuilding work.

5.0 Operation of Joint Facilities.

5.1 Responsibility for Operation and Maintenance of Project. Each Party shall operate and maintain such portions of the Project to which responsibility therefore is designated herein in such manner as to meet the requirements of the Department of Ecology and other government agencies having jurisdiction to safeguard the health and safety of persons and safety of property, and, as necessary in the normal course of business to assure the continued operation and maintenance of the Project.

5.2. Responsibility for Maintaining Water Level in Reservoir. Notwithstanding any other provision of this Agreement, each Party shall supply water to the Reservoir commensurate with its Ownership Share to maintain an adequate level of water therein at all times. Each Party shall fulfill such responsibility by maintaining a sufficient water supply and

necessary related pumping capacity, equipment and controls to supply the Reservoir, at any time required, such share of a volume of 1.7 million gallons within a continuous 24 hour period. If either Party's water supply does not meet this requirement, such Party shall immediately use its best efforts to acquire adequate source and pumping capacity, equipment and controls in order to comply with such requirement.

5.3 Reservoir Draw Down and Replenishment. The Parties shall operate the Joint Facilities and their respective water systems in accordance with the following terms for the lowering of the water level in the Reservoir and the replenishment of the water used through draw down.

A. Domestic Demands. The Parties agree to restrict the draw down of the water level in the Reservoir to five (5) feet below overflow for normal domestic demands. During the summer months of May through September of each year, when normal demands are at or near maximum levels, each Party shall control and operate its source or sources of water supply to replenish the volume of water it has withdrawn from storage within a 24 hour period subject to the approval of Cedar River's right to supply such water by Seattle. The 24 hour period shall begin at 9:00 a.m. and end at 8:59 a.m. the following day. The Control Board shall establish alternate operating criteria during the other months of each year.

B. Emergency Fire Demand. Either Party may withdraw water from the Reservoir to meet their respective fire flow requirements during periods of maximum domestic demand or at other times, if required. To assure that water from storage can be provided in required volumes to provide domestic water service at all points in each Party's water system, the Parties agree that neither Party shall draw down or lower the hydraulic elevation of the water to less than ten (10) feet below overflow in the event of emergency fire demand without notification to the other Party provided in no event shall the Reservoir be drawn

down more than fifteen (15) feet from the overflow level. Each Party agrees to replenish the volume of water it has withdrawn from storage for emergency fire flow purposes within 72 hours after the time of use.

C. Other Emergencies. The Parties recognize the potential of emergency conditions such as failure of water system facilities, power interruptions, natural disaster or other sudden unexpected occurrences. Should such emergencies occur, each Party or both Parties may withdraw from the Reservoir such volumes of water that are available without regard to the draw down of the hydraulic elevation of the water level. Further, each Party agrees, to the extent practicable, to apply all of its available resources to meet such emergency condition and to establish such conservation measures as may be necessary for a period not to exceed seven (7) consecutive calendar days for each such emergency. The Parties recognize and agree that the occurrence of such emergencies may adversely affect customer service equally in each Party's water system. The Party which meets such an emergency condition further agrees to apply all of its resources to the restoration of normal operation conditions and the refilling of the Reservoir as soon as practical following such emergency.

D. Revision of Terms. The Control Board shall review and, if it approves, revise the terms of this Section 5.3 after one full year of operation of the Joint Facilities. Such terms may thereafter be revised as the Control Board may approve.

5.4 Notice and Response.

A. Emergency Condition. In the event of an emergency condition occurring in either the East Area of Cedar River or the Northeast Area of Covington, the other Party shall be immediately notified. The Party so notified shall immediately provide assistance to the extent possible to the other Party and shall modify its operations and controls as necessary to meet the

emergency in accordance with the intent of this Section 5.

B. Reimbursement. In the event of such emergency, the Party suffering the emergency shall reimburse the other Party for all labor and other costs incurred and reasonably allocable in responding to such emergency.

5.5 Telemetry. The Joint Facilities provide for improvements to the telemetry and control facilities. Each Party shall make such other additions, if any, to its telemetry and control facilities as are necessary to assure its performance of the requirements of this Section 5. The maintenance, repair and replacement of each Party's telemetry and control facilities shall be the responsibility of such Party to assure the reasonable, continued operation of its water system.

5.6 Water System Operation. Each Party covenants and agrees to improve as necessary, and to maintain and operate, its water system, to assure its continuous ability to meet the requirements of this Section 5.

5.7 Federal, State and Local Regulations. Each Party agrees and covenants to comply with all federal, state and local regulations in the operation of its water system connected to the Joint Facilities.

6.0 Sale of Water.

6.1 Sale of Water by Cedar River. Cedar River agrees to sell potable water to Covington at the point of intertie located at State Highway No. 169 and S.E. 256th Street, subject to the following conditions, terms and limitations:

A. Condition: Seattle's prior written approval of this Agreement;

B. Terms:

(1) Price. The price of each 100 cubic feet of water sold shall be seventy-five percent (75%) of Cedar River's water commodity rate charged to all retail water customers.

(2) Quantity. The quantity of water sold is subject to any quantity restrictions which may be imposed by Seattle; and Cedar River may first fulfill its water supply obligations prior to the sale of any water to Covington.

C. Limitations:

(1) Seattle Requirements. This Section 6.1 is subject to the Seattle Contract and such other terms and condition as may be required by Seattle; provided Cedar River shall not be required to agree to any term, condition or limitation required by Seattle as a condition to this Agreement which has the effect of restricting Cedar River's ability to purchase water from Seattle. Cedar River shall, at its option, be released from its obligations contained in this Paragraph 6.1 if it is or becomes subject to any such restriction or if Seattle at any time prohibits the sale of water to Covington.

(2) Resale of Water. Covington shall not, without the prior written consent of Seattle and Cedar River resell water purchased hereunder to another public or private water purveyor.

6.2 Sale of Water by Covington. Covington agrees to sell potable water to Cedar River at the same point of intertie identified in Section 6.1, subject to the following terms:

A. Price. The price of each 100 cubic feet of water sold shall be Covington's base water commodity rate charged to all of its wholesale water customers.

B. Quantity. The quantity of water sold is subject to Covington first fulfilling its obligations for water supply to its retail customers. If Seattle, at any time, restricts Cedar River's ability to meet its water supply obligations to the East Area, then Covington shall provide such water supply to the best of its ability to do so.

6.3 Water Quality.

A. General. Each Party agrees and covenants to maintain a reasonable water quality from each of its sources of

supply to assure compatibility and to meet the standards and regulations of all federal, state and local agencies having jurisdiction. In the event Seattle requires Covington's water to be treated to maintain compatibility with Seattle water even if Covington's water complies with state and federal water quality standards, each Party agrees to pay one-half (1/2) the cost of such treatment subject to the following limitations:

(1) During any calendar year in which Seattle does not allow net water flows from Cedar River to Covington to occur at any time, such cost to Cedar River shall not exceed $5,000.00 per year;

(2) During any other calendar year, such treatment cost when added to the cost of water purchased by Cedar River from Covington shall not exceed the cost of the same amount of Seattle water to Cedar River.

If the share of such treatment cost to Covington exceeds one-half (1/2) because of the limitations set forth in (i) or (ii) above, Covington may pay the excess amount. If Covington chooses not to pay the excess amount, then Cedar River shall have the choice of (a) paying the excess amount, or (b) for the purpose of isolating the respective water supplies of the Parties and after ten (10) days written notice to Covington, disconnecting Cedar River's water distribution system serving the East Area from Cedar River's Seattle water supply and purchasing water from Covington to serve such area and Covington shall sell Cedar River such water.

B. Chemicals. Except as required by law or a governmental agency having jurisdiction, neither Party shall add chemicals to or otherwise supplement its water supply without the prior written consent of the other Party.

6.4 Metering. The interties to be constructed as part of the Joint Facilities shall include the installation of metering equipment at each point of connection of the Parties' water systems.

6.5 Measurement of Water Flow. The measurement of the volume of flow between systems in any period shall be the sum of the net directional volume at each metering facilities at the end of the period less the same sum at the beginning of the period.

6.6 Implementation of Water Conservation Programs. Prior to sale of any water hereunder the Parties shall develop, adopt, implement and amend as needed water conservation programs that are supportive of Seattle's regional water conservation program.

6.7 Term/Revision. The term of this Section 6 shall commence upon the date of acceptance by both Parties of the Joint Facilities under the construction contract therefor and shall end five (5) years from such date; provided that, this Section 6 shall be extended for a period of five (5) years if the Parties express their agreement to do so in writing prior to the expiration of such term. The Agreement may be renewed in five (5) year increments thereafter in the same manner. The Parties agree to negotiate in good faith prior to the end of each five (5) year term in respect to the terms hereof in order to accomplish each such renewal.

7.0 Insurance.

7.1 During Construction. Builder's All Risk Insurance during the construction period shall be provided at the expense of the contractor or contractors as a part of the cost of the Project, and such insurance shall name Cedar River, Covington and such consultants of the Parties as determined by the Control Board as additional named insureds. In addition, each contractor shall be required to provide liability insurance in such amounts and such coverage as shall be determined by the Control Board and which shall be reasonably sufficient to protect the Parties against liability arising from such construction.

7.2 After Construction. Each Party shall maintain casualty insurance for all risks of direct physical loss from external causes on the Joint Facilities to the extent of their

interests therein at the then current replacement cost of such improvements. Each Party shall further maintain public liability insurance with per occurrence limits of not less than two million Dollars ($2,000,000) or in such greater amounts as may be determined by the Control Board.

8.0 Liabilities; Waiver of Subrogation.

8.1 Release. Each of the Parties releases the other Party, its agents and employees from any claim for loss or damage, including consequential loss or damage, arising out of the construction, operation, maintenance, reconstruction, and repair of the Project due to negligence, including gross negligence, but not any claim for loss or damage resulting from breach of any contract relating to the Project, including this Agreement, or for willful or wanton misconduct.

8.2 Costs. Any loss, cost, liability, damage and expense to the Parties or any party, other than damages to any Party resulting from loss of use and occupancy of the Project or any part thereof, resulting from the construction, operation, maintenance, reconstruction or repair of the Project and based upon injury to or death of persons or damage to or loss of Project property and property of other parties, to the extent not covered by collectible insurance, shall be charged to Cost of Construction or Annual Costs, whichever may be appropriate.

8.3 Insurance. Each party shall cause its insurers to waive any rights of subrogation against the other Party, its agents and employees, for losses, costs, damages or expenses arising out of the construction, operation, maintenance, reconstruction or repair of the Project.

9.0 Agreed Change in Proportion of Use. The Parties may agree in writing to adjust the percentage of use of the Joint Facilities to which they may be entitled under the terms of this Agreement either as a permanent amendment to this Agreement or as a temporary arrangement, and they may agree that one Party will pay the other on an agreed basis for such temporary or permanent

use.

10.0 End of Project. When the Project is no longer useful or the requirements of governmental agencies having jurisdiction preclude its use, or if the Project is damaged and the Parties mutually agree to not rebuild or repair it in accordance with Section 4.9, the Parties shall sell for removal all salable parts of the Project to the highest bidders. After deducting all costs of ending the Project, including, without limiting the generality of the foregoing, the cost of razing all structures and disposing of the debris and meeting all applicable requirements of law, the Parties shall close the appropriate funds or accounts and, if there are net proceeds, distribute to each Party its ownership interest percentage of such proceeds. In the event such costs of ending the Project exceed available funds, each Party shall pay its Ownership Share of such excess as incurred.

11.0 Notices. Any notice, demand, approval or request or other item provided for in this Agreement to be served, given or made in connection therewith shall be deemed properly served, given or made when given in person or deposited in the U.S. Mail, registered or certified mail, postage prepaid, addressed to the person and at the address designated in writing by the respective Party, as the case may be. Either Party may at any time, and from time to time, change its designation of the person to whom notice shall be given by giving notice to the other Party as hereinabove provided.

12.0 Personal Covenants; Rule Against Restrictions on Alienation.

12.1 Personal Covenants. Except for the Parties' mutual waiver of the right to partition set forth in Subsection 2.4F, all of the covenants and conditions herein shall be personal to the respective Parties but shall nevertheless be binding upon any Party which acquires any right, title or interest of any Party in or to the Project or under this Agreement, by assignment or in any other way.

12.2 Rule Against Restrictions on Alienation. If the duration of any term or condition of this Agreement shall be subject to the rule against restrictions on alienation or to a similar or related rule, then the effectiveness of such term or condition shall not extend beyond (i) the maximum period of time permitted under such rule or (ii) the specific applicable period of time expressed in this Agreement, whichever is shorter.

13.0 Assignment/Change in Boundaries. Except as set forth herein, neither Party may assign, sell, transfer, convey or otherwise allow any other person, corporation, partnership, firm or other entity to in any way use either the Reservoir or the Transmission Line without the prior written consent of the other Party, which consent may be withheld for any reason. It is recognized that one or more of the Parties may, during the term of this Agreement, merge with, or be annexed to, another municipal corporation, or may be dissolved by operation of law, or may be divided between two or more other municipal corporations, or may lose the right to serve all or part of its territory because of annexation by another municipal corporation or may, for some other reason not now foreseen, cease, either in whole or in part, to furnish water to all or part of its present territory. The Parties recognize the difficulty of providing for the effect of every such possible contingency in the operation of this Agreement. However, the Parties do agree on the following principles and procedures, which shall apply so far as practicable, in case of any change of the nature described in the preceding two sentences:

A. The Parties shall not permit any change in their boundaries which will impair the security of the holders of any bonds issued to pay for the Project.

B. In the event of a change of a Party's boundaries by annexation, merger or consolidation of a part of, or all of, the territory of one of the Parties, which territory is served by the Project, the Parties agree to negotiate in good faith for any

amendments to this Agreement necessary to insure that the cost of constructing and operating the Joint Facilities, and the benefits from their use, shall be shared equitably among such public agencies which shall have jurisdiction over the area in which the Project is located and which it is designated to benefit.

C. If all of that portion of a Party's area which is served or designed to be served by the Project should be annexed to a city or other district, such city or district shall succeed such Party as a party hereto and shall assume all rights and obligations of the Party whose interest is assumed.

14.0 Default.

14.1 Demand/Failure to Cure. Upon failure of a Party to make any payment when due, or to perform any obligation herein, the other Party may make written demand upon such Party, and if the failure is not cured within 10 days from the date of such demand it shall constitute a default at the expiration of such period.

14.2 Performance Under Protest. If a Party in good faith disputes the legal validity of the written demand, it shall make such payment or perform such obligation within the 10 day period under written protest directed to the other Party. Such protest shall be in writing and shall specify the reasons upon which the protest is based. Payments not made by the defaulting party pursuant to the written demand may be advanced by the other Party and, if so advanced, shall bear interest until paid, at the highest lawful rate. Upon resolution of such dispute, then any payments advanced or made between the Parties, as in this Section provided, shall be adjusted appropriately.

14.3 Specific Performance. In addition to the rights granted in this Section the nondefaulting Party may take any action, in law or equity, including an action for specific performance, to enforce this Agreement and to recover for any loss, damage or payment advances, including attorneys' fees and collection costs incurred by reason of such default.

15.0 Resolution of Disputes by the Parties. The Parties desire to establish procedures to facilitate the informal and inexpensive resolution of any disputes arising under this Agreement by mutual cooperation and without resort to litigation. To accomplish this objective, the Parties agree to follow the procedures set forth below if and when a dispute arises under this Agreement:

A. Complaint Letter. The complaining Party shall write a description of the alleged breach of the Agreement and send it to the other Party by certified or registered mail. This letter shall explain the nature of the complaint and refer to the relevant sections of their Agreement upon which the complaint is based. The complaining Party shall also set forth a proposed solution to the problem, including a specific time frame within which the parties must act.

B. Response. The Party receiving the letter must respond in writing within ten (10) days with an explanation, including references to the relevant parts of the Agreement and a response to the proposed solution.

C. Meeting. Within ten (10) days of receipt of this response, the parties must meet and discuss options for resolving the dispute. The complaining Party must initiate the scheduling of this resolution meeting.

D. Mediation. A settlement conference must be held within thirty (30) days of an unsuccessful resolution meeting. The settlement conference will be held at the Seattle office of Judicial Arbitration and Mediation Services, Inc. ("JAMS"). The complaining Party must contact JAMS to schedule the conference. The Parties may agree on a retired judge from the JAMS panel. If they are unable to agree, JAMS will provide a list of three available judges and each party may strike one. The remaining judge will serve as the mediator at the settlement conference.

E. Arbitration. If the dispute is not settled by other prescribed resolution formats, the Parties agree to submit

the dispute to JAMS for binding arbitration.

1. The Parties may agree on a retired judge from the JAMS panel. If they are unable to agree, JAMS will provide a list of three available judges and each party may strike one. the remaining judge will serve as the arbitrator at the arbitration.

2. The Parties agree that arbitration must be initiated within three years after the claimed breach occurred and that the failure to initiate arbitration within the three year period constitutes an absolute bar to the institution of any new proceedings.

3. The aggrieved Party may initiate arbitration by sending written notice of an intention to arbitrate by registered or certified mail to all parties and to JAMS. The notice must contain a description of the dispute, the amount involved, and the remedy sought.

4. If and when a demand for arbitration is made by either Party, the Parties agree to execute a Submission Agreement, provided by JAMS, setting forth the rights of the parties if the case is arbitrated and the rules and procedures to be followed at the arbitration hearing. The complaining Party shall be liable for one-half (1/2) of the arbitration fees and the responding Party or Parties shall pay the remaining one-half (1/2).

5. The arbitration shall be governed by the Washington Rules of Evidence and RCW Chapter 7.04.

16.0 Scope of Agreement. The scope of this Agreement is expressly limited to the construction, maintenance and operation of the Joint Facilities and the purchase and sale of water and shall not be construed to impose any obligation on either Party not expressly required to carry out the terms of this Agreement.

17.0 Term of Agreement. When the Project is terminated as provided in Section 10, this Agreement shall thereafter terminate upon the payment by each Party of all obligations payable hereunder.

18.0 Approvals. Each Party shall approve the acceptance and adoption of the terms and conditions hereof by resolution and provide the other Party with a certified copy of the same. Each Party represents to the other that it has the full power and authority to enter into this Agreement and to bind itself to, and to perform, each and every term, covenant and condition herein, and that to do so will not violate any other agreement, contract, resolution or bond covenant of the respective party.

19.0 Effective Date. The effective date of this Agreement is Dec. 4, 1990, 1990.

APPROVED BY RESOLUTION NO. 2805, DATED Dec. 4, 1990.

(Corporate Seal)

CEDAR RIVER WATER & SEWER DISTRICT, a municipal corporation

By: _____
President and Commissioner

By: _____
Secretary and Commissioner

APPROVED BY RESOLUTION NO. 1362, DATED NOV - 7 1990.

(Corporate Seal)

COVINGTON WATER DISTRICT, a municipal corporation

By: _____
President and Commissioner

By: _____
Secretary and Commissioner

SOUTHEAST KING COUNTY
SUBREGIONAL SUPPLY SYSTEM

EXECUTIVE SUMMARY

1. GENERAL

Providing a dependable supply of drinking water in southeast King County has been increasingly difficult for individual utilities during the past few years. Escalating costs and the lack of available sites for the development of wells and/or new surface water supplies, the difficulty in obtaining water rights, and the rapid increase in population have made it difficult for a single utility to obtain adequate new water supplies to meet the projected demand for drinking water.

In addition, excess source capacity, which at one time enabled a utility to survive a short-term water shortage, has all but vanished. To be better prepared for the future and to respond to temporary water shortages, individual utilities are working together with the use of temporary emergency interties, joint - use water storage tanks, development of alternate sources, and wheeling of excess supplies of water between utilities.

Covington Water District (Covington) and Cedar River Water and Sewer District (Cedar River) have joined together to explore what may be done on a joint basis to enable both utilities to meet the expected demand in a dependable manner. The creation of joint activities between the two districts can result in significant benefits to both districts. Efficiency of operation, increases in system pressures, fire flow capabilities, storage capacity, and source reliability are but a few of the benefits to be gained through cooperative actions. Actions to improve supply, storage, and distribution in one district can have a beneficial impact on neighboring districts.

2. EXISTING CONDITIONS

Both water districts are currently undergoing a period of rapid increase in demand. Cedar River is able to meet this increase by purchasing additional water from the Cedar River Supply Line owned by the Seattle Water Department. This additional water is considered "new" water and costs between $0.510 per hundred cubic feet (ccf) and $0.514 per ccf depending on the time of the year when used. Cedar river currently has no alternative source of water should anything happen to the Cedar River Supply Line.

Covington utilizes wells as their sole source of water. The current capacity of Covington's six existing wells is 5.5 million gallons per day (MGD). Source capacity is evaluated relative to peak system demand and the current Covington source capacity is approximately equal to the peak demand. With no additions to the source capacity, Covington will be approximately 0.5 MGD undersized by 1995.

The two districts share a common boundary along the north side of Covington and the south side of Cedar River. There currently exists one 8-inch intertie between the two districts. Due to pressure constraints, the intertie can flow one direction by gravity: from Covington to Cedar River. The intertie requires booster pumping to flow into Covington.

Both districts have indicated a need for additional storage capacity. Covington requires new storage in their highest pressure zone to develop the system pressures by gravity instead of through booster pumping and to improve system reliability. Cedar River requires new storage for their east zone to be used for fire protection and system pressure.

3. PROPOSED JOINT ACTIVITIES

A study of the potential joint activities by Covington and Cedar River has been prepared by Economic and Engineering Services, Inc. (EES). This study also identifies the modifications required to each of the two systems to allow such joint activities to operate effectively. The study recommended that the following projects take place:

- Construct a new 4.0 Million Gallon (MG) water storage tank to be used jointly by the two districts. The overflow elevation for the tank shall be set at elevation 756.

- Construct a new 12-inch intertie on the Maple Valley - Black Diamond Highway. Install equipment within the intertie to meter the flow of water in both directions through the intertie.

- Refurbish the existing Covington Pump Station, which currently pumps water from the 660 zone into the 725 zone, so that it can provide efficient domestic and fire flow to a 756 pressure zone. Water passing through these pumps will also be used to fill the joint reservoir.

- Construct a pump station near the Maple Valley - Black Diamond Highway at Witte Road SE and SE 231st Street. This pump station will act to provide fire flow to the Cedar River east zone prior to the completion of the new tank and will be used for booster pumping from Cedar River into Covington following the construction of the new tank.

- o Install a new pipeline within the Covington system along Witte Road to improve the transmission capabilities. This line will enable water from the refurbished Covington pump station and the Witte Road Well to be delivered to the new tank and to the Cedar River east zone.

These modifications will result in the creation of required transmission lines between source and storage, fire flow requirements being met throughout the adjacent pressure zones in both districts, storage capacity requirements being met by both districts, and alternate source becoming available to each district.

Currently, approximately 250 customers located along the Maple Valley - Black Diamond Highway in the southeastern portion of Cedar River will be served by Covington water, with the potential for an estimated 800 customers.

An hydraulic model of the combined portions of the two districts has been prepared by EES for this study. A number of simulations have been performed to identify the response of the system to various combinations of demands and supply options. The proposed modifications appear to provide the required results.

The long-term goal of connecting the two districts is to combine the central and east zones of Cedar River and the 725 zone of Covington into a single pressure zone at 756 feet. The projects recommended for construction at this time are those necessary to utilize the joint tank and to create the interties necessary to provide alternative source for each district.

4. PROJECT COSTS AND COST SHARING

Estimated project costs for the recommended activities are included in Table 1. Estimated costs for the new 4.0 MG tank and transmission line, the new line within the Covington system, and the refurbishing of the Covington pump station are provided by Hammond, Collier, and Wade - Livingstone Assoc., Inc., the District Engineer for Covington. The cost for the Cedar River booster pump has been estimated by Goldsmith and Associates, the District Engineer for Cedar River. EES estimated the costs for the intertie construction and engineering, and project administration.

The costs include 8.1 percent sales tax, 10 percent construction contingency, engineering and design, and administration and legal fees.

Table 2 lists the cost sharing breakdown for the joint projects. The division of costs is based on the assumed benefits from the construction for each district.

The division of costs utilizes the following assumptions:

- o 4 MG Storage Tank - 3 MG for Covington, 1 MG for Cedar River

- o Transmission line from tank to Four Corners divided by the portion within Kent property, - split equally; the remainder - split with the same proportion as the tank.

- o New line within Covington system - split on the same proportion as the tank.

- o Refurbish Covington booster pump station, construct Cedar River pump station, intertie construction, telemetry, and project management - split equally.

Subsequent to future development along the new pipelines constructed for this project, income can be generated for the districts through General Facilities Charges or latecomers fees. Any income derived in this manner will be split in the same proportion as the costs.

Lines eligible for this income include the transmission line which does not pass through Kent property, the intertie, and the new Witte Road line. The Witte Road line is eligible on only one side of the road since the other side is already developed. The transmission line through Kent property will not contain any services or be eligible for future income.

Costs for the design and construction of interties for drought relief are currently eligible for 20 percent grant funding. Items within this project scope which are eligible include the Maple Valley - Black Diamond Road intertie, the transmission piping within the Kent property, the Cedar River Pump Station located on Witte Road SE and SE 231st Street, and the Covington Pump Station.

Additional expenses anticipated to be incurred during the development of the single pressure zone have not been specifically identified. They are expected to include, however, construction of additional telemetry equipment to control the activities of the pumps in each district and to help maintain a safe water pressure in the pipelines, construction of a new intertie between Cedar River and the 600 pressure zone in Covington, and construction of individual pressure reducing valves (PRVs) within both districts.

The additional telemetry equipment is anticipated to cost approximately $50,000, depending on the final configuration of pumps and piping. Total project cost for the construction of the new intertie will be approximately $350,000. Installation of individual PRVs will cost approximately $40,000. These expenses are anticipated to be incurred between 1997 and 2002.

5. SCHEDULE

Both districts are currently in need of alternate source of supply and additional storage. Any schedule for this work should utilize a short time frame to get the facilities on-line as quickly as possible. The following schedule will meet this criteria:

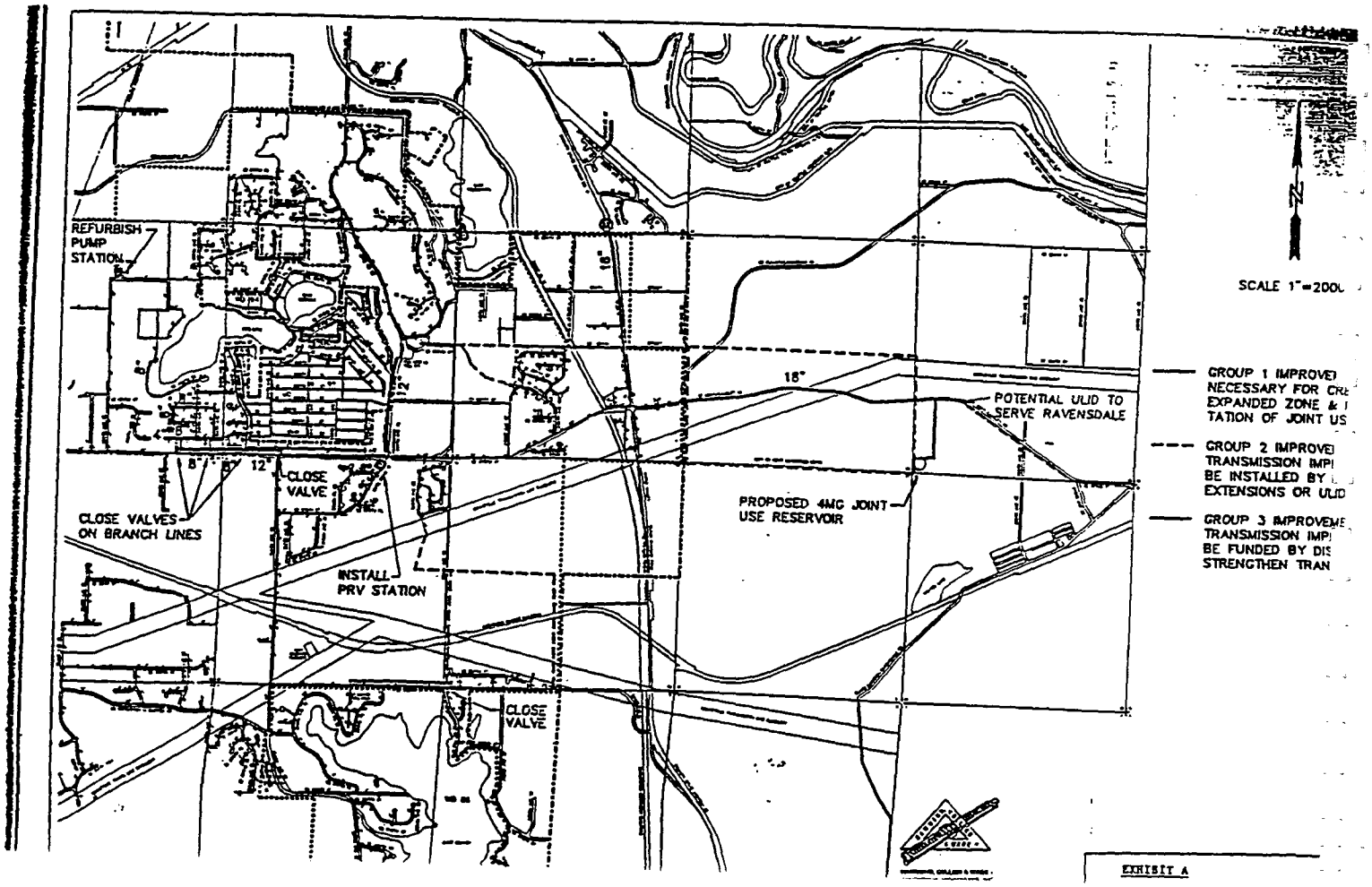
- o Submit application for Department of Health (DOH) grant money by February 15, 1990.
- o Submit letter to Seattle Water Department for Covington to utilize water from Cedar River Supply Line by February 15, 1990.
- o Have an agreement in place specifying the methods to be used for cost sharing for design, construction, operations and maintenance, cost of water, and other items considered necessary by June 1, 1990.
- o Complete a study of the effects of blending Cedar River and Covington water by June 1, 1990.
- o Complete construction and have all proposed items operational by June 1, 1991.

6. ORGANIZATION OF PROJECT

There are a number of organizational matters to be considered prior to the creation of the joint system. These items occur during design and construction of the recommended facilities as well as during operation of the system.

Acting in the interest of both districts, EES would manage the design and construction of the facilities. The Manager will coordinate design criteria, manage grant monies, schedule activities, and maintain the payment records. Any construction contracts would be required to be approved by the Boards of Commissioners from both districts. One district would act as the lead agency for the payment of construction costs and would be reimbursed by the other district. Contracts would need to be structured so that all requirements on any outstanding and future bonds are met.

Ownership of the land on which the joint tank is located must be finalized. The scheduled cost sharing is based on the land ownership being shared on a 75 percent Covington/25 percent Cedar River basis. Maintenance of the tank should be paid on the same cost share basis as the construction costs. Any operation costs should be included in the wholesale cost of water.


REFURBISH PUMP STATION
CLOSE VALVE
CLOSE VALVES ON BRANCH LINES
INSTALL PRV STATION
CLOSE VALVE
PROPOSED 4MG JOINT USE RESERVOIR
POTENTIAL ULID TO SERVE RAVENSDALE
18"
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GROUP 1 IMPROVE
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TABLE 1

COVINGTON WATER DISTRICT AND CEDAR RIVER WATER AND SEWER DISTRICT

JOINT PROJECT COSTS (1)

ACTIVITY	CONSTRUCTION COST	SALES TAX	CONTINGENCIES	ENGINEERING et. al.	TOTAL
4 Million Gallon Water Storage Tank	$614,000	$54,708	$61,400	$194,892 (2)	$925,000 (8)
Transmission line from tank to existing Covington lines					
Portion through City of Kent Property 18-inch	$230,000	$20,493	$23,000	$35,227	$308,720
Remainder of transmission line 18-inch	$115,000	$10,247	$11,500	$17,614	$154,360
Witte Road Line (3)	$107,205	$9,552	$10,721	$29,000	$156,477
Refurbish Covington booster pump station	$52,239	$4,231	$5,224	$8,306	$70,000
Construct Cedar River pump station	$52,239	$4,231	$5,224	$8,306	$70,000
Maple Valley - Black Diamond Road 12-inch intertie (4)	$75,000	$6,075	$7,500	$23,000	$111,575
Telemetry (5)	N/A	N/A	N/A	N/A	$50,000
Project Management (6)	N/A	N/A	N/A	$60,000	$60,000
	$1,245,683	$109,537	$124,569	$376,349	
				Subtotal	$1,906,132
			Less 20% DOH grant (7)		$112,059
				Total	$1,794,073

(1) Costs are in 1989 dollars.

(2) Includes $60,000 for purchase of the tank site.

(3) Eligible for 50% rebate from future development.

(4) Intertie includes piping, valves and two way metering. Cost is eligible for 100 % rebate from future development.

(5) Predesign estimate.

(6) Blending study, joint hydraulic analysis, grant management, document review.

(7) 20 percent Department of Health (DOH) grant applies to intertie, transmission line through City of Kent property, Cedar River pump station and Covington Pump Station.

(8) Because of the presence of rock on the storage tank site discovered during the recently completed geotechnical study, the project cost estimate for the storage tank has increased by $240,000 including contingency and sales tax (revision Nov. 1990).

TABLE 2

COVINGTON WATER DISTRICT AND CEDAR RIVER WATER AND SEWER DISTRICT

JOINT PROJECT COSTS SHARING

ACTIVITY	Project Cost (1)	Division (2)	Covington Share	Cedar River Share
4 Million Gallon Water Storage Tank	$925,000 (6)	75.00%	$693,750	$231,250
Transmission line from tank to existing Covington lines				
Portion through City of Kent Property 18-inch	$308,720	50.00%	$154,360	$154,360
Remainder of transmission line 18-inch	$154,360	75.00%	$115,770	$38,590
Witte Road Line (3)	$156,477	75.00%	$117,358	$39,119
Refurbish Covington booster pump station	$70,000	50.00%	$35,000	$35,000
Construct Cedar River pump station	$70,000	50.00%	$35,000	$35,000
Maple Valley - Black Diamond Road 12-inch intertie (4)	$111,575	50.00%	$55,788	$55,788
Telemetry (5)	$50,000	50.00%	$25,000	$25,000
Project Management	$60,000	50.00%	$30,000	$30,000
	$1,906,132		$1,262,025	$644,107
Less 20% BOM grant	$112,059	50.00%	$56,030	$56,030
	$1,794,073		$1,205,996	$588,077
Overall Percent of Cost			67.2%	32.8%

(1) Costs are in 1989 dollars. Project Costs from Table 1.

(2) Identifies the percentage of the cost which is allocated to Covington.

(3) Eligible for 50% rebate from future development.

(4) Intertie includes piping, valves and two way metering. Cost is eligible for 100 % rebate from future development.

(5) Predesign estimate.

(6) Because of the presence of rock on the storage tank site discovered during the recently completed geotechnical study, the project cost estimate for the storage tank has increased ~~by $240,000~~ $90,000 including contingency and sales tax (revision Nov. 1990). This adds an additional ~~$180,000 to~~ $67.500 Covington and ~~$60,000~~ to Cedar River.

~~$67.500~~ $22.500 C.H.P. VCS

$67.500 C.H.P. VCS

$925,000 + 90,000 = $1015,000

$ 93,750 + 67,500 = $761,250

AMENDMENT TO AGREEMENT FOR JOINT OWNERSHIP, CONSTRUCTION AND OPERATION OF WATER STORAGE AND TRANSMISSION FACILITIES

THIS AMENDMENT is made as of the 21st day of May, 1991 to that certain Agreement for Joint Ownership, Construction and Operation of Water Storage and Transmission Facilities ("Agreement") dated December 4, 1990 between Cedar River Water & Sewer District, a municipal corporation, and Covington Water District, a municipal corporation (collectively "Parties");

R E C I T A L S:

A. Section 1.0 of the Agreement provides a deadline of June 15, 1991 for certain events to occur as a condition of performance by the Parties. Such events have been delayed despite the Parties' diligent efforts to cause such conditions to occur.

B. The parties desire to extend such deadline by a period of one year to ensure that there is adequate time for such conditions to be satisfied, now therefore,

IN CONSIDERATION of the mutual benefits herein contained, the Parties hereby agree as follows:

1. One Year Extension. The date of June 15, 1991, which appears on the sixth line of page 4 and on the seventh line of page 5 of the Agreement, is hereby changed to June 15, 1992.

2. No Other Changes. The Agreement is otherwise unchanged.

SIGNED at Renton, Washington as of the date first appearing above.

CEDAR RIVER WATER AND SEWER DISTRICT, a municipal corporation

by: _____
President

by: _____
Secretary

COVINGTON WATER DISTRICT, a municipal corporation

by: _____
President

by: _____
Secretary

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COVINGTON WATER DISTRICT
KING COUNTY, WASHINGTON
RESOLUTION NO. 1888

A RESOLUTION APPROVING AMENDMENT NO. II TO: AGREEMENT FOR JOINT OWNERSHIP, CONSTRUCTION AND OPERATION OF WATER STORAGE AND TRANSMISSION FACILITIES AND AUTHORIZING THE PRESIDENT AND SECRETARY OF THE BOARD TO EXECUTE THE AMENDMENT.

WHEREAS, on December 4, 1990, Covington Water District and Cedar River Water and Sewer District entered into an Agreement for Joint Ownership, Construction and Operation of Water Storage and Transmission Facilities (the "Joint Agreement"); and

WHEREAS, Covington has obtained an interruptible supply of water from the City of Auburn; and

WHEREAS, Cedar River Water and Sewer District has agreed to provide emergency back-up supply; now, therefore,

BE IT RESOLVED that the Board of Water Commissioners does hereby approve Amendment No. II to the Agreement for Joint Ownership, Construction and Operation of Water Storage and Transmission Facilities between Cedar River Water and Sewer District and Covington Water District and further authorizes the President and Secretary of the Board to execute the Amendment.

ADOPTED at a regular meeting of the Board of Water Commissioners of Covington Water District at King County, Washington, held on the 4th day of June, 1997.

President

Secretary

COPY

ORIGINAL
1 of 2

AMENDMENT NO. II TO:
AGREEMENT FOR JOINT OWNERSHIP, CONSTRUCTION AND OPERATION OF WATER STORAGE AND TRANSMISSION FACILITIES

BETWEEN: CEDAR RIVER WATER AND SEWER DISTRICT AND COVINGTON WATER DISTRICT

This is the second Amendment to the "Agreement for Joint Ownership, Construction and Operation of Water Storage and Transmission Facilities" between Cedar River Water and Sewer District (Cedar River) and Covington Water District (Covington) signed November 7, 1990, by Covington, and December 4, 1990, by Cedar River, and hereinafter referred to as the Joint Agreement. This Amendment No. II is effective June 4, 1997. The purpose of the Amendment is to set forth the terms and conditions for Cedar River to provide 1.5 MGD back-up water supply to Covington's agreement for water supply from Auburn.

R E C I T A L S:

A. Covington's water supply from Auburn (Auburn Supply) is provided for under Interlocal Agreement #2 (IA #2), between Auburn, Covington and Water District #111; Interlocal Agreement #1 (IA #1) between Auburn and Water District #111; and the Interlocal Agreement (Interlocal) between Water District #111 and Covington related to the 50/50 split of costs and water available under IA #1.

B. Covington has requested permission from Cedar River to purchase 1.5 MGD as a back up to the Auburn Supply;

C. Covington has been in full moratorium on new water service connections since February 15, 1995;

D. Covington has entered into the Interlocal between Water District #111 (WD #111) and Covington:

(1) which provides for a 50/50 split of the cost of the facilities constructed in 1996, outside the Auburn service area under IA #1 between Auburn and WD #111; and

(2) said facilities have the capacity to deliver 5 MGD total to WD #111 and Covington; and

(3) which provides for a 50/50 split of the supply

of water that Auburn can deliver to the intertie under IA #1 between Auburn and WD #111, after Auburn meets its user demand on Lea Hill; and

(4) before the construction of the facilities in IA #2 within the Auburn service area, the supply delivered to the intertie will be less than 5 MGD to be split equally; and

(5) said supply share to Covington will be between 200,000 GPD and 600,000 GPD; and

(6) said supply will be interruptible per IA #1.

E. Covington has entered into IA #2 between Auburn, WD #111 and Covington;

(1) to construct facilities within Auburn's service area that will have the capacity to deliver 5 MGD to the intertie; and

(2) which will provide for a supply of water equivalent to 2.5 MGD for each district, total 5 MGD, but

(3) said supply will be interruptible until Auburn obtains an additional new water right for 7 MGD, at which time the 2.5 MGD supply to each district, total 5 MGD to the two districts will be firm, and the two districts will have parity with Auburn direct users; and

(4) IA #2 facilities are scheduled for completion in 1998.

F. Cedar River has agreed to enter into an agreement to provide back-up water supply for Covington to supplement its share of water from Auburn through IA #1 and IA #2, with said back-up supply equivalent to 600,000 GPD until completion of IA #2 facilities when the back-up supply increases to 1.5 MGD.

G. This Amendment is subject to the approval of the City of Seattle (Seattle). Seattle's approval is conditioned upon a certain minimum number of the 28 cities and special purpose districts which purchase water from Seattle, entering into a Hold Harmless and Indemnification Agreement with Seattle. When approved by Seattle, Cedar River may pump water to Covington under the terms of this Amendment pursuant to Seattle's Water Rights Claim.

H. The provisions of this Amendment are intended to be additional to the Joint Agreement.

D E F I N I T I O N S:

BACK-UP SUPPLY: For the purposes of this Amendment, the back-up supply (Back-Up Supply) from Cedar River to Covington is defined as an emergency supply:

(1) to be available upon Seattle's issuance of written consent to this Amendment; and

(2) to be used only when the Auburn supply to Covington under IA #1 or IA #2 is interrupted.

1.5 MGD: Notwithstanding the foregoing, for the purposes of this Amendment, the Back-Up Supply from Cedar River to Covington:

(1) will not exceed an average of 600,000 GPD until the IA #2 facilities are completed and on line; and

(2) will not exceed an average of 1.5 MGD after the IA #2 facilities are completed and on line and continuing until this Amendment expires.

Now, therefore,

IN CONSIDERATION of mutual covenants herein provided, the parties agree as follows:

1.0 Agreement to Sell. Cedar River agrees to sell to Covington 1.5 MGD as Back-Up Supply to Covington's Auburn Supply. The water sold pursuant to this Amendment will be delivered through one or more of the existing interties between Cedar River and Covington (East Intertie - on State Route 169 at approximately Southeast 256th Street, Central Intertie - on Witte Road at approximately 248th or West Intertie - on 196th Avenue Southeast at approximately 236th Street).

2.0 Pricing. Section 6.1 of the Joint Agreement is hereby amended and restated in part as follows:

2.1 Sale of Water by Cedar River. Cedar River agrees to sell potable water to Covington through existing interties between the parties subject to the following conditions, terms and limitations:

A. Conditions. (unchanged).

B. Terms:

(1) Price. The price of each 100 cubic feet

of water sold during any period of time shall be the highest marginal rate charged by Seattle to Cedar River during such period including Seattle's "demand" charges attributable to sales of water to Covington.

(2) Quantity. The quantity of water sold is subject to any quantity restrictions which may be imposed by Seattle and the terms of this agreement, as amended.

C. Limitations. (unchanged).

Section 6.2 is hereby amended by striking the words "to the East Area" in the fourth and fifth lines of Section B.

Section 6.7 is hereby amended and restated in its entirety as follows:

6.7 Term/Revision. The term of this Section 6 shall commence upon the date hereof and shall expire upon December 31, 2011. Such term may be renewed in such increments and on such terms as the parties may agree. The parties agree to negotiate in good faith prior to the end of the term in order to accomplish such renewal.

3.0 Pumping Facilities. Cedar River shall install an additional pump, with controller, upgrades to three phase power and telemetry at its Central Area pump station for the purpose of implementing the Back-Up Supply. These facilities will remain as Cedar River's sole property. Covington will reimburse all costs of design, engineering, equipment purchases and installation and shall pay all reasonable charges for maintenance and operation of the pump, controller, telemetry and appurtenances. Cedar River agrees to maintain such facilities in a manner consistent with municipal water purveyor industry standards.

4.0 Moratorium Lifted. Covington agrees that the current moratorium on new connections will be lifted within 60 days after the Back-Up Supply is available to Covington. Covington agrees that the Back-Up Supply will be allocated to new connections over no less than a five-year period, and that Covington will not go into another moratorium within such five (5) year period. Nothing contained herein shall be construed to limit Covington's ability to prioritize, or to otherwise set lawful conditions to service as may be necessary to ensure the public's health and safety is protected and that its scarce water resource will be adequate to meet the next five (5) years' demand.

5.0 Limitations on Service. Covington agrees that the Back-Up Supply will be used within the Covington current and future

service area, which area was identified in the South King County Coordinated Water System Plan.

6.0 Conservation and Curtailment. Covington agrees to continue its commitment to conservation and its participation in the Water Conservation Coalition of Puget Sound, to ensure that its conservation approach is coordinated with the region and consistent with Cedar River. Covington shall meet or exceed all requirements placed on Cedar River by Seattle.

7.0 Term. This Amendment shall become effective upon written approval by Seattle. This Amendment shall terminate on the earlier of December 31, 2011, upon Covington receiving firm (uninterruptible) water under the terms of IA #2, upon the termination of IA #1 and IA #2, upon Covington obtaining sufficient ground water withdrawal rights to serve its entire service area, or upon the formation of the Cascade Water Alliance and the assumption by the Alliance of Seattle's position under the Purveyor contract between Seattle and Cedar River. The termination of this Amendment shall not affect the validity of the Joint Agreement on that certain Interlocal Agreement of even date pertaining to the installation of an intertie and water main on 196th Avenue Southeast.

8.0 Assignment. This Amendment shall be binding upon and inure to the benefit of all successors or assigns.

9.0 Release and Indemnification. Cedar River and Covington agree to release, indemnify and hold Seattle harmless pursuant to the terms of the Amendment for those purposes between Seattle and the Purveyors. Covington hereby agrees to release and discharge Cedar River from all claims resulting from directives issued by Seattle to Cedar River to curtail or discontinue water service hereunder.

10.0 Effect on Underlying Agreement. Except as specifically provided herein, the provisions of the Agreement for Joint Ownership Construction and Operation of Water Storage and Transmission Facilities shall remain in full force and effect.

APPROVED BY RESOLUTION NO. 3621, DATED June 3, 1997

CEDAR RIVER WATER & SEWER DISTRICT,
a municipal corporation

BY: _____
President

BY: _____
Secretary

APPROVED BY RESOLUTION NO. 1888, DATED June 4, 1997

COVINGTON WATER DISTRICT, a municipal corporation

BY: _____
President

BY: _____
Secretary

COVINGTON WATER DISTRICT
KING COUNTY, WASHINGTON
RESOLUTION NO. 1889

A RESOLUTION APPROVING THE INTERLOCAL AGREEMENT FOR INSTALLATION OF WATERLINE AND INTERTIE ON 196TH AVENUE SOUTHEAST AND AUTHORIZING THE PRESIDENT AND SECRETARY OF THE BOARD TO EXECUTE THE AMENDMENT.

WHEREAS, Covington Water District and Cedar River Water and Sewer District previously entered into an Agreement for Joint Ownership, Construction and Operation of Water Storage and Transmission Facilities dated December 4, 1990 which in part governs the operation of existing interties between the parties; and

WHEREAS, the Veteran's Administration has constructed a cemetery in Cedar River's water service area which abuts a Covington water main; and

WHEREAS, Covington has authorized Cedar River to provide water service through Covington's main; and

WHEREAS, the parties have entered into an agreement for the construction, ownership, operation and maintenance of joint facilities related to this project; now, therefore,

BE IT RESOLVED that the Interlocal Agreement for Installation of Waterline and Intertie on 196th Avenue Southeast executed by Cedar River Water and Sewer District is hereby approved and the President and Secretary of the Board are hereby authorized to execute the Interlocal Agreement.

ADOPTED at a regular meeting of the Board of Water Commissioners of Covington Water District at King County, Washington, held on the 4th day of June, 1997.

Jim Hamby
President

Secretary

COPY

WATER DISTRICT NO. 105, KING COUNTY CWD

RESOLUTION NO. 973

WATER DISTRICT NO. 108, KING COUNTY CWSD

RESOLUTION NO. 1922

A JOINT RESOLUTION concerning policy and procedures for establishment of water service areas; and repealing previous Joint Resolutions 439 and 1078.

RECITALS:

1. Water District No. 108, King County ("WD 108") and Water District No. 105, King County ("WD 105") are each municipal corporations organized under the laws of the State of Washington.

2. These Water Districts have heretofore adopted a Joint Resolution concerning establishment of water service areas (WD 108's Resolution 1078 and WD 105's Resolution No. 439).

3. The previous Joint Resolution included a "tentative" service area, and left the actual boundary line to be determined by future development in the area.

4. The two Water Districts now feel that development in the former "tentative" area has progressed sufficiently that it is now possible to establish a complete and definite boundary between the two Water Districts' service areas.

5. Therefore, the two Water Districts, in the interest and spirit of cooperation; and to improve planning and construction of economical and efficient water systems for the benefit of property owners in their respective service areas, have determined to adopt this new and revised Joint Resolution.

BE IT RESOLVED that the respective Boards of Water Commissioners of WD 108 and WD 105 do hereby agree as follows:

1. **BOUNDARY LINE.** The common boundary line between the service areas of each of the Water Districts is attached hereto as Exhibit "A" to this Resolution.

2. **SERVICE AREA.** WD 108 shall be entitled to, and shall, provide water service to the area north of said boundary line, and WD 105 shall be entitled to, and shall, provide water service to the area south of said boundary line.

3. **TEMPORARY SERVICE.** In the event that application is made by a developer or property owner for water service, and the District in whose service area the property is located (the "permanent service district") is unable to extend service within a reasonable time to such applicant, then the other Water District (the "temporary service district") shall be entitled to provide service to the applicant on the following conditions:

3.1 **APPLICATION TO PERMANENT DISTRICT.** The applicant shall make application directly to the permanent service district.

3.2 **REFERRAL TO OTHER DISTRICT.** If the permanent service district determines that it is unable, as above, to serve the applicant's property, then it shall refer the application to the other (temporary service district) with a letter authorizing it to serve tne customer.

3.3 **TEMPORARY/PERMANENT SERVICE.** Wherever possible, the temporary service district shall extend only temporary water service facilities, as contrasted with permanent water mains. However, where because of King County or other governmental requirements, temporary service will not suffice, then the other Water District may install permanent water mains, fire hydrants and other appurtenances ("water facilities") to serve the property.

The status of all temporary services shall be reviewed by the two Districts at least on every renewal date of this Agreement.

3.4 **CHARGES AND RATES.** The temporary service district shall contact the permanent service district to verify the permanent service district's current "connection" or "hook-on" charges (including "system development" or "general facilities" charges). The temporary service district shall collect that amount, plus the temporary service district's meter installation charge. The temporary service district shall retain the meter installation charge, and shall forward to the permanent service district the balance of the charges collected, less the temporary service district's then standard administrative charge not exceeding 15%.

In addition to the foregoing, the temporary service district shall be entitled to charge, and retain, its normal rates and charges for water consumed. Such water charges shall be billed direct by the temporary service district to the applicant and/or customers, as applicable.

If the two districts determine, some time in the future, that the temporary service should become permanent service by the "temporary service district", then when permanent mains are installed by the "temporary service district", the "permanent service district" shall reimburse to the "temporary service district" the above "connection", etc. charges originally received by it from the "temporary service district".

3.5 **MAINTENANCE.** The Water District then serving the property shall be responsible to maintain, repair and/or replace any temporary or permanent water facilities, at its own expense, so long as it is serving the property.

3.6 **PERMANENT CONNECTION.** The permanent service district shall be entitled to, at any time and at its own expense, disconnect any such customers from the temporary service district's mains, and connect them to the permanent service district's system when, in its sole discretion, it has determined it is able to serve the property. Provided, however, that the permanent service district shall give the temporary service district at least 30 days written notice of the permanent service district's intent to disconnect any such customer(s).

3.7 **REIMBURSEMENT.** If the temporary service district installed (at its expense) only temporary water facilities to serve the customer, then the permanent service district shall have no responsibility to reimburse the temporary service district for the cost thereof. However, if the temporary service district installed permanent water facilities to serve the property, then the temporary service district shall have the right (but not the obligation) to ask the permanent service district to purchase these permanent water facilities and to incorporate them in the permanent water district's system. In such case, these permanent water facilities shall be disconnected from the temporary service district's system, and the permanent service district shall pay to the temporary service district an agreed value of the same. Said agreed value shall not exceed whichever of the following is the lesser amount: (a) the temporary service district's actual construction cost (including the district's engineering and then standard administrative charges, but excluding any amounts paid by the developer and/or owner of the property); or (b) the depreciated cost of the facilities, less any connection or hook-on and meter installation charges collected by the temporary service district.

3.8 **ONE SERVICE PER METER.** In accordance with the Resolutions of both Water Districts, only one single family residence shall be connected to any one water meter.

4. **UNQUALIFIED RIGHT TO SERVE.** Neither Water District shall be required to consult with, or obtain the approval of, the other prior to construction of any water mains, annexation of territory or application for permits, franchises or governmental approvals, within their respective service areas as herein defined.

5. **SERVICE TO AREA OF OTHER DISTRICT.** Neither District shall construct any water mains or water system facilities (except as provided above); accept any petition for annexation; or apply for any permits, franchises or governmental approvals to provide service within the service area of the other District, without the consent of the other District.

6. **FUTURE ADJUSTMENTS.** It is recognized by each Water District that it may, in the future, be necessary to make minor adjustments to the above service area boundary line. It is further recognized that it may, in unusual instances, be necessary for one District to permanently serve water within the other's service area. An example of the latter would be a single development or parcel straddling said boundary line, or on one side of the boundary line but adjacent to existing water mains on the other side of the boundary. In such cases, where it would be inconvenient or would increase the cost of water system to the customer, or where it would be uneconomical for one District to construct duplicating facilities, the two Water Districts will cooperate with each other by adjusting the above service area boundary, or allowing one District to permanently serve within the territorial limits of the other.

7. **SETTLEMENT OF DIFFERENCES.** The Water Districts understand that it is impossible to predict and resolve all eventualities or conflicts that may arise in the development of water service to the respective service areas on either side of said boundary and/or in connection with the annexation of territory to each District. Each District, however, agrees to cooperate to the utmost with the other to the end that the best interests of the property owners within the service area of each District will be served. In the event that some unanticipated occurrence arises and the two Districts are unable to agree upon a method of resolving the same, then both Districts shall jointly petition the King County Boundary Review Board for determination of the dispute. At the election of the Boundary Review Board, the Board as a whole, a subcommittee of the Board, or

a single Board member appointed by the Boundary Review Board, may arbitrate said dispute. The decision of the Boundary Review Board (or a subcommittee or member appointed to arbitrate the same) shall be final and binding upon both Water Districts.

8. **TERM.** This Agreement constitutes a contract between the two Water Districts and shall remain in full force and effect until January 1, 1989, and thereafter, for successive five year terms, unless sixty (60) days prior to January 1, 1989 or the expiration of any subsequent five year term, either District shall give written notice to the other District of its intention to cancel the same. No such termination notice shall be issued by either party to this Agreement, however, unless there has first been joint consultation between the two Boards of Water Commissioners, and the termination has been approved by the King County Boundary Review Board upon application by one or both of the Water Districts.

9. **INTERTIE.** Each of the Water Districts will immediately extend permanent water mains to the intersection of the Witte Road and 248th Street S.E. and one or the other of the Water Districts shall install an emergency cross-connection between the two Water District's systems, at that point. The cost of the emergency cross-connection shall be borne equally by the two Water Districts. In emergencies of short duration, each of the Water Districts shall furnish water to the other, at cost. In emergencies of longer duration than a fire, main break or other system malfunction, the two Districts shall agree to a charge for water furnished which shall approximate the actual cost of the water, plus the supply district's then standard administrative charge not to exceed 15%.

ADOPTED by the Board of Water Commissioners of Water District No. 105, King County, at a regular meeting thereof held on the 7 day of DECEMBER, 1983.

ADOPTED by the Board of Water Commissioners of Water District No. 108, King County, at a regular meeting thereof held on the 11th day of January, 1984.

BOARD OF WATER COMMISSIONERS
WATER DISTRICT NO. 105
OF KING COUNTY, WASHINGTON

By _____
President and Commissioner

By _____
Secretary and Commissioner

BOARD OF WATER COMMISSIONERS
WATER DISTRICT NO. 108
OF KING COUNTY, WASHINGTON

By _____
President and Commissioner

By _____
Secretary and Commissioner

EXHIBIT "A"
TO WD 105 AND WD 108 JOINT RESOLUTION
CONCERNING POLICY AND PROCEDURES FOR ESTABLISHMENT
OF WATER SERVICES AREAS

(WD 105 RESOLUTION NO. 973)
(WD 108 RESOLUTION NO. 1922)

Beginning at the NW Corner of the NE¼ of the SW¼ of Section 13, Township 22 North, Range 5 East, W.M.;

Thence Southerly along the West line of the NE¼ of the SW¼ to the South line of the NE¼ of the SW¼ of said Section 13;

Thence East along the South line of said NE¼ of the SW¼ and the North line of the South ½ of the SE¼ of said Section 13 to the East line of said Section 13;

Thence continuing East along the North line of the South ½ of the South ½ of Section 18, Township 22 North, Range 6 East, W.M., to the East line of said Section 18;

Thence continuing East along the North line of the South ½ of the SW¼ of Section 17, Township 22 North, Range 6 East, W.M., to the NE corner of said South ½ of the SW¼;

Thence South along the East line of said South ½ to the SE corner thereof;

Thence continuing South along the West line of the North ½ of the NE¼ of Section 20, Township 22 North, Range 6 East, W.M., to the SW corner of said North ½ of the NE¼;

Thence East along the South line of said North ½ to the East line of said Section 20;

Thence continuing East along the North line of the SW¼ of the NW¼ of Section 21, Township 22 North, Range 6 East, W.M., to the NE corner of said SW¼ of the NW¼;

Thence South along the East line of the SW¼ of the NW¼ of a point 150' North of the North boundary of SE 248th Street;

Thence East along a line 150' North of and parallel to the North boundary of SE 248th Street to the East boundary of 220th Avenue SE (Witte Road);

Thence South along the East boundary of 220th Avenue SE to a point 150' South of the South boundary of SE 248th Street;

Thence East along a line 150' South of and parallel to the South boundary of SE 248th Street to the East boundary line of 224th Avenue SE (West Lake Wilderness Drive SE);

Thence South 1°17'55" West 275'±; along the East margin of 224th Avenue SE (West Lake Wilderness Drive SE);

Thence North 89°28'11" West 201.2';

Thence South 1°17'55" West 75'±;

Thence North 34°06'40" East approximately 400'± to the Northwest corner of Tax Lot 33;

Thence South 50°42' East approximately 330'± to the Northeast corner of Tax lot 33;

Thence South 34°06'40" West approximately 349'± to the Southeast corner of Tax Lot 41;

Thence South 34°39'01" West approximately 382'± to the Southeast corner of Tax Lot 40 (being Lot 2 of King County Short Plat #876073);

Thence North 61°05'24" West approximately 308'± to the Southwest corner of Tax Lot 131 (being Lot 1 of King County Short Plat #876073 and the East margin of 224th Avenue SE - West Lake Wilderness Drive SE);

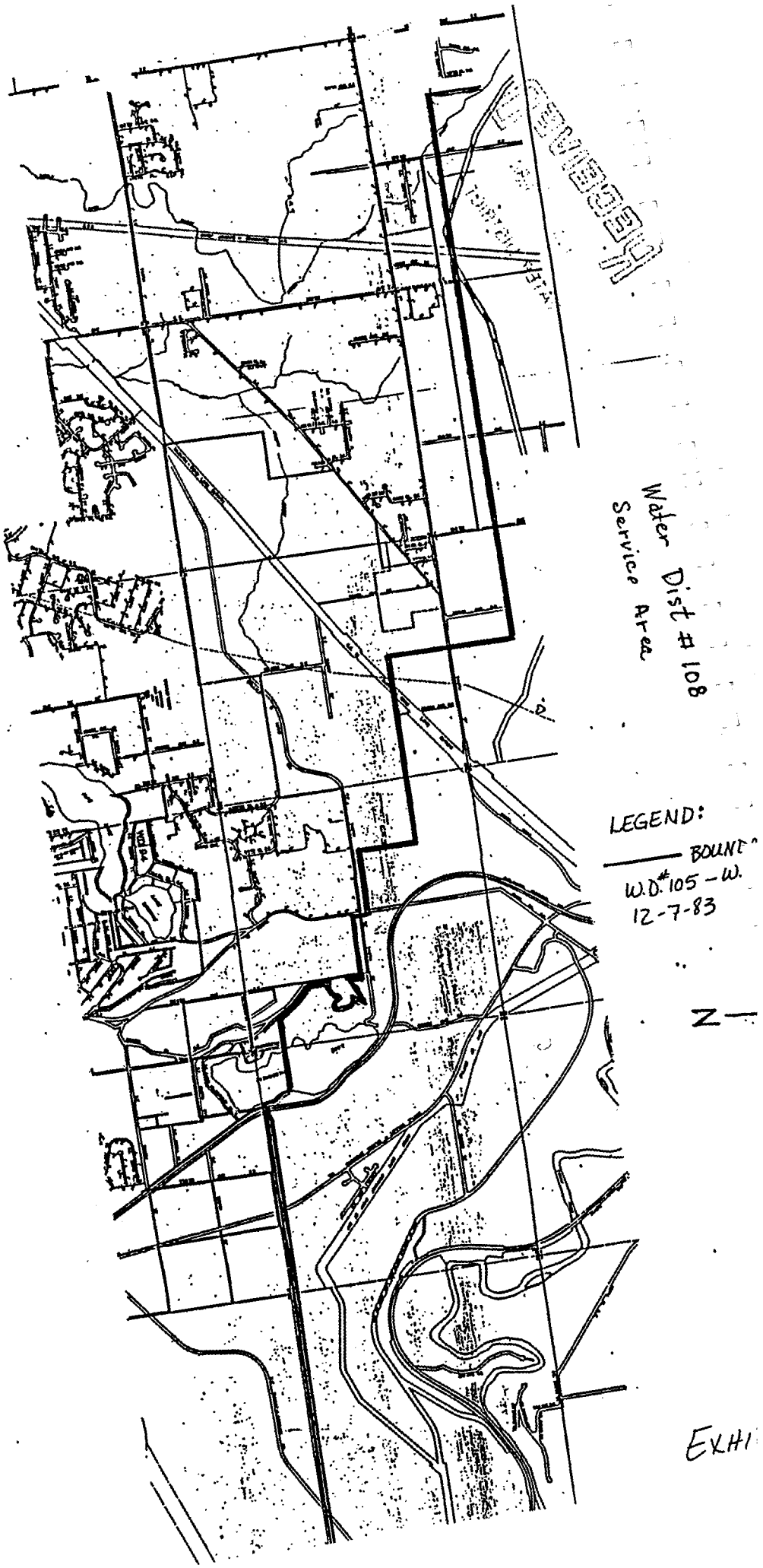
NOTE: The foregoing five (5) paragraphs describes the property NOT owned by King County Parks located in the NE¼ of the SE¼ of Section 21, Township 22 North, Range 6 East, W.M.;

Thence South along the East boundary of 224th Avenue SE (Lake Wilderness Drive SE) to the North line of the South ½ of the SE¼ of said SE¼;

Thence East on the North line of the South ½ of the SE¼ of the SE¼ and the North line of the South ½ of the SW¼ of the SW¼ of Section 22, Township 22 North, Range 6 East, W.M., to the East shore of Lake Wilderness;

Thence South along the East shore of Lake Wilderness to the South line of Section 22, Township 22 North, Range 6 East, W.M.;

Thence Easterly along said South line of Sections 22, 23 and 24, Township 22 North, Range 6 East, W.M., to the City of Seattle Cedar River Watershed, being the terminus of this boundary line description.


Water Dist #105
Service Area
Water Dist #108
Service Area
LEGEND:
BOUNDA
W.D.#105 - W.
12-7-83
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ORIGINAL

AMENDMENT NO. III TO:
AGREEMENT FOR JOINT OWNERSHIP, CONSTRUCTION AND OPERATION OF WATER STORAGE AND TRANSMISSION FACILITIES

BETWEEN: CEDAR RIVER WATER AND SEWER DISTRICT
AND
COVINGTON WATER DISTRICT

This is the third Amendment ("Amendment III") to the "Agreement for Joint Ownership, Construction and Operation of Water Storage and Transmission Facilities" ("Joint Agreement") between Cedar River Water and Sewer District ("Cedar River") and Covington Water District ("Covington") signed November 7, 1990, by Covington, and December 4, 1990, by Cedar River, and hereinafter referred to as the "Joint Agreement."

RECITALS:

A. The Joint Agreement provided for Cedar River and Covington to jointly construct, own and operate a four million gallon water reservoir, an 18-inch transmission line within the city of Kent water shed ("Transmission Line"), an intertie facility, and for the sale of water between the parties.

B. Amendment No. I to the Joint Agreement provided for the extension of a deadline and has no further effect.

C. Amentment No. II to the Joint Agreement set forth the terms and conditions for Cedar River to provide 1.5 MGD back-up water supply to Covington's agreement for water supply from Auburn.

D. Interlocal Agreement For Installation of Water Line and Intertie on 196th Avenue S.E. set forth the terms and conditions for Covington to construct a water main on 196th Avenue S.E., as identified in Cedar River's Comprehensive Plan, including a metering vault, for the reimbursement of Covington's costs and for provision of water service to Cedar River's customer, the Veterans' Administration Cemetery, through the Covington system.

E. The purpose of this Amendment III is to expand the coverage of the Joint Agreement to include provisions for construction, operation, maintenance and repair of a 12-inch water main and appurtenances ("Water Main") to be constructed within the city of Kent water shed and on the Kent-Kangley and Summit-Landsburg Roads as shown on Exhibit 1 attached hereto which is incorporated by reference. The Water Main will serve customers within the boundaries of both parties. The Water Main and appurtenances will be installed by Tahoma School District ("Tahoma") pursuant to a Developer Extension Agreement ("Developer Extension Agreement") between Cedar River and Tahoma. The Water Main will initially provide water service and fire flow to a new Tahoma school

located in the Cedar River service area, as adjusted, on the Summit-Landsburg Road. Upon completion, this school will be served by Cedar River.

F. The boundary between Covington and Cedar River will be adjusted with appropriate annexations, franchises and amendments to the South and East King County Coordinated Water System Plan ("SKCCWSP and/or EKCCWSP") boundaries.

G. Cedar River is to provide to Covington copies of all agreements between Cedar River and Tahoma, and all other parties connected with the construction of the Water Main Project. Now therefore,

IN CONSIDERATION of the mutual covenants herein contained, the parties agree as follows:

1.0 Boundary Adjustment: The parties shall execute, concurrently herewith, a separate agreement to adjust the water service area boundary between Covington and Cedar River. The parties shall cooperate in any annexation proceeding necessary to accomplish the intent of such agreement and cooperate in obtaining all necessary approvals for the boundary change.

2.0 Developer Extension: Tahoma will install the Water Main pursuant to the Developer Extension Agreement with Cedar River. Cedar River and Covington shall both have the opportunity to review and approve the design and any changes, including field changes thereto, and to inspect and approve that portion of the Water Main from its commencement point ("Commencement Point") at the existing Covington owned water line on Kent-Kangley Road in the city of Maple Valley to a demising point ("Demising Point") where the Water Main branches off the Summit-Landsburg Road into the Tahoma property. Cedar River shall require Tahoma to install a water meter ("Water Meter") and pressure-reducing valve ("PRV") at the Demising Point.

Covington shall provide to Tahoma and Cedar River a monthly accounting of its costs for plan review, inspections and permits by the 10th working day following the month in which Covington incurred the cost. Cedar River shall pay such costs from funds on deposit from Tahoma within 30 days of the receipt of said accounting.

Except for routine water service agreements to serve single family residences, each party shall provide to the other party copies of all proposed agreements with Tahoma or other parties that impact the construction or operation of the Water Main or this Amendment III. Neither party may enter into any such agreement which has the effect of increasing the burdens or obligations of the other party in a material manner without the prior written consent of the other party.

Covington will apply for the necessary permits for the Water Main under its King County, Kent (if necessary) and Maple Valley Right of Way Franchises for the portions of the project within its service area as designated in the SKCCWSP. Cedar River has applied for the necessary permits within the city of Kent water shed. Cedar River will apply for the necessary permits within its service area as designated in the EKCCWSP.

3.0 Ownership of Facilities: Upon completion of the Developer Extension Agreement, Tahoma will grant bills of sale for the Water Main and appurtenances as follows:

A. That portion of the Water Main and appurtenances from the Commencement Point to the Demising Point shall be conveyed entirely (100%) to Covington;

B. That portion of the Water Main and appurtenances from the Demising Point to the easterly terminus of the Water Main shall be conveyed entirely (100%) to Cedar River; and

C. The Water Meter located at the Demising Point will be conveyed one-half to Cedar River and one-half to Covington. The PRV shall be installed on the Cedar River side of the Water Meter and shall be conveyed entirely (100%) to Cedar River. The Water Meter shall be governed by the Joint Agreement as if it was an original part of the Transmission Line as defined therein.

4.0 Customer Connections: Covington shall be entitled to connect to the Water Main and serve properties within Covington's service area. Cedar River shall be entitled to connect to the Water Main and serve properties within Cedar River's service area.

5.0 Reimbursement Agreement: Because the Water Main is primarily located within Covington's service area, Covington shall enter into a reimbursement agreement with Tahoma in order to provide Tahoma with possible reimbursement for its costs of the portion of the Water Main lying within Covington's service area. This reimbursement agreement shall be pursuant to Covington's standard terms and conditions. All reimbursements due Tahoma from Cedar River have been previously negotiated and settled.

6.0 Maintenance and Operation: That portion of the Water Main located on Covington's side of the Demising Point, shall be owned, controlled, operated and maintained solely by Covington. That portion of the Water Main on Cedar River's side of the Demising Point shall be owned, controlled, operated and maintained solely by Cedar River.

7.0 Water Supply: Covington shall convey (not supply) water under this Amendment to the Water Main based on the terms and conditions contained in the Joint Agreement, as amended, provided, however, when Cedar River connects the Water Main to Cedar River's main water system thereby creating a loop, Cedar River may adjust the PRV so as to reduce Cedar River's reliance on water conveyed by Covington. The parties shall coordinate and cooperate with each other in making such adjustment.

8.0 Water Quality: Each party shall maintain water quality to industry standards in their respective portions of the Water Main pursuant to Section 6.3 of the Joint Agreement. This will require displacement of water in the Water Main from the Commencement Point to the Demising Point by routine use or flushing. The parties shall coordinate and cooperate with each other in the flushing of and the circulation of water within the Water Main.

9.0 Effect on Joint Agreement: The Joint Agreement as amended shall remain in full force and effect except as modified herein.

10.0 Effective Date: This Amendment III shall be effective upon mutual execution hereof.

APPROVED BY RESOLUTION NO. 3828

DATED 6/20, 2000

CEDAR RIVER WATER & SEWER DISTRICT, a municipal corporation

BY: _____
President and Commissioner

BY: _____
Secretary and Commissioner

APPROVED BY RESOLUTION NO. 2084

DATED 06-27-, 2000

COVINGTON WATER DISTRICT, a municipal corporation

BY: _____
President and Commissioner

BY: _____
Secretary and Commissioner

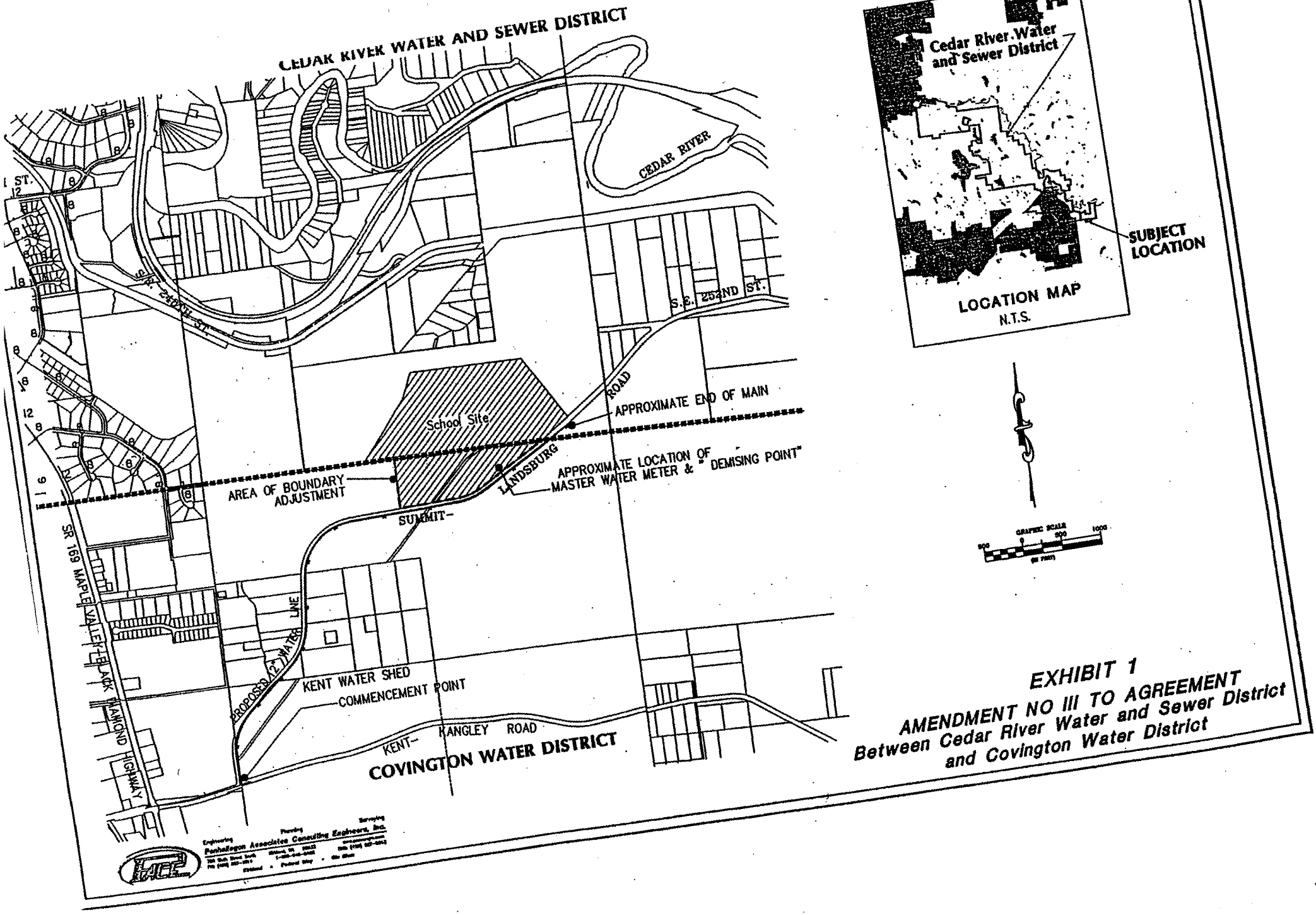


EXHIBIT 1

AMENDMENT NO III TO AGREEMENT
Between Cedar River Water and Sewer District
and Covington Water District

ORIGINAL

AGREEMENT TO ADJUST WATER SERVICE AREA BOUNDARY

THIS AGREEMENT is entered into as of the last date of execution below between Cedar River Water and Sewer District ("Cedar River"), a municipal corporation and Covington Water District ("Covington"), a municipal corporation.

R E C I T A L S:

A. Cedar River and Covington are water districts organized and existing under RCW Title 57. Cedar River is a party to the East King County Water System Plan ("EKCWSP") and Covington is a party to the South King County Coordinated Water System Plan ("SKCWSP"). Both of such plans contain an agreed upon water service area boundary ("Boundary") between Cedar River and Covington as shown on Exhibit 1 attached hereto and incorporated by reference.

B. Cedar River (under its previous name of King County Water District No. 108) and Covington (under its previous name as King County Water District No. 105) previously entered into that certain joint resolution ("Joint Resolution") No. 1922 adopted January 11, 1984 by Cedar River and No. 973 adopted December 7, 1983 by Covington by which each District agreed to the Boundary.

C. Covington and Cedar River desire to adjust a portion of the Boundary as shown on Exhibit 1. A legal description of the adjustment area is attached hereto as Exhibit 2 which is incorporated by reference. Now, therefore,

IN CONSIDERATION of the mutual premises herein contained, the parties hereby agree as follows:

1. Boundary Adjustment. Covington and Cedar River hereby agree to adjust the Boundary as described in Exhibits 1 and 2. The Boundary, as adjusted, is hereby ratified, confirmed and approved.

2. Joint Resolution. The Joint Resolution is hereby modified as provided by this Agreement. The Joint Resolution as modified remains in full force and effect.

3. Planning and Cooperation. The parties shall cooperate with each other and take all necessary and appropriate action to

obtain required approvals to the foregoing Boundary adjustment, including amendment of the EKCWSP and SKCWSP boundaries. The parties shall reflect the Boundary adjustment in each of their next updated water system comprehensive plans.

4. Miscellaneous. This Agreement represents the entire agreement between the parties concerning the subject matter hereof.

Executed at King County, Washington.

Covington Water District:

by: _____
President

by _____
Secretary

Date: 06-27-00

Cedar River Water and Sewer District

by: _____
President

by: _____
Secretary

Date: 7/05/00

K.C 689

CEDAR RIVER SERVICE AREA

SEC. 26-22-6

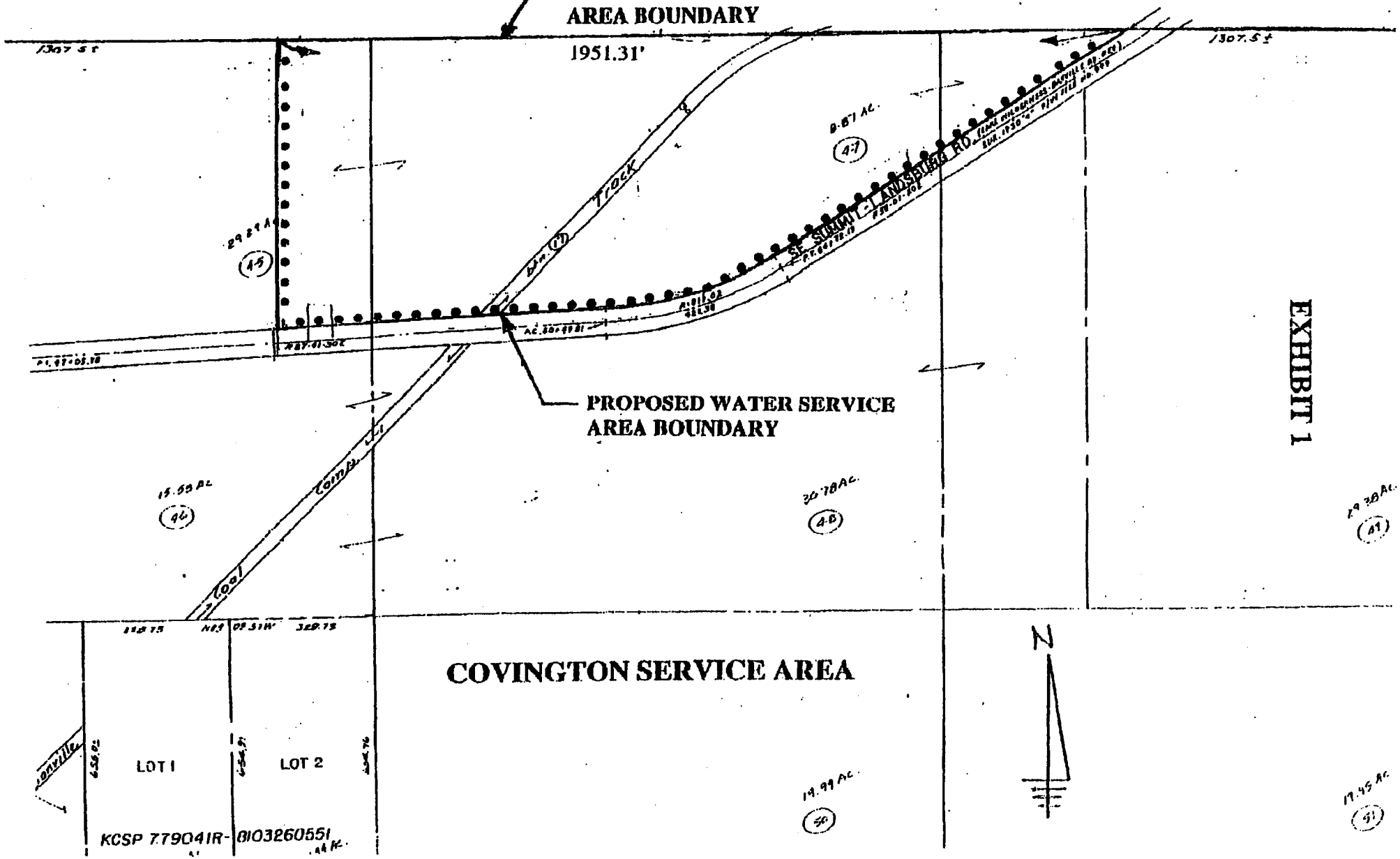


EXHIBIT 2

LEGAL DESCRIPTION

THAT PORTION OF THE NORTH HALF OF SECTION 26, TOWNSHIP 22 NORTH, RANGE 6 EAST, WILLAMETTE MERIDIAN, IN KING COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF SAID SECTION 26;
THENCE NORTH 89 DEGREES 08' 19" WEST ALONG A LINE BETWEEN THE NORTHEAST AND NORTHWEST CORNERS OF SAID SECTION 26. A DISTANCE OF 862.88 FEET TO THE NORTHERLY MARGIN OF SOUTHEAST SUMMIT-LANDSBURG ROAD (LAKE WILDERNESS - DANVILLE ROAD REVN, SURVEY No. 1930a), AND TO THE **TRUE POINT OF BEGINNING**;
THENCE SOUTH 58 DEGREES 48' 28" WEST ALONG THE SAID NORTHERLY MARGIN, A DISTANCE OF 986.61 FEET TO A POINT OF CURVATURE OF A TANGENT CURVE TO THE RIGHT HAVING A RADIUS OF 789.02 FEET, THENCE WESTERLY ALONG THE ARC OF SAID CURVE THROUGH A CENTRAL ANGLE OF 29 DEGREES 34' 00" A DISTANCE OF 407.16 FEET;
THENCE SOUTH 88 DEGREES 22' 28" WEST ALONG SAID NORTHERLY MARGIN, A DISTANCE OF 734.76 FEET;
THENCE NORTH 00 DEGREES 49' 56" EAST, A DISTANCE OF 675.03 FEET TO A POINT ON SAID LINE BETWEEN THE NORTHEAST AND NORTHWEST CORNERS OF SAID SECTION 26, DISTANT 2,818.00 FEET FROM THE NORTHEAST CORNER THEREOF;
THENCE SOUTH 89 DEGREES 08' 19" EAST ALONG SAID LINE, A DISTANCE OF 1955.12 FEET TO THE **POINT OF BEGINNING.**
THIS LEGAL DESCRIPTION WAS DERIVED FROM SURVEY DATA PER DRAWING FOR TAHOMA SCHOOL DISTRICT, PLUM CREEK SITE BY DALEY-MORROW-POBLETE, INC. PROJECT NO. 97305 DATED 10/20/98, REV. 5/14/98 AND ROAD LOCATION PER SAID KING COUNTY SURVEY NO. 1930A.

CONTAINING ± 21.45 ACRES.

SEPA DOCUMENTATION

ENVIRONMENTAL CHECKLIST

A. BACKGROUND

1. Name of proposed project, if applicable: *Cedar River Water and Sewer District Comprehensive Water System Plan*

2. Name of applicant: *Cedar River Water and Sewer District*

3. Address and phone number of applicant and contact person:

Applicant:
Cedar River Water and Sewer District
Ron Sheadel, Manager
18300 SE Lake Youngs Road
Renton, WA 98028-8058
(425) 255-6370

Contact Person/Agent:
Penhallegon Associates Consulting Engineers, Inc.
Susan E. Boyd, Associate
750 Sixth Street South
Kirkland, WA 98033
(425) 827-2014, 1-800-945-8408

4. Date checklist prepared: *November 15, 1999*

5. Agency requesting checklist: *Cedar River Water and Sewer District*

6. Proposed timing or schedule (including phasing, if applicable):

A recommended Capital Facilities Plan is included in Section 6 of the Comprehensive Water System Plan. Specific timing of improvements will depend on the availability of funding, the schedule of development and water system requirements.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

Please refer to Section 6 of this Plan for detailed information regarding future improvements contemplated for the water system. The Comprehensive Water System Plan does not propose land use expansion or changes and only considers the water system improvements which are required to meet existing and future populations of the water service area outlined in the Plan.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

None known.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain:

None known.

10. List government approvals or permits that will be needed for your proposal, if known.

Approvals from the State of Washington Department of Health, King County, and the City of

Maple Valley are required in accordance with State and County regulations governing comprehensive utility planning.

11. Give brief, 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 that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

This proposal contemplates the adoption of the Cedar River Water and Sewer District Comprehensive Water System Plan. The Plan addresses future water system needs within the District's water service area boundary as described in the Plan. The Plan puts forth a recommended Capital Facilities Plan in accordance with the design criteria and system analysis developed as part of the Plan.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. 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.

As indicated on Figure 1-1 (Location Map), Figure 1-2 (Vicinity Map) and Figure 2-2 (Service Area Map), Cedar River Water and Sewer District is generally located in the Maple Valley and Renton areas. The District generally lies east of Renton and Lake Youngs with the Maple Valley Highway running northeast through the area. All or part of the following sections and included in the District's water planning area:

Section	Township	Range	Section	Township	Range
1	22 N	5 E	14	22 N	6 E
12	22 N	5 E	15	22 N	6 E
13	22 N	5 E	16	22 N	6 E
22	23 N	5 E	17	22 N	6 E
23	23 N	5 E	18	22 N	6 E
24	23 N	5 E	20	22 N	6 E
25	23 N	5 E	21	22 N	6 E
26	23 N	5 E	22	22 N	6 E
27	23 N	5 E	23	22 N	6 E
34	23 N	5 E	24	22 N	6 E
35	23 N	5 E	19	23 N	6 E

36	*23 N*	*5 E*	*29*	*23 N*	*6 E*
1	*22 N*	*6 E*	*30*	*23 N*	*6 E*
2	*22 N*	*6 E*	*31*	*23 N*	*6 E*
3	*22 N*	*6 E*	*32*	*23 N*	*6 E*
4	*22 N*	*6 E*	*33*	*23 N*	*6 E*
5	*22 N*	*6 E*	*34*	*23 N*	*6 E*
6	*22 N*	*6 E*	*35*	*23 N*	*6 E*
7	*22 N*	*6 E*	*36*	*23 N*	*6 E*
8	*22 N*	*6 E*	*5*	*22 N*	*7 E*
9	*22 N*	*6 E*	*6*	*22 N*	*7 E*
10	*22 N*	*6 E*	*7*	*22 N*	*7 E*
11	*22 N*	*6 E*	*8*	*22 N*	*7 E*
12	*22 N*	*6 E*	*18*	*22 N*	*7 E*
13	*22 N*	*6 E*	*31*	*23 N*	*7 E*

B. ENVIRONMENTAL ELEMENTS

1. EARTH

a. General description of the site (circle one): <u>Flat, rolling, hilly, steep slopes</u>, mountains, other

b. What is the steepest slope on the site (approximate percent 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, specify them and note any prime farmland.

The dominant soil type found within the District belongs to the Alderwood Association which is further discussed in Section 2 of the Plan.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

Not Applicable.

e. Describe the purpose, 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, generally 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 that may effect your proposal? If so, generally describe.

Not Applicable.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

Not Applicable.

3. WATER

a. Surface:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

The Cedar River runs through the District and several water bodies are present including Lake Youngs, Lake Desire, Spring Lake, Shady Lake, Shadow Lake,

Peterson Lake, Lake Francis, Lake Webster, Lake Wilderness and Walsh Lake. This proposal, however, does not directly impact surface water.

2) Will the project require any work over, in, 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 to wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

Not Applicable.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

No.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

Specific projects recommended in the Plan may lie within the 100 year floodplain. This proposal, however, does not include any activity related to the floodplain.

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.

No.

b. Ground

1) Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities if known.

No.

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 humans the system(s) are expected to serve.

None.

c. Water Runoff (including storm water):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this

water flow? Will this water flow into other waters? If so, 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:

_x_ deciduous tree: alder, maple, aspen, other
_x_ evergreen tree: fir, cedar, pine, other:
_x_ shrubs,
_x_ grass
_x_ pasture
__ crop or grain
_x_ wet soil plants: cattail, buttercup, bulrush, skunk cabbage, other
__ water plants: water lily, eelgrass, milfoil, other
__ other types of vegetation:

b. What kind and amount of vegetation will be removed or altered?

None.

c. List threatened or endangered species known to be on or near the site.

None Known.

d. 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 near the site or are known to be on or near the site:

birds: hawk, heron, eagle, songbirds, other:
mammals: deer, bear, elk, beaver, other small mammals: cougar
fish: bass, salmon, trout, herring, shellfish, other:

b. List any threatened or endangered species known to be on or near the site.

Eagles and salmon (in Rock Creek and Cedar River), but they will not be impacted by this Plan.

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, but operation of the District's water system requires water, electricity and fuel.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

No.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

Not Applicable.

7. ENVIRONMENTAL HEALTH

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

No.

1) Describe special emergency services that might be required.

None.

2) Proposed measures to reduce or control environmental health hazards, if any:

Not Applicable.

b. Noise

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

None.

2) What types of 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.

None.

3) Proposed measures to reduce or control noise impacts, if any:

Not Applicable.

8. LAND AND SHORELINE USE

a. What is the current use of the site and adjacent properties?

The existing land use for the District is identified on Figure 2-3 (Land Use Map) of the Plan.

b. Has the site been used for agriculture? If so, describe.

Not Applicable

c. Describe any structures on the site.

Not Applicable

d. Will any structures be demolished? If so, what?

No.

e. What is the current zoning classification of the site?

The current zoning classification are identified in Section 2 of the Plan

f. What is the current comprehensive plan designation of the site?

Please see Section 2 of the Plan.

g. If applicable, what is the current shoreline master program designation of the site?

Not Applicable.

h. Has any part of the site been classified as an "environmentally sensitive" area?

If so, specify.

Environmentally sensitive areas are present in the District. This Comprehensive Water System Plan proposal will not impact any of these areas.

i. Approximately how many people would reside or work in the completed project?

Not Applicable.

j. Approximately how many people would the completed project displace?

None.

k. Proposed measures to avoid or reduce displacement impacts, if any:

Not Applicable.

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

This Comprehensive Water System Plan was developed to address the future water system needs of Cedar River Water and Sewer District based on the existing and projected land use and associated water system requirements.

9. HOUSING

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

None.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

None.

c. Proposed measures to reduce or control housing impacts, if any:

Not Applicable.

10. 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. Proposed measures to reduce or control aesthetic impacts, if any:

Not Applicable.

11. LIGHT AND GLARE

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

None.

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. Proposed measures to reduce or control light and glare impacts, if any:

Not Applicable.

12. 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.

No.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

Not Applicable.

13. 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 or next to the site.

Not Applicable.

c. Proposed measures to reduce or control impacts, if any:

Not Applicable.

14. 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.

Please see Figures 1-1 and 1-2 of the Plan.

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 existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

No.

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

No.

f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

Not Applicable.

g. Proposed measures to reduce or control transportation impacts, if any:

Not Applicable.

15. PUBLIC SERVICES

a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, school, other)? If so, generally describe.
No.

b. Proposed measures to reduce or control direct impacts on public services, if any.

Not Applicable.

16. UTILITIES

a. Circle utilities currently available at the site: electricity, Natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.

b. Describe the utilities that are proposed for the project, the utility providing service, and the general construction activities on the site or in the immediate vicinity which might be needed.

This proposal establishes a plan for the future development of the water system within Cedar River Water and Sewer District's water service area boundary and assumes that adequate facilities are provided.

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: _____

Date Submitted: Jan 25, 00

D. SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS

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?

No Increases.

Proposed measures to avoid or reduce such increases are:

Not Applicable.

2. How would the proposal be likely to affect plants, animals, fish or marine life?

No Impact.

Proposed measures to protect or conserve plants, animals, fish or marine life are:

Not Applicable.

3. How would the proposal be likely to deplete energy or natural resources?

Construction of new water system facilities will require the use of construction materials typical to this type of work.

Proposed measures to protect or conserve energy or natural resources are:

Efficient planning and design of utilities will assist in the conservation of water. A Conservation Plan is also included as an Appendices to the Plan.

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (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 primelands?

No Impacts.

Proposed measure to protect such resources of to avoid or reduce impacts are:

Any future work associated with the Cedar River Water and Sewer District water system will be consistent with the regulations and policies governing the protection of such resources.

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses consistent existing plans?

No Impacts.

Proposed measures to avoid or reduce shoreline and land use impacts are:

Not Applicable.

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

This proposal will not impact demands on transportation or public utilities but will provide a guideline for future development of the District's water system.

Proposed measures to reduce or respond to such demands are:

Not Applicable.

7. Identify, if possible, whether the proposal may conflict with local, state or federal laws requirements for the protection of the environment.

This proposal will not conflict with any such laws.

DETERMINATION OF NON-SIGNIFICANCE

Description of the Proposal: *This proposal is for the adoption of the Cedar River Water and Sewer District Comprehensive Water System Plan. The Plan addresses future water system service to all areas of the Cedar River Water and Sewer District water service area as identified in the Plan. The Plan puts forth a Capital Facilities Plan in accordance with water system requirements and design criteria developed as part of the planning process.*

Proponent: *Cedar River Water & Sewer District*

Location: *Cedar River Water and Sewer District is generally located in the Maple Valley and Renton areas. The District generally lies east of Renton and Lake Youngs with the Maple Valley Highway running northeast through the area.*

Lead Agency: *Cedar River Water & Sewer District*

The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request.

This DNS is issued under 197-11-340(2); the lead agency will not act on this proposal for 15 days from the date below. ***Comments must be received by no later than 5:30pm on March 7, 2000 at the office of Cedar River Water and Sewer District, 18300 SE Lake Youngs Road, Renton, WA 98058-8058.***

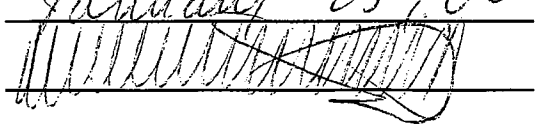
Responsible Official: *Ron Sheadel*

Position/Title: *Manager, Cedar River Water and Sewer District*

Phone: *(425) 255-6370*

Address: *18300 SE Lake Youngs Road*
Renton, WA 98058-8058

Date: January 25, 00

Signature: 

COMMENTS AND APPROVAL

ORIGINAL

CEDAR RIVER WATER AND SEWER DISTRICT
OF King COUNTY, WASHINGTON

RESOLUTION NO. 3819

A RESOLUTION adopting the Cedar River Water and Sewer District 2000 Comprehensive Plan.

WHEREAS the District engaged Penhallegon Associates Consulting Engineers, Inc. to prepare an updated comprehensive water system plan for the District in accordance with RCW 57.16.010 and WAC 246-290; and a draft of such plan has been prepared and reviewed by District staff and the Board of Commissioners and circulated to such governmental bodies and agencies as required by law;

WHEREAS an Environmental Checklist and Determination of Environmental Non-Significance ("DNS") with regard to such water system comprehensive plan was also prepared, circulated and a hearing held thereon as required by law and the District's SEPA rules and the DNS was approved and adopted by the District resolution immediately preceding this resolution;

WHEREAS the Board of Commissioners finds that such updated water system comprehensive plan determines the present and reasonably foreseeable needs of the District's water system and should be adopted and approved; Now, therefore

BE IT RESOLVED that the Board of Commissioners hereby adopts and approves the 2000 Water System Comprehensive Plan of Cedar River Water and Sewer District.

PASSED BY THE BOARD OF COMMISSIONERS OF CEDAR RIVER WATER

AND SEWER DISTRICT OF KING COUNTY, WASHINGTON, at its regular meeting held on April 18, 2000.

President and Commissioner

Commissioner

Commissioner

ATTEST:

Secretary and Commissioner

CEDAR RIVER WATER AND SEWER DISTRICT
COMPREHENSIVE WATER SYSTEM PLAN
COMMENTS AND APPROVALS

In accordance with WAC 246-290-100, a draft of the Cedar River Water and Sewer District Comprehensive Water System Plan was provided to all agencies having jurisdiction, neighboring utilities and other interested parties for consideration and comment. The Draft Plan was sent to the below listed agencies and those agencies which provided comments are noted. A summary of the comments, responses to the comments received, and copies of the comment letters are included in this section. Once obtained, approval documentation is to be provided at the end of this section.

Distribution List - Cedar River Water and Sewer District Draft Comprehensive Water System Plan	
Plan Holder	**Comments Received?**
Ms. Stacy Patterson State of Washington Department of Health Northwest Drinking Water Operations 1511 Third Avenue, Suite 719 Seattle, WA 98101-1632	Yes
Mr. Ernie Dunston Seattle Public Utilities Water Department Dexter Horton Building - 10th Floor 710 2nd Avenue Seattle, WA 98104	Yes
Mr. Bruce Bennett King County Utilities Technical Review Committee 201 South Jackson, Suite 600 Seattle, WA 98104	Yes
Mr. Ron Speer Soos Creek Water and Sewer District 14646 SE 192nd Street Renton, WA 98058-1039	No
Ms. Judith Nelson Covington Water District 18631 SE 300th Place Kent, WA 98042-9208	No
Ms. Lys Hornsby City of Renton 1055 S. Grady Way Renton, WA 98055	No
Mr. Greg McCormick City of Maple Valley P.O. Box 320 Maple Valley, WA 98038	No

Mr. Lester Piele King County Water District No. 90 15606 SE 28th Street Renton, WA 98059-8522	No
East King County Regional Water Association 1309 114th Avenue SE, Suite 300 Bellevue, WA 98044	No
Mirrorrmont Services, Inc. 23730 Bothell-Everett Highway, Suite K Bothell, WA 98021-9300	No

SUMMARY OF COMMENTS AND RESPONSES

The following includes a summary of the comments received to Cedar River Water and Sewer District's Draft Comprehensive Water System Plan. Responses to the comments are given, including identification of changes which have been made to the Plan. Copies of the comment letters, with the comments identified, are also provided in this section.

STATE DEPARTMENT OF HEALTH - Comment Letter Dated May 23, 2000

DOH Comment 1 - (Introduction) "The District's future water service area extends to the east to include an area that was not identified by the City of Seattle as its place of use when the Cedar River water right claim was submitted to the Department of Ecology. Does the District have the right to serve this area with water obtained from the Cedar River?"

Response - *It is apparent that the City of Seattle's water rights for the Cedar River source do not include Range 7 within Townships 22 and 23, although the City's Tolt River water permit includes the City's entire service area, including this portion of Cedar River Water and Sewer District. As a customer of Seattle, the District relies on Seattle for insuring the adequacy of the regional water rights. The District, however, recognizes that prior to extending service into Range 7, review or modification of existing Seattle water rights or modification of the District's Maplewood Estates water rights may be required. The District currently has an application pending for expanding the place of use on the recently acquired Wonderland Mobile Home Park water rights. The proposed revision identifies the place of use as the entire Cedar River Water and Sewer District service area, as defined in the East King County Coordinated Water System Plan. Please note that the area in question has consistently been planned for public water service in previous Seattle, County, Coordinated Water System Plan and District planning documents, all of which have received approval by various agencies. Any change to this would require coordination with these agencies to determine consistency with policies regarding the extent and boundaries of public water service. Language explaining this has been added to Sections 2.2 and 5.4 of the Plan.*

DOH Comment 2 - (Introduction) "Please provide a copy of your interlocal agreement with Covington that transfers a portion of the Covington service area to your service area. In addition, please make sure that the service area change is brought to the attention of the East King County Regional Water Association so that the base map can be changed to reflect the current situation."

Response - *The interlocal agreement with Covington Water District is currently is included in the Appendices. Annexation of the area, as well as modification of the East King County Coordinated Water System Plan will be required to formalize the service area exchange.*

DOH Comment 3 - (Introduction) "The plan should discuss whether there is a need for the District to develop a satellite management program in order to provide timely and reasonable water service throughout the entire service area. How might the District respond to a request from a customer within the service area who could not be served directly?"

Response - *Cedar River Water and Sewer District currently has a satellite system management program policy which was established by Resolution No. 3277 in 1994 and used for the Webster Lake system transfer. The District will consider satellite management on a case by case basis. It is, however, a recommendation of this Plan that the District revisit this policy and update its policy for satellite system management according to current requirements and standards. Currently, it is the District's policy to retain ownership of the facilities required to serve its customers. The District may agree to satellite management, if an agreement regarding system standards, funding of improvement projects, and long term ownership of facilities can be reached. Section 2.4 of the Plan has been modified to recommend that the District update and formalize its satellite management program.*

DOH Comment 4 - (Existing Water System) "The Board of Health revised the cross-connection control program requirements for public water systems in 1999. Please identify any deficiencies with the current program and recommend a schedule for bringing the District's program into full compliance with the regulations."

Response - *Cedar River Water and Sewer District is currently reviewing its cross-connection control programs and policies for compliance with the recently revised DOH standards regarding cross connection control. This is ongoing and will be complete by the end of 2000.*

DOH Comment 5 - (Existing Water System) "Figure 3-2 and the Comprehensive Plan do not show the installation of PRV No. W-7 that is listed on Table 3-5 and described as being located at the intersection of 140th Ave. SE & SR 169. Also the piping between the 635 Fairwood pressure zone and the 481 Cedarwood 1 pressure zone does not appear to be shown on the comprehensive plan."

Response - *The hydraulic profile and Comprehensive Plan map have been modified to include the above referenced facilities.*

DOH Comment 6 - (Existing Water System) "The upgrading of the pump stations in the Central-East area is discussed in the plan. Pump station upgrades, however, have not been included in the CIP. Table 5-4 suggests the District could have difficulty meeting its pump station design criteria shortly after 2005 rather than around 2010 as stated in the plan. Please include the upgrading of one or more of the pump stations in the CIP and continue to recommend a review of the CIP if either the District's population growth or its demand for water changes significantly. Another option would be to provide additional discussion concerning the 18-hour pumping day design criteria and the flexibility it provides the District as it develops its CIP."

Response - *The Central Pump Station Upgrade is included in the CIP as Project Number 7. Language has been added to Section 5.8.2 of the Plan to discuss the monitoring of the status of this station.*

DOH Comment 7 - (Existing Water System) "Figure 5-1 identifies an area of low fire flow north of Spring Lake along 190th Ave. SE. Will the construction of the 12-inch main along 196th Ave. SE increase the fire

flow to this area? Please indicate the fire flow that will be available in this area, according to the model, once Project 20 has been constructed."

Response - *The completion of CIP Project Number 20 will significantly increase fire flows in the Spring Lake area and provide between 1,600 gpm and 2,500 gpm. This flow is dependent on completion of the Shady Lake Watermain Project (Project No. 31). Please note that flows in this area are limited by topography.*

DOH Comment 8 - (Existing Water System) "We have the Wellhead Protection Study for the Webster Lake Estates dated January 30, 1995. Please indicate that the owners/operators of potential contaminants listed in the study's inventory have been notified of their location within the wellhead protection area."

Response - *Current District staff were unable to verify if their predecessors sent information to potential contaminant sources located within the Webster Lake Well's Wellhead Protection Area. The District is preparing to send letters to these potential sources of contaminants in the near future.*

DOH Comment 9 - (System Analysis) "We understand that the District is actively participating in regional efforts to ensure future source capacity. Please include a brief discussion of these efforts and options within the plan."

Response - *Cedar River Water and Sewer District has long been active in pursuing additional regional water supply options to meet projected growth within the region. The District spent more than eight years supporting the IWG/CWA position and is now a member of the Water Suppliers Association or WSA. This group of Seattle purveyors is actively seeking long term water supply options through its negotiations for a water supply contract with Seattle. In addition, Cedar River Water and Sewer District representatives participate in a wide variety of supply and conservation activities and committees, including the Seattle Purveyors Committee, the Seattle 1% Conservation Program, King County Water Reuse programs, the Tacoma 2nd Supply Line project, and others. In addition, the District is actively pursuing transfer of privately held water rights to the District when service can be extended to areas previously served by private wells. Please refer to revised language in Section 5.4 of the Plan.*

DOH Comment 10 - (Appendices) "The conservation program must establish a target savings for the six year life of the WSP and include a detailed schedule of the programs and measures that will be implemented to achieve this savings. In addition, the plan must commit to the continued collection of water data in the customer classes described on pages 8 and 9 in the enclosed Conservation Planning Requirements document."

Response - *Please note that the specific target savings used in developing demand projections have been incorporated into Conservation Plan included in the Appendices. Additionally, the Conservation Plan has been modified to better explain the District's ongoing data collection efforts and projected conservation*

program implementation. Please note that the District has recently implemented a fourth tier in its rate structure to encourage conservation.

DOH Comment 11 - (Appendices) "Please include all comments received by King County and adjacent purveyors in the appendix of the final plan."
Response - *All received comments are included in the Plan Appendices.*

DOH Comment 12 - (Appendices) "Also, please note that we have forwarded a copy of the plan to the Department of Ecology (DOE) and have asked that they provide comments to us regarding the water resources section of the plan. We will forward these comments to the District when/if they are received."
Response - *Comments from DOE have not been received to date.*

KING COUNTY - Comment Letter Dated February 28, 2000

King County Comment 1 - (Figures in the Plan) "The service area boundary as established in the East King County Coordinated Water System Plan is not represented correctly on the figures in the plan. Please modify the figures to reflect the designated boundaries. If any boundary changes are being proposed, please discuss the need fo the proposed changes."

Response - *The boundary has been corrected on the Figures in the Plan.*

King County Comment 2 - (Page 1-7) "The Washington State Department of Health and King County require new comprehensive plans to be prepared every six years, not every five years."

Response - *The comment has been noted and the Plan has been corrected.*

King County Comment 3 - (Page 2-5) "Please provide more specific information concerning the District's approach to satellite management. There are currently large areas of the District that could not be served in a timely and reasonable manner per RCW 70.116.060. If an application for a new public water system were received by King County, the County would have no choice but to allow the system to form. Is it the District' position that it would want no role in management of the new system?"

Response - *See Response to DOH Comment 3 and revised Plan language in Paragraph 2.4.3.*

King County Comment 4 - (Table 2-4) "The calculations of reduced demand due to the one_percent conservation initiative are incorrect. Also, the District should consider whether demand per ERU after 2010 should level off (as shown) or continue to decrease due to continued conservation efforts and improvements in plumbing design."

Response - *The demands have been modified to reflect 1% conservation per year for 10 years. This Plan takes a conservative approach to projecting water demands beyond the next ten years. Although demands may continue to decrease with modified plumbing fixtures and conservation efforts, the District can not plan for that until the extent of success from these efforts becomes evident. A recommendation of the Plan is that the District continue monitoring its conservation efforts to see how successful current programs are and modify the future demand projections based on actual conservation results.*

King County Comment 5 - (Page 5-7) "The District should discuss any water rights issues with the proposed use of the well."

Response - *Water rights associated with the proposed use of the well are briefly discussed in the Maplewood Well Study contained in the Appendices to the Plan. Please refer to DOH Comment 1 and revised Section 5.4 for additional discussion regarding current water rights considerations.*

King County Comment 6 - (Table 5-2) "Please describe the contractual agreement with Wonderland Mobile Home Park."

Response - *The District has recently extended service to the Wonderland Mobile Home Park and*

acquired the water rights for the well previously serving this property. An application is currently pending with DOE for an extension of the place of use for this well. No contractual agreement exists with Wonderland and it is considered a typical customer of the District.

King County Comment 7 - (Page 5-27) "Current water use per ERU in the Webster Lake area is over twice the District average. Explain how this information is consistent with the statement that te Webster Lake area has implemented a "stringent conservation program." Describe the conservation program implemented in the Webster Lake area. Why is the District proposing to spend $1,200,000 on a capital project to bring more water to an area that is evidently currently wasting large amounts of water? How will the District pay for this capital expense (that information in not shown on page 6-4)?"

Response - *The District has met with the residents of the Webster Lake area to discuss water use and need for water conservation. A fourth tier was added to the District's rate structure to further encourage water savings. Please note that although water use in this area is higher than average use within the District, it is not inconsistent with the establishment of an upscale community of 10,000 to 15,000 square foot homes with substantial landscaped areas. As the community (and especially landscaped areas) become established, water use is expected to decline. Regarding the construction of the 244th Extension to Lake Webster - this facility is proposed for a variety of system wide issues. As indicated on the Water System Plan Map, the pipeline will eventually extend to a proposed 1.0 million gallon reservoir, which by coincidence, will be located on the highest ground in the area, adjacent to Lake Webster. The proposed pipeline will also provide required fire flows to an existing 3,500 square foot, 3-story wooden school which is located in the area and is approximately 60 years old. Benefits to the Webster Lake area are improved service through provision of a back-up source to a single source system and provision of fire flows. The residents of the area will be surcharged for these benefits to assist in project funding. Table 6-1 has been modified to better explain the project and proposed funding.*

King County Comment 8 - (Page A-17) "What is meant by the column heading labeled "capacity"?"

Response - *This column represents water rights in gpm.*

SEATTLE PUBLIC UTILITIES - March 14, 2000

SPU Comment 1 - (Demand Forecast) "... However, the reviewer felt that Section 2.8.2 Projected Demands, page 2-14, could be expanded a bit. The suggestion is that a brief description of the methodology could be included rater than just statements of what the forecast is based on what has been taken into account. ... It is noted in the plan that CRWSD took on a new wholesale customer in 1998 (which we assume is Covington) and that sales to this customer are projected to rise gradually from a tenth of an mgd now to one mgd in 2010 to almost two mgd in 2020. While this is consistent with our expectations through 2005, we expect Covington to switch over to the Tacoma 2nd Supply Pipeline when it comes on lin and cease purchasing water through CRWSD. ..."

Response - *The text in Section 2.8 has been modified to better explain the process used in demand projections. Cedar River Water and Sewer District has long taken a regional perspective to water supply and several long term regional alternatives (including supplying water to Covington) are being evaluated. Comments regarding the Tacoma 2nd Supply Pipeline are noted but scheduling of this facility is beyond the District's control.*

SPU Comment 2 - (Water Quality) "See attached Water Quality Review of Cedar River Water & Sewer District Comprehensive Water System Plan."

Response - *Please see below.*

SPU Comment 3 - (System Analysis) "... The suggestion is that CRWSD adopt a conservation policy in the water plan that any wholesale customer that you supply be required to support and assist SPU's regional conservation program (at least with the water supplied via Seattle). You should also state your policies regarding the supply of drinking water for irrigation of new golf courses (Covington contract conditions)."

Response - *It is agreed that any SPU water supplied to others should be subject to adopted conservation practices and programs of the District. Cedar River has no such policy regarding supply of water to new golf courses.*

SPU WQ Comment 1 - (8.1.2) "I believe this particular water system plan is for the Cedar River Water and Sewer System (Public Water System ID #418007). Referencing the satellite system of Lake Webster (PWS ID #05217E) may not be appropriate, and could be confusing.

Response - *The Lake Webster system is part of Cedar River Water and Sewer District, owned and operated by the District. However, the Webster Lake System is currently a separate water system, with its own source of supply and other facilities. At the present time, it is not physically connected to the remainder of the Cedar River system. As such, a separate water permit, monitoring data, and water quality testing program is maintained for the Webster Lake system. This is best explained in Section 3 of the Plan.*

SPU WQ Comment 2 - (8.2) "The text states that the outside consultant coordinates with the "District's Manager". Is this the General Manager or the Operations Manager?"
Response - *The District's consultants coordinate with the District's management and staff as required and the Plan has been modified to reflect this.*

SPU WQ Comment 3 - (Table 8-1) "The note at the bottom, explaining what the various acronyms stand for, are incomplete. WDM, WTPO, WWTPO and variations on these are missing."
Response - *The acronym definitions have been added to the table.*

SPU WQ Comment 4 - (8.5.1) "CRWSD is RESPONSIBLE for all of their own testing (purchased treated surface water as well as groundwater). Seattle does provide these services to the district, bu the ultimate responsibility still lies with the district. Seattle is RESPONSIBLE for monitoring and reporting associated with raw water quality, the treatment process, and the water entering the transmission system from the treatment plant. This arrangement is clearer in the later part of the section, but not in the beginning. The text states that the lead and copper monitoring results are documented in the Appendices. I didn't see them . . . "
Response - *Text has been revised to reflect a clear definition of responsibilities for water quality testing. Lead and Copper test results have been incorporated into the Appendices.*

SPU WQ Comment 5 - (8.5.2) "CRWSD's population was given to me as 17,500 in 1999. Based on that population figure, 14 coliform samples are required under the REDUCED monitoring program (70% of WAC required samples). Seattle's schedule reflects the collection of at least the required 14 per month. Please let me know what population the current WFI reflects."
Response - *Comment noted and Plan changed.*

SPU WQ Comment 6 -(8.5.3) "In the event of a violation of the established maximum contaminant levels that repeat or replacement coliform samples need to be collected because of a coliform positive result or an invalidated sample, additional sampling is the responsibility pf the District. (Note: the need to collect additional samples does not constitute a violation.)"
Response - *The wording has been modified in the Plan.*

SPU WQ Comment 7 - (Table 8-3) "... Bacteriological testing under the regional monitoring program is reduced to 70% of 20 samples, or 14 per month. This does not constitute a WAIVER, so it s best not to use that term in this context. ... Why is the District drawing 3 more coliform samples? Comment for TTHM - Sample is collected at a site representing the maximum residence time for the source. AC test - do you mean asbestos? Generally, this test has to be run only every 9 years, although testing results would have some bearing on this."
Response - *Comments noted. See SPU WQ Comment 5 regarding the number of samples taken by SPU.*

The District is maintains a monitoring schedule for the Webster Lake source, which has been established by the District and exceeds minimum requirements. Past testing results dictate AC monitoring. See Appendices for AC water quality test results.

SPU WQ Comment 8 - (Table 8-4) Corrections to table 8-4
Response - *The table has been corrected.*

SPU WQ Comment 9 - (Water Quality Data) "The items I found in this section included the WDOH Monitoring Report for 2000 for Webster Lake Estates. Again, I question whether this should be included, but in any case, it is not monitoring data. It is a listing of what monitoring needs to be done during the year. The second item was the information that SPU provided to the wholesale customers for inclusion in the 1999 Annual Water Quality Report. This does provide information on the source water quality and treatment performance in 1999 (for the Cedar and the Tolt), but it does not provide any information about the distribution system water quality for CRWSD. The third item is the running and annual average TTHM monitoring data ending the 3rd quarter of 1999 for all of SPU's customers. ... Other water quality data should be included, along with a discussion of the results and the significance (i.e. how does the data compare to the standard?)."
Response - *The Appendices have been expanded to include additional monitoring results and information, including a copy of the District's current Water Quality Report (Consumer Confidence Report) with applicable District water quality data and testing results.*

STATE OF WASHINGTON

DEPARTMENT OF HEALTH

1511 Third Ave., Suite 719 • Seattle, Washington 98101-1632

RECEIVED

MAY 24 2000

May 23, 2000

MR. RON SHEADEL
GENERAL MANAGER
CEDAR RIVER WATER AND SEWER DISTRICT
18300 SE LAKE YOUNGS ROAD
RENTON WA 98058-8058

Re: Cedar River Water and Sewer District
King County
Water System Plan
Submittal #00-0207

Dear Ron Sheadel:

Thank you for the Cedar River Water and Sewer District Comprehensive Water System Plan (WSP) received in this office on February 2, 2000. Please excuse the delay in our review. Although we have found the plan to be very thorough and well prepared, we ask that you please address the following comments before final approval.

Introduction

1. The District's future water service area extends to the east to include an area that was not identified by the City of Seattle as its place of use when the Cedar River water right claim was submitted to the Department of Ecology. Does the District have the right to serve this area with water obtained from the Cedar River?

2. Please provide a copy of your interlocal agreement with Covington that transfers a portion of the Covington service area to your service area. In addition please make sure that the service area change is brought to the attention of the East King County Regional Water Association so that the base map can be changed to reflect the current situation.

3. The plan should discuss whether there is a need for the District to develop a satellite system management program in order to provide timely and reasonable water service throughout the entire service area. How might the District respond to a request from a customer within the service area who could not be served directly?

Existing Water System

4. The Board of Health revised the cross-connection control program requirements for public water systems in 1999. Please identify any deficiencies with the current program and recommend a schedule for bringing the District's program into full compliance with the regulations.

5. Figure 3-2 and the Comprehensive Plan do not show the installation of PRV No. W-7 that is listed on Table 3-5 and described as being located at the intersection of 140th Ave. SE & SR 169. Also the piping between the 635 Fairwood pressure zone and the 481 Cedarwood 1 pressure zone does not appear to be shown on the comprehensive plan.

6. The upgrading of the pump stations in the Central-East area is discussed in the plan. Pump station upgrades, however, have not been included in the CIP. Table 5-4 suggests the District could have difficulty meeting its pump station design criteria shortly after 2005 rather than around 2010 as stated in the plan. Please include the upgrading of one or more pump stations in the CIP and continue to recommend a review of the CIP if either the District's population growth or its demand for water changes

significantly. Another option would be to provide additional discussion concerning the 18-hour pumping day design criteria and the flexibility it provides the District as it develops its CIP.

7. Figure 5-1 identifies an area of low fire flow north of Spring Lake along 190th Ave. SE. Will the construction of the 12-inch main along 196th Ave SE increase the fire flow to this area? Please indicate the fire flow that will be available in this area, according to the model, once Project No. 20 has been constructed.

8. We have the Wellhead Protection Study for the Webster Lake Estates dated January 30, 1995. Please indicate that the owners/operators of potential contaminants listed in the study's inventory have been notified of their location within the wellhead protection area.

System Analysis

9. We understand that the District is actively participating in regional efforts to ensure future source capacity. Please include a brief discussion of these efforts and options within the plan.

Appendices

10. The conservation program must establish a target savings for the six year life of the WSP and include a detailed schedule of the programs and measures that will be implemented to achieve this savings. In addition, the plan must commit to the continued collection of water use data in the customer classes described on pages 8 and 9 in the enclosed Conservation Planning Requirements document.

11. Please include all comments received by King County and adjacent purveyors in the appendix of the final plan.

12. Also, please note that we have forwarded a copy of the plan to the Department of Ecology (DOE) and have asked that they provide comments to us regarding the water resource section of the plan. We will forward these comments to the District when/if they are received.

We hope that you have found these comments to be clear and constructive. Please submit the updated WSP on or before September 23, 2000. In order to expedite the review of your revised submittal, please include a cover letter summarizing how each of the above comments was addressed in the updated plan and where each response is located (i.e., page numbers, Appendices, etc.). Please note that we are enclosing an invoice for $3,191 for the WSP review. This fee covers our cost for the current review, and the review of one revised WSP. If additional revisions are required, an additional fee will be assessed to cover review costs.

If you have any questions, please do not hesitate to contact me at (206) 464-7591, or Bob James at (206) 464-7671.

Sincerely,

Stacy Patterson
Regional Planner
NW Drinking Water Operations

enclosures

cc: Bob James, DOH
Susan Boyd, Penhallegon Associates Consulting Engineers, Inc.
Bruce Bennett, King County UTRC
Seattle/King County Health Department

February 28, 2000

Ron Sheadel, Manager
Cedar River Water and Sewer District
18300 SE Lake Youngs Rd.
Renton, WA 98058-8058

Dear Mr. Sheadel:

Thank you for providing me with a draft version of the Cedar River Water and Sewer District's 2000 Comprehensive Water System Plan. In general, the plan is well written and addresses King County's concerns. There are a few items, however, that should be modified prior to review of the plan by the Utilities Technical Review Committee (UTRC).

Figures in the plan

(1) The service area boundary as established in the East King County Coordinated Water System Plan is not represented correctly on the figures in the plan. Please modify the figures to reflect the designated boundaries. If any boundary changes are being proposed, please discuss the need for the proposed changes.

Page 1-7

(2) The Washington State Department of Health and King County require new comprehensive plans to be prepared every six years, not every five years.

Page 2-5

(3) Please provide more specificity concerning the District's approach to satellite management. There are currently large areas of the District that could not be served in a timely and reasonable manner per RCW 70.116.060. If an application for a new public water system were received by King County, the County would have no choice but to allow the system to form. Is it the District's position that it would want no role in management of the new system?

Table 2-4

(4) The calculations of reduced demand due to the one percent for conservation initiative are incorrect. Also, the District should consider whether demand per ERU after 2010 should level off (as shown) or continue to decrease due to continued conservation efforts and improvements in plumbing design.

Page 5-7

(5) The District should discuss any water rights issues with the proposed use of the well.

Table 5-2

(6) Please describe the contractual agreement with Wonderland Mobile Home Park.

Page 5-27

(7) Current water use per ERU in the Webster Lake area is over twice the District average. Explain how this information is consistent with the statement that the Webster Lake area has implemented a "stringent conservation program." Describe the conservation program implemented in the Webster Lake area. Why is the District proposing to spend $1,200,000 on a capital project to bring more water to an area that is evidently currently wasting large amounts of water? How will the District pay for this capital expense (that information is not shown on page 6-4)?

Page A-17

(8) What is meant by the column heading labeled "capacity"?

After the District has responded to these comments, please send eight revised copies of the plan to my attention and I will distribute them to the UTRC for review. I will then inform you of the date and location of the UTRC meeting so that you may attend. Please contact me at (206) 296-1952 or at bruce.bennett@metrokc.gov if you have any questions.

Sincerely,

Bruce Bennett, Chair
King County Utilities Technical Review Committee

cc: Susan Boyd, Penhallegon Associates (by e-mail)

March 14, 2000

Ron Sheadel
Cedar River Water & Sewer District
18300 SE Lake Youngs Road
Renton, WA 98058

Re: Cedar River Water & Sewer District's Water Comprehensive Plan Update

Dear Ron:

This letter contains comments of Seattle Public Utilities' (SPU) reviewers of Cedar River Water & Sewer District's (CRWSD) Water Comprehensive Plan Update. In keeping with the approach of the SPU Water Supply Plan, SPU is reviewing all purveyor draft complans to assure more consistent planning and enable coordinated operation of Seattle's regional water system and purveyor's distribution systems. SPU comments and recommendations are intended to assist you in achieving timely approval of your plan.

DEMAND FORECAST

(1) The SPU reviewer feels that this section of the plan is very well done. The overall forecast is consistent with Seattle's forecast of demand for CRWSD. The forecast demand takes into account the 1% conservation program. However, the reviewer felt that section 2.8.2 Projected Demands, page 2-14, could be expanded a bit. The suggestion is that a brief description of the methodology could be included rather than just statements of what the forecast is based on and what has been taken into account. It is noted in the plan that CRWSD took on a new wholesale customer in 1998 (which we assume is Covington) and that sales to this customer are projected to rise gradually from a tenth of an mgd now to one mgd in 2010 to almost 2 mgd in 2020. While this is consistent with our expectations through 2005, we expect Covington to switch over to the Tacoma 2nd Supply Pipeline when it comes on line and cease purchasing water through CRWSD. This possibility should be mentioned in the text.

WATER QUALITY

(2) See attached *Water Quality Review of Cedar River Water & Sewer District Comprehensive Water System Plan.*

SYSTEM ANALYSIS

The SPU reviewer felt this was a very well prepared and readable plan. There are no significant comments or recommendations.

CONSERVATION

(3) The reviewer felt that this section of the plan looks good the way it is, with one suggestion. The suggestion is that CRWSD adopt a conservation policy in the water plan that any wholesale customer that you supply be required to support and assist SPU's regional conservation programs (at least with the water supplied via Seattle). You should also state your policies regarding the supply of drinking water for irrigation of new golf courses (Covington contract conditions).

SUMMARY

We hope the enclosed comments and recommendations will be helpful in finalizing CRWSD's comprehensive water plan. SPU staff is available to speak with you or your consultant if you have any questions regarding this review. Please contact me at (206) 684-5951 if you wish to contact any of the SPU reviewers for further discussion or clarification.

Sincerely,

Ernie Dunston
Purveyor Liaison

cc: Susan Boyd, Penhallegon Associates
SPU Reviewers

Seattle Public Utilities
Memorandum
DATE:

March 7, 2000
TO: Ernie Dunston

FROM: Julie Hutchins

RE: Review of Cedar River Water & Sewer District's Water System Plan

I have reviewed Section 8 – Operations Program, of the Cedar River Water & Sewer District Comprehensive Water System Plan, with a focus on water quality and regulatory compliance issues. Below are my comments. If you, the district, or the district's consulting engineer have any questions on my comments; feel free to contact me at 206 684-7880 or via email at
HYPERLINK mailto:julie.hutchins@ci.seattle.wa.us
julie.hutchins@ci.seattle.wa.us
. Thanks for the opportunity to provide these comments.
The Water System Planning Handbook (April 1997) provides additional guidance on what to include in the water system plan. Sections specifically related to water quality and regulatory compliance are Chapter 3 Section 2 (page 14) and Chapter 6 Section 4 (pages 49-51).
Below are my detailed comments.
Section or Reference
Comment

(1) 8.1.2
I believe this particular water system plan is for the Cedar River Water and Sewer System (Public Water System ID # 418007). Referencing the satellite system of Lake Webster (PWS ID #05217E) may not be appropriate, and could be confusing.

(2) 8.2
The text states that the outside consultants coordinate with the "District's Manager". Is this the General Manager or the Operations Manager?

(3) Table 8-1
The notes at the bottom, explaining what the various acronyms stand for, are incomplete. WDM, WTPO, WWTPO and variations on these are missing.

(4) 8.5.1
CRWS is RESPONSIBLE for all of their own testing (purchased treated surface water as well as groundwater). Seattle does provide these services to the district, but the ultimate responsibility still lies with the district. Seattle is RESPONSIBLE for monitoring and

reporting associated with raw water quality, the treatment process, and the water entering the transmission system from the treatment plant. This arrangement is clearer in the later part of this section, but not in the beginning.
The text states that the lead and copper monitoring results are documented in the Appendices. I didn't see them, although maybe they weren't in the materials I was reviewing.

(5) 8.5.2
CRWSD's population was given to me as 17,500 in 1999. Based on that population figure, 14 total coliform samples are required under the REDUCED monitoring program (70% of WAC required samples). Seattle's schedule reflects the collection of at least the required 14 per month. Please let me know what population the current WFI reflects.

(6) 8.5.3
In the event of a violation of the established maximum contaminant levels that repeat or replacement coliform samples need to be collected because of a coliform positive result or an invalidated sample, additional sampling is the responsibility of the District. (Note: the need to collect additional samples does not constitute a violation.)

(7) Table 8-3
Again, I'm not sure it's appropriate to include the Webster Lake information, although I am not sure.
Bacteriological testing under the regional monitoring program is reduced to 70% of 20 samples, or 14 per month. This does not constitute a WAIVER, so it is best not to use that term in this context. As noted earlier, Seattle collects at least 14 on CRWSD's behalf.
Why is the district drawing 3 more coliform samples?
Comment for TTHM – Sample is collected at a site representing the maximum residence time for the source.
AC test – do you mean Asbestos? Generally this test has to be run only every 9 years, although the testing results would have some bearing on this.

(8) Table 8-4
Isn't Kirk the Operations Manager now?
WDOH now has an after hours emergency notification number, although I don't know it off the top of my head (or leave as notify SPU)
Update to reflect Seattle Public Utilities, and correct phone #s
Purveyor Coordinator (Ernie Dunston) phone # is incorrect.
Remove Water Quality 206-684-7404
Change "Emergency" to Water Supply Operations (24 hr) at 206-386-1818
Change "Lab" to WQ Lab at 206-684-7834
Remove Watershed, or correct number to 206-233-1510

(9) Water Quality Data
The items I found in this section included the WDOH Monitoring Report for 2000 for

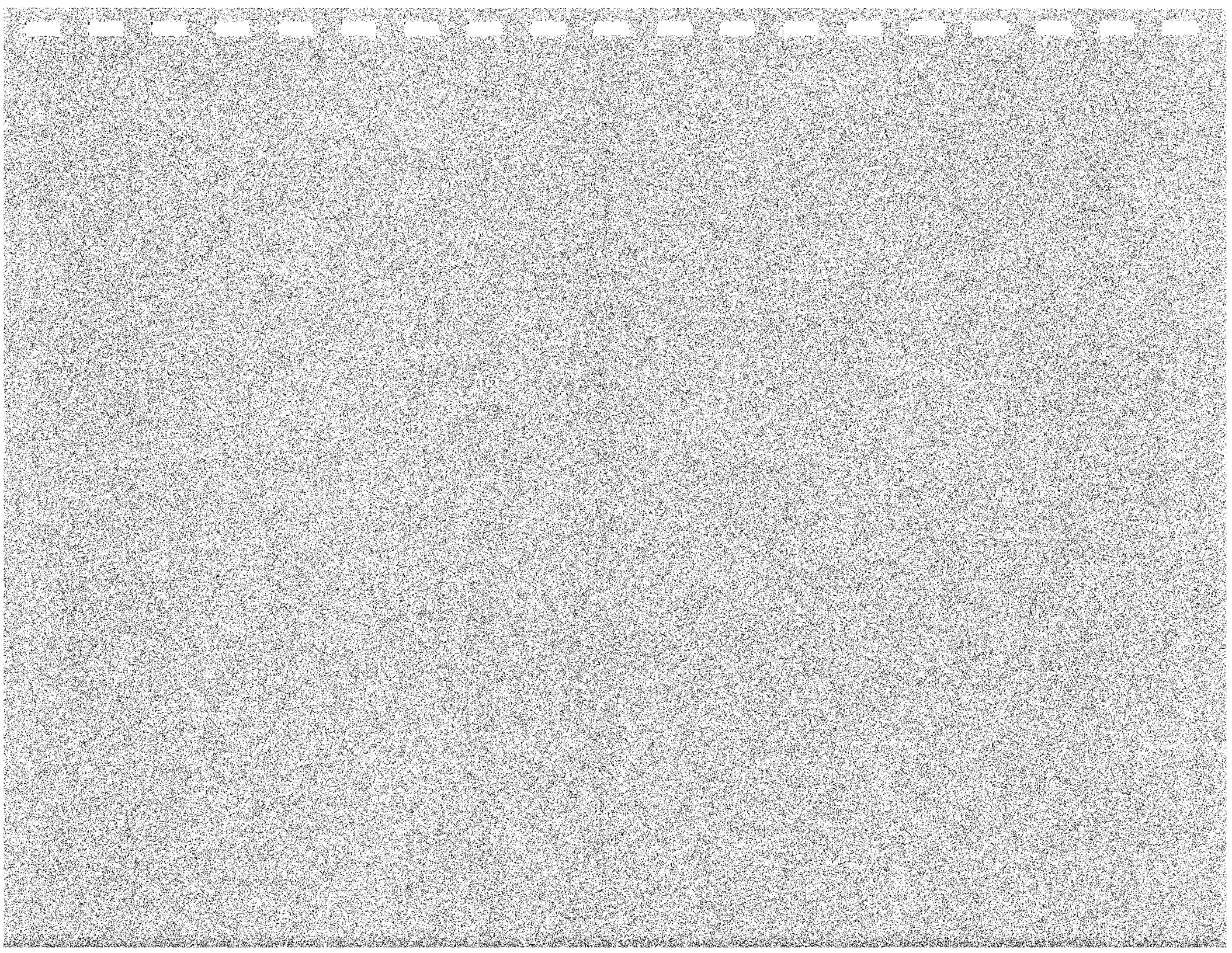
Webster Lake Estates. Again, I question whether this should be included, but in any case, it is not monitoring data. It is a listing of what monitoring needs to be done during the year.

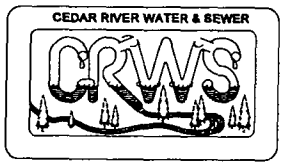
The second item was the information that SPU provided to the wholesale customers for inclusion in the 1999 Annual Water Quality Report. This does provide information on the source water quality and treatment performance in 1999 (for the Cedar and the Tolt), but it does not provide any information about the distribution system water quality for CRWSD.

The third item is the running annual average TTHM monitoring data ending the 3rd quarter of 1999 for all of SPU's customers. It is definitely inappropriate to include the data for all the other wholesalers in this plan, and the inclusion of only one running annual average value is not very informative.

Other water quality data should be included, along with a discussion of the results and the significance (i.e. how does the data compare to the standard?)

CEDAR RIVER WATER AND SEWER DISTRICT
STANDARD PLANS AND SPECIFICATIONS





Cedar River Water & Sewer District

VOLUME III
STANDARD SPECIFICATIONS FOR DEVELOPER CONSTRUCTED WATER EXTENSIONS

October 5, 1999

Penhallegon Associates Consulting Engineers, Inc.
750 Sixth Street South
Kirkland, Washington 98033

PART D

STANDARD SPECIFICATIONS FOR DEVELOPER CONSTRUCTED WATER EXTENSIONS

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PART D - STANDARD SPECIFICATIONS FOR WATER WORKS CONSTRUCTION

SECTION D1. WATERWORKS MATERIALS

D1.a GENERAL

All contractor supplied materials shall be new and undamaged. Unless otherwise approved by the Inspector, the same manufacturer of each item shall be used throughout the Work. All reference specifications herein shall be of the latest revision.

D1.b PIPE

1. Ductile Iron Pipe (Preferred)

a. Standard:	AWWA C151
b. Cement lining:	AWWA Standard C104
c. Exterior Coating:	Bituminous coated per AWWA C104
d. Class:	Class 50 or as specified in the Special Provisions/Contract Drawings
e. Type of Joint:	Tyton joint or as specified in the Special Provisions/Contract Drawings

2. Polyvinyl Chloride (PVC) Pipe (When Approved)

a. Standard:	AWWA C900
b. Class:	CI 150 minimum or as specified in the Special Provisions/Contract Drawings
c. Standard Dimension Ratio:	SDR 18
d. Rings:	Molded rubber of manufacturers' design and as furnished by manufacturer to fit the type of pipe used.

3. Copper Service Pipe

Type "K" annealed, use standard brass compression fittings.

4. Plastic Service Pipe

a. Standards: High molecular weight polyethylene (AWWA C901, ASTM 1248) type 3, grade 3 (PE3408) DRISCO, of all virgin material (CS-255-63). Must carry NSF seal of approval. Two sizes will be permitted: 1" and 2" size. 1" pipe shall be iron pipe size and 2" pipe shall be copper tube size.

b. Type of Joint:	Standard brass compression fittings.
c. Working pressure:	200 psi at 73.4°$_F$.

D1.c FITTINGS

1. Cast or Ductile Iron

a. Standard:	AWWA C110
b. Compact (Ductile Iron):	Per AWWA C153.
c. Class:	At least equal to class of pipe.
d. Type of Joints:	Compatible with pipe or with an adapter or as specified in the Special Provision/Contract Drawings
e. Lining:	Cement lining per AWWA C104.

2. Fittings for PVC Pipe

"Ring Tite" as manufactured by Tifco or equal.

3. Special

Special fittings shall be as specified in the Special Provisions/Contract Drawings

D1.d VALVES

1. Gate Valves

a. Standard:	AWWA C509
b. Description:	Gate valves shall be iron body, resilient wedge valves. Stem nuts shall be identical with District's existing equipment. All valves shall open counter-clockwise and be of the non-rising stem type.
c. Working pressure:	150 psi unless specified otherwise.
d. Type of Joint:	Unless otherwise noted valves shall be flanged with machined flange faces or mechanical joint.

2. Butterfly Valves

Butterfly valves shall in design, material, and workmanship, conform to the standards of AWWA C504. All other specifications shall be provided in the Special Provisions/Contract Drawings.

3. Double Check Valves (Back Flow Prevention)

All back flow prevention devices shall meet Washington State Department of Health "Approved Cross-Connection Control Devices" Listings. They shall be tested and certified at time of installation.

4. Air and Vacuum Release Valves

Air and vacuum release valves shall be Rennselear Figure 372, or equal, as approved by the Engineer.

5. Control Valves

Pressure Reducing, Pressure Relief, Pump Control and other controlling Globe Valves shall be CLA-VAL Automatic Valve or approved equal.

a. Pressure reducing and pressure sustaining valves shall be CLA-VAL Model 92-01 BCS (Auxiliary valve 92-01 BCS) with epoxy coating, a valve position indicator, open & close speed control, a sight gage, spring range 30 - 300 psi.

6. Valve Boxes

Valve boxes and tops shall be cast iron City of Seattle standard cover with drop handle. Bottom section length shall be 42″ minimum adjusted to fit field condition for the particular project or as specified in the Special Provision/Contract Drawings.

D1.e FIRE HYDRANT ASSEMBLIES

1. Hydrant

Standard: AWWA C502

2. Description (See also Standard Plans No. 1 & 2)

Hydrants shall be Clow, Mueller, Dresser, with MJ end. Operating nuts shall be identical with District's existing equipment. Threading on pumper ports shall match the standards of the particular Fire District where hydrants is located. The hydrants shall be equipped with one (1) pumper nozzle (Fire District 25 - 5″ Stortz Nozzle; Fire District 40 - 5″ Stortz Nozzle x 4″ Pacific Coast Thread connection with cap and cable; Maple Valley Fire and Life Safety (FD #43) - 4″ nominal size, ¼ turn Stortz Nozzle x 4½″ NS thread with cap and cable, two (2) 2½″ hose ports NS . thread, 1¼″ pentagon operating nuts, and open by turning counter clockwise. Hydrant valve diameter shall be a minimum of 5¼″. Hydrants shall be flanged at ground line. Hydrant shall be so constructed that the direction of pumper connection may be rotated to face the roadway. Hydrant shall be of traffic type with designed replaceable break points and shall have a variable length riser. All nozzles shall be equipped with bronze nipples screwed into the hydrant and locked in place. Minimum depth of clear cover over the pipe shall be three (3) feet. Hydrant paint shall be as shown on the standard plans. Installation to include placement of Hye-lites reflector button Model BB-2110 (or equal) with Crafco Quikstix adhesive (or equal) within 12″ of the center of the pavement on the side the hydrant is located.

3. Piping

a. All hydrant laterals shall be thickness class 52 ductile iron (Or approved equal).

b. Lateral pipelines to Hydrants under 50' in length shall be a minimum of 6" diameter. Laterals over 50' in length shall be a minimum of 8" in diameter.

c. MEGALUG retainer glands required at all lateral pipe to fitting or approved equal.

d. Pipe to pipe shall be mechanical joint with Field-Lok gaskets or approved equal. Where Field-Lok gaskets are used, paint bell blue for future identification.

D1.f SERVICE CONNECTION EQUIPMENT

1. Water Meters

Meters shall be furnished by the District. Meters shall be Neptune Touch Read System or Sensus SR II Touch Read.

2. Corporation Stops

Corporation stops shall be bronze alloy, ball valve type with 1" I.P. thread inlet and 1" copper thread outlet, Ford , Mueller, or equal, as approved by the Inspector. (Ford FB-700 preferred.)

3. Saddles

Pipe saddles shall be bronze or ductile iron, suitable for installation on the type and class of pipe being used. Bands shall be flattened and properly formed to fit the outside diameter of the pipe. Bands, bolts, and nuts shall be hot-dip or electro-galvanized. Double bands shall be employed on pipe 8" and larger. Single wide flat bands shall be used on pipe 6" and smaller. Gaskets shall be good quality red rubber, or neoprene. (Ford 202 for 1" service preferred.)

4. Oversized Service Connections

On 2" single service lines, a 2" resilient seat gate valve with a valve box is required.

5. Tracer Wire

Tracer wire shall be laid from the corp stop, spiraled around pipe and brought to surface at termination of service. Wire shall be 10 gauge copper solid strand.

D1.g JOINTING MATERIALS

1. Rubber Gaskets

a. Standard: AWWA C111

D1.h GUARD POSTS

1. Hydrant Guard Post

a. Standard: State of Washington Department of Transportation "Standard Specifications," 1998, Section 9-30.5(6).

b. Description: 9" diameter by 6 feet long precast concrete. Exposed surfaces shall be free from honeycomb or other serious defects.

c. Material coating for posts less than six (6) months old:

1) Prime with a solution of three (3) pounds of zinc sulphate crystals in one gallon of water, colored so as to contrast with the color of the concrete, and then allow to thoroughly dry.
2) Coat with one coat of priming paint, Formula H-1-83 per State of WashingtonDepartment of Transportation "Standard Specifications" 1998, Section 9-08.2 and then allow to thoroughly dry.
3) Paint with two (2) finishing coats. Paint shall be white to match the District's existing hydrant guard posts.

2. Valve Marker Post A

a. Standard: See Detail
b. Description: Concrete posts, 4" x 4" by 42" long.
c. Material coating: White, same as hydrant.
d. Markings: The distance from the valve marker to the valve shall be plainly painted on the post with black enamel paint.

3. Valve Marker Post B

a. Where approved by District
b. Standard: See detail
c. Description: 3" PVC Pipe with cap, 42" long

D1.i CONCRETE

1. Bedding Concrete

Concrete for pipe bedding shall be Portland cement concrete containing not less than four (4) sacks of cement per cubic yard. The water/cement ratio shall be 8.2 gallons per sack of cement. The fine aggregate shall not be less than 30% or more than 50% of the total weight of the aggregate.

2. Miscellaneous Concrete Structures

Concrete for encasement, blocking and other structures shall be Portland cement concrete containing not less than six (6) sacks of cement per cubic yard and produce a 28-day compressive strength of not less than 3,000 psi. The fine aggregate shall not be less than 30% or more than 50% of the total weight of the aggregate. The concrete shall have a maximum slump of five (5) inches.

Core samples and testing of the concrete may be required as directed by the Inspector.

D1.j GRAVEL

1. Foundation Gravel

a. General
Foundation gravel to be used shall be a type and gradation to provide a solid compact bedding in the trench. Since trench conditions vary, foundation gravel requirements will change. Bedding requirements for two trench bottom conditions are described as follows:

b. Condition One
Where silty soil or fine sandy soil is encountered that will flow in a stream of water, the gravel should consist of clean bank run sand and gravel, free from dirt, topsoil, and debris, and containing not less than 35% retained on a ¼" mesh sieve and 100% passing a 2" screen. This foundation gravel shall be used only in a dry trench bottom, free from quick and/or running sand.

c. Condition Two
Where clay, peat or other soft materials are encountered which may be saturated with water but which will not break down into fine particles and flow as silt or sand will, the trench shall be over excavated 24" and foundation gravel used. The foundation gravel shall be of such gradation that 100% will pass a 3" screen with at least 90% retained on a 1" screen. The foundation thus stabilized shall be leveled to provide a uniform pipe foundation by using a well-graded gravel ranging in size from ¼" to ¾".

2. Bedding Material

Bedding material shall consist of clean, granular, well graded sand and gravel material of which 100% will pass the U.S. Standard ¾" opening, and not more than 3% will pass the U.S. No. 200 (wet sieve), with a minimum sand equivalent of 50 per the test methods of the Materials Laboratory of the Department of Highways, Olympia, Washington (unless otherwise approved by the District/Engineer).

3. Backfill Material

Backfill material shall be 100% 3" diameter or less, and may be bank run which has been passed through a 3" screen with a binder content of not more than 20% and reasonable grading from fine to coarse (unless otherwise approved by Engineer). All crossings of County rights-of-way shall be backfilled to County specifications.

D1.k PAINTING

All exposed metal above ground, including valve box covers and pipes, but excluding fire hydrants, shall be properly primed and painted with two coats of oil based paint equal to Rustoleum "white". Painting of fire hydrants shall be as specified in the standard plans.

SECTION D2. WATERWORKS CONSTRUCTION

D2.a GENERAL

Except as otherwise noted herein, all work shall be accomplished in accordance with the most current edition of the Standard Specifications for Road, Bridge, and Municipal Construction prepared by the Washington State Department of Transportation and American Public Works Association, hereafter referred to as the Standard Specifications, and according to the recommendations of the manufacturer of the material or equipment used.

D2.b CLEARING AND GRUBBING

Clearing and grubbing work shall be performed within the confines of the area indicated on the plans, and as staked out in the field. All resulting debris shall be disposed of by the Contractor and the right-of-way cleaned up in a neat and workmanlike manner. No logs, stumps, rocks, etc., shall be left lying in the right-of-way or an adjacent property without specified written approval by the District, or the Engineer, and the affected adjacent property owner.

D2.c EXCAVATION

1. Normal Conditions

Trenches shall be excavated to the line and depth designated by the Inspector to provide a minimum cover of 42″ for pipe 8″ and less and 48″ for pipe over 8″, over the top of the pipe unless otherwise specified in the plans. Except where approved by the Inspector, the trench sides shall be excavated vertically. Trench widths shall be only as necessary for adequate working space. The maximum trench width at the top of the pipe shall normally be the outside diameter of the pipe barrel plus 16 inches. The top width of the trench shall not exceed the outside diameter of the pipe plus 30 inches. All excavation and shoring shall conform to WAC 296.

No more than 1500 feet of open trench will be permitted unless so authorized in writing by the Engineer. All trenches shall be backfilled at the end of each work day, or as otherwise secured, as approved by the Inspector.

2. Special Conditions

a. Pavement Cutting (per appropriate governmental agency standards):

In trenching through an existing pavement, the open cut shall be a neat-line cut by either saw cutting or jack hammering a continuous line.

1) Concrete - pavement shall be cut one foot outside the edge of the trench on each side. The concrete shall be cut on a straight line and shall be beveled so that the cut will be approximately 1½ inches wider at the top than at the bottom.

2) Asphalt - pavement shall be cut one foot outside the edge of the

trench on each side. Pavement shall be cut ahead of the trenching equipment to prevent excessive tearing up of the surface and to eliminate ragged edges.

b. Rock Excavation:

All ledge rock that requires systematic drilling and blasting for its removal, and boulders exceeding one-half cubic yard in volume, shall be removed to provide a minimum clearance of six inches (6") under the pipe.

c. Dewatering:

Pipe trenches shall be kept free from water, during excavation, pipe laying, and jointing, and the pipe embedment, in a manner acceptable to the Inspector. Surface water shall be diverted, and ground water shall be kept pumped down, or otherwise removed, to the extent necessary to keep the trench free from water and the bottom stable.

Before trenching operations begin, the Contractor shall have available on the site of the Work sufficient pumping equipment and/or other machinery to insure that the provisions of the above paragraph can be maintained.

d. Timbering and Sheeting:

The Contractor shall provide and install timbering and sheeting as necessary to control trench width to protect workmen, the Work, and existing structures, utilities and other properties in accordance with title 296 WAC. Timbering and sheeting shall be removed unless specific permission is granted by the Inspector to leave it in place. No timbering and/or sheeting shall be permitted to remain above the top of the pipe.

e. Tunneling:

When tunneling is required, tunnels shall not be less than 4 feet high and 2 feet wide and not less than 1 foot wider than the outside diameter of the pipe. Tunnels shall be backfilled with materials acceptable to the Inspector and backfill shall be mechanically compacted. When tunneling is used under pavements, subsequent low pressure grouting may be required.

f. Highway Crossing:

The Contractor may use any method which provides satisfactory results and is acceptable to the Inspector and the governmental agency having control of the highway, provided that the Contractor restores the roadway to a condition acceptable to the governmental agency having control of the road and the Inspector.

g. Over-Excavation:

Trench bottoms shall be over excavated as necessary to remove all unstable soil and eliminate "boiling" or "quick" conditions to such depth as to provide a firm base. Over excavated materials shall be replaced with foundation material as specified in Standard Details. Over-excavation for purposes of these specifications will be deemed to include the loosening of subgrade material below the grade of the pipe or appurtenance, as well as the physical removal of material below the grade of the pipe or appurtenance. In the event of over-excavation, the Contractor shall provide, at this own expense, suitably compacted bedding material (D2.d), in place, to the required grade.

If the over-excavation consists of the loosening of the parent material below grade, the Contractor shall remove the loose material, at his own expense, and backfill with suitable bedding material as noted above. The suitability of such bedding material shall be approved by the Inspector.

D2.d FOUNDATION AND BEDDING

a. General

Proper preparation of foundation, placement of foundation material where required, and placement of bedding material shall precede the installation of all pipe. This shall include necessary leveling of the native trench bottom or the top of the foundation material as well as placement and compaction of required bedding material to a uniform grade. The entire length of pipe will rest firmly on a well compacted material.

2. Foundation

Where over-excavation has been necessary, foundation material (D1.j.1) shall be placed and compacted to form a suitable base for the replacement of the required thickness of bedding material. In no case shall coarse aggregate contain pieces larger than five (5) inches, measured along the line of greater dimension.

3. Bedding

Bedding shall consist of the leveling of the bottom of the trench or the top of the foundation material and the furnishing, placing, and compaction of bedding materials under the pipe and along the sides to a minimum depth of six (6) inches over the top of the pipe or as required by the Inspector. Minimum thickness of the layer of bedding material required under any portion of the pipe shall be four (4) inches for all pipe sizes of 27 inches diameter and smaller, and six (6) inches for all pipe sizes of 30 inches diameter and larger. Bedding material shall be thoroughly rammed and tamped around the pipe with the proper tools, so as to provide firm and uniform support over the full length of all pipe and fittings. Care shall be taken to prevent any damage to the pipe or its protective coating.

D2.e INSTALLATION OF PIPE AND FITTINGS

1. Alignment

Alignment shall be within 0.5 feet of the specified alignment.

2. Pipe Laying

Pipe laying shall be done in accordance with the specifications and instructions of the manufacturer of the kind of pipe used, subject to the approval of the Inspector. Tools designed especially for installing each particular type and kind of pipe shall be used. All pipe ends shall be square with the longitudinal axis of the pipe, maximum ¼" out of square as measured across the diameter of the pipe, and shall be reamed and otherwise smoothed so that good connections can be made. All operations for any special type of pipe, joint or connection shall be carefully done in accordance with the manufacturer's instructions.

Any installation, or repair which involves Asbestos-Cement pipe shall be in accordance with Puget Sound Air Pollution Control Agency guidelines for handling, removal and disposal of asbestos materials.

3. Contamination Prevention

Dirt or other foreign material shall be prevented from entering the pipe or appurtenances during handling or laying operations. Any pipe or fitting that has been installed with dirt or foreign material in it shall be removed, cleaned and relayed. The open ends of pipe and fittings shall be plugged with a temporary watertight plug whenever work is stopped and/or whenever water in the trench threatens to enter the pipe.

4. Blocking or Bracing

Concrete for Blocking or Bracing shall:

1) Be in accordance with the Standard Details.
2) Be placed in back of all fittings having unbalanced thrust.
3) Be placed so as to secure bearing on undisturbed earth.
4) Bear against fittings only, shall be clear of joints and have plastic wrapping so as to permit taking up or dismantling joint.
5) Be formed with lumber or timber.
6) Be free of entrapped air pockets, removal method as approved by District/Engineer.
7) Shall have a smooth finish.

Precast blocking shall not be used without prior written approval from the Inspector. Blocking shall not be covered up without approval of the Inspector.

D2.f INSTALLATION OF AUXILIARY EQUIPMENT

2. Valves

a. General

Valves shall be set at places designated by the District/Engineer. Before placing in the trench in a vertical position, each valve shall be carefully inspected for defects. The valve shall be bedded similar to pipe and fittings.

b. Valve Box

Cast iron valve boxes shall be set so they will be in a vertical alignment to the gate valve operating stem. The operating stem shall extend such that the operating nut is no more than 36" from finished grade. The lower casting of the unit is to be installed using ETHAFOAM pad ring, and shall not rest directly upon the body of the gate valve or upon the water main. The upper casting of the unit is to be placed in proper alignment and to such an elevation that its top will be at final grade. Lock down valve boxes to be used in off street application. Valve boxes shall be used in full sections only. Installation of partial sections is not allowed.

c. Valve Marker Posts

Painted concrete marker posts shall be set for all valves except auxiliary hydrant valves. The post shall be set at right angles to the road from the valve and shall be situated in a safe and reasonably conspicuous location, normally at the property line, with the approximate distance to the valve stenciled in 2" black numerals on the face of the marker post.

d. Air and Vacuum Relief Valve Assemblies

Installation shall be as shown in the Standard Details. The assembly shall be set at the high point of the line. A valve guard post shall be placed where there is danger of damage. The relief valve shall be suitable for installation by direct burial.

e. Blow-off Valve Assemblies

Installation shall be as shown in the Standard Details. The blow-off shall be installed in such a position and location that waste water can be disposed of without damage to surrounding property.

4. Fire Hydrant Assemblies

a. Hydrant

Fire hydrant assemblies shall be made and installed according to the Standard Details Each hydrant assembly shall be inspected and adjusted as above specified for valves. Hydrant trenches shall be excavated to not

more than two (2) feet beyond the back side of the hydrant. All hydrants shall remain bagged until the entire system is complete and accepted.

b. Piping

Hydrant laterals shall consist of a section of thickness class 52 D.I. (or approved equal) 6 or 8 inch pipe from the main to the hydrant and shall include an auxiliary gate valve set vertically and placed in the line as indicated in the standard drawing for hydrant settings.

c. Retainer Glands

Use MEGALUG retainer glands or Field-Loc gaskets at all joints within hydrant lateral. Where Field-Loc gaskets are used, paint bell blue for future identification.

3. Service Connection Equipment

All service connections to water mains shall be made using saddles of the size and type suitable for use with the pipe being installed. Care shall be exercised to assure that the main is not damaged by installation of the saddle.

Service pipe shall be either type "K" soft copper tubing or poly water service as specified in Paragraph D1.b. The depth of trenching for service connection piping shall provide three (3) feet of cover over the top of the pipe for that portion of the service connection located in public rights-of-way. That portion of the service connection located on private property shall have a minimum of 24 inches of cover. All connections to conform to the Uniform Plumbing Code, individual pressure reducing valves are recommended if supply pressure exceeds 80 psi.

D2.g CONNECTION TO EXISTING SYSTEM

1. General

Where connections to the existing system are to be made in existing pipes, the Work shall be conducted at such a time and in such a manner as to minimize the interruption of service. Necessary pipe, fittings, and valves shall be assembled at the site ready for installation prior to shutting-off of water in the existing main. Once the water has been cut-off, the Work shall be prosecuted vigorously and shall not be halted until the line is restored to service. Installation shall be as shown in the Standard Details.

No direct connections to the existing system will be allowed without an approved backflow prevention device until the newly constructed mains have been tested for pressure and purity and approved in accordance with District Standards.

The Contractor shall discuss the proposed interruption schedule with the District Manager a minimum of 48 hours prior to the requested time of interruption. The Contractor shall notify each of the affected water users in writing a minimum of 24 hours prior to the interruption. District personnel only are authorized to operate

District valves.

2. **"Cut-in" Connection**

The cut-in shall be as shown in the Standard Details, and shall be made only with the approval of and under direct inspection by the Inspector.

3. **"Tapping" Connection**

The tap shall be as shown in the Standard Details. A standard epoxy coated fabricated steel Split Tapping Sleeve shall be used. For 12" and larger main diameters a neoprene gasketed joint shall be used. For 10" and smaller main diameters a mechanical joint type shall be used (for tapping connection to AC mains, use split cast iron MJ tapping sleeve). The Tapping Sleeve, connected and tested (normal main pressure), in place with valve connected to tee shall be completed before tap is started in existing main.

D2.h BACKFILLING

1. **General**

Compaction and restoration must be done as detailed below and immediately after the trench is backfilled, so as to cause least disruption to traffic. Backfilling of trenches shall be made with the same materials excavated from the trenches unless these materials are found to be unsuitable by the Inspector. Prior to the backfilling, all form of lumber and debris shall be removed from the trench. Care shall be exercised to see that large rock, stumps, logs, etc., are excluded from material used for backfill. Machine backfilling shall be carried on so that the trench is continually filled from the end.

2. **Consolidation, Grading, and Compaction**

At locations where paved streets, driveways, or sidewalk will be constructed or reconstructed over the trench, or where the trench is greater than four (4) feet deep, or where provided for in the Special Provisions or directed by the Inspector, the backfill shall be mechanically compacted to 95% of maximum density. Throughout the length of any pipe run, backfill at depths over 4 feet shall be compacted to 90% maximum density by mechanical compaction. The top 4 feet of the trench line shall then be mechanically compacted to 95%. All densities shall be determined by testing specified in Section 2-03.3(14)D of WSDOT 1998 Standard Specifications. Contractors shall provide compaction reports to the District and the Engineer verifying the required compaction. A minimum of two compaction tests shall be taken for each 200 linear feet of main line trench, or as designated by the District Inspector; one test at subgrade and one at 50% of trench depth.

In any trench in which 95% density cannot be achieved with existing backfill, the top 4 feet shall be replaced with gravel base as specified in the WSDOT 1998 Standard Specifications, Section 9-03.10. This new material shall then be mechanically compacted to 95%.

Restoration of asphalt pavement shall include a minimum of 4 inches of crushed surfacing material and 2 inches of asphalt concrete Class B or comparable surfacing approved by the Engineer. Roadway shall then be overlaid full width with a minimum of 1 inch compacted asphalt concrete Class B. Any exceptions to this overlay requirement will be on a case-by-case basis, subject to approval by the Inspector. Concrete pavement shall be restored consistent with Section 5-05 of the WSDOT 1998 Standard Specifications. Any traffic lane affected by the trenching shall be replaced full-width.

3. Cuts Across Road Alignment

In general, utility trenching through existing pavement across the road alignment will be discouraged. It will not be permitted unless it can be shown that alternatives such as boring or jacking are infeasible, or unless the utility can be installed just prior to reconstruction or overlay of the road.

Without exception, the entire trench shall be backfilled with gravel backfill for pipe bedding or crushed surfacing top course meeting the requirements of Sections 9-03.12(3) and 9-03.9(3) of the WSDOT 1998 Standard Specifications respectively. Backfill shall be placed and compacted mechanically in 1-foot lifts with a County inspector present. After backfill and compaction, an immediate cold mix patch shall be placed and maintained in a manner acceptable to the Engineer. On asphalt pavement, a permanent hot mix patch the same thickness as the original asphalt or a minimum of 2 inches, whichever is greater, shall be placed and sealed with a paving grade asphalt within 30 calendar days. Cement concrete pavement shall be restored with a 8-sack mix, using either Type II or Type III cement, within 30 calendar days.

4. On Proposed Traveled Roadways (e.g. new subdivisions)

When working in areas of proposed traveled County roadway, backfill compaction shall be achieved throughout the entire depth of the trench by mechanical compaction as described in D2.h.2 above.

5. Excess or Insufficient Material

In all cases where it is not necessary to re-establish original ground level, excess material shall be heaped over the trench as additional mounding. Where necessary, excess material shall be removed and disposed of at the Contractor's expense and in a manner satisfactory to the District and the Engineer.
Imported materials required to properly complete backfilling shall be hauled in and placed by the Contractor at his own expense.

6. Holding Backfill on Steep Slopes

Where, in the opinion of the Inspector, there is a danger of backfill being washed away due to steepness of the slope in the direction of the trench, material shall be held in place as follows:

Backfill to eighteen (18) inches below the top of trench. Then, at intervals, as specified by the Inspector, two (2) 2 x 6 posts at least four (4) feet long, shall be

driven into the backfill, one on either side of the pipe, at about right angles to the slope of the ground, and broadside facing in the direction of the trench. These posts shall be supported on the downhill side by 2 x 4 stakes at least three (3) feet long, driven at an angle of 45 degrees, about twelve (12) inches into undisturbed ground in the trench sides. Tops of posts and stakes shall be driven approximately flush with the ground surface. Three (3) 2 x 6 crosspieces, cut to fit tightly between the trench sides, shall then be laid against the uphill sides of the posts, to form an 18-inch bulkhead, and then crosspieces and stakes shall be securely spiked to the posts. Backfilling shall then be completed as previously described.

7. Barricades

Newly backfilled and/or soft areas shall be immediately and adequately barricaded and marked to warn motorists and pedestrians. All driveways and road crossings shall be graveled when necessary. Proper and sufficient warning signs shall be so placed as to adequately warn the public away from hazardous areas.

D2.i PAVEMENT RESTORATION

1. General

Wherever possible, the Contractor shall make suitable arrangements with the District, or other authority having jurisdiction, to have the District or other authority take over the repavement and subsequent maintenance following backfill as described above. Should such arrangements not be made, repavement shall be as described below.

2. Time Interval

No repavement shall be attempted until after the backfill has been mechanically compacted or allowed to settle to a degree of compaction satisfactory to the Inspector (D2.h). During the period of settlement, the trench surface shall be maintained by the Contractor in such a manner as may be necessary to safely accommodate traffic.

3. Base Course

Where asphaltic concrete pavement has been cut for trenching, backfill shall be removed the width of the trench and to such depth as required to permit installation of six and one-half (6½) inch compacted depth of sub-grade gravel. The top surface shall be rolled or tamped to proper elevation to receive the final paving as called for. Where Portland Cement concrete paving has been cut for trenching, backfill shall be removed the width of the trench and to such depth as required to permit the installation of sub-grade material as may be required by the authority having jurisdiction.

4. Paving

a. Bituminous

Bituminous paving shall be of the same type and quality as the original pavement. Materials and method of construction shall be subject to approval by the Inspector.

b. Concrete

Concrete repavement shall be undertaken at such time as may be fixed by the authority having jurisdiction. Temporary repavement shall be six and one-half (6½) inches of crushed rock with a "Light Bituminous Surface Treatment" placed as soon after completion of backfill as the Inspector may direct. Final concrete repavement shall be made using Hi-early strength cement in the concrete, and shall provide the full original thickness. The surface shall be finished to match the existing pavement. Headers shall be installed at the junction with all existing pavement and expansion and contraction joints constructed where directed by the Inspector.

D2.j CLEANUP

1. Flushing Mains

Upon completion of pipe laying, the pipe shall be thoroughly flushed through all hydrants, blow-offs or other approved means to assure that all solids and contaminated materials have been removed. Flushing shall be accomplished as follows:

a. The Contractor shall schedule and organize his work so as to use flushing water during off-peak hours only.

b. The District and the Engineer shall be notified a minimum of 48 hours prior to the time of water main flushing.

c. Flushing shall be done only in the presence of a representative of the District.

d. Flushing shall be done through hydrant ports. Where hydrant ports are not available (dead ends) then a tap shall be provided large enough to develop a velocity of at least 2.5 fps in the main.

e. Each section of newly laid pipes between valves or dead ends shall be flushed independently.

f. Fire hydrants and other dead end appurtenances shall be flushed simultaneously with the main line.

g. When flushing after disinfection, the Contractor shall be responsible for the disposal of treated water flushed from the mains, and shall neutralize the

wastewater for protection of aquatic life in the receiving water before disposal into any natural drainage channel. The Contractor shall be responsible for disposing of disinfecting solution to the satisfaction of state and local authorities. Should the Contractor choose to flush to sewage collection system, these activities must be coordinated through the District.

h. Clear, clean, uncontaminated water used in flushing shall be directed to approved storm water runoff conveyance systems. Contractor shall use care to minimize erosion caused by flushing procedures.

2. Site Cleanup

a. Final cleanup work shall be completed as closely behind the construction work as it is physically possible to do so.

b. All excess material, rocks, logs, etc., shall be disposed of by the Contractor to the satisfaction of the Inspector. No debris shall be disposed of by dumping on private property without permission.

c. Drainage ditches affected by the construction operation shall be left in as good or better condition than what existed prior to beginning work.

d. Upon completion of all cleanup work, the entire site shall have a neat and workmanlike appearance.

SECTION D3. WATERWORKS TESTING

D3.a GENERAL

All pipe and appurtenances shall be cleaned, and shall be tested for leakage after backfill has been completed as specified. The Contractor shall furnish all labor, tools, equipment and materials necessary to make the tests and to perform any work incidental thereto.

The Contractor shall conduct preliminary tests and assure himself that the section to be tested is in an acceptable condition before requesting the Inspector to witness the test.

The District/Engineer at all times shall have access to the Work and to the locations where the Work is in preparation. The Developer at all times shall maintain proper facilities for such access.

Inspection and testing shall be in accordance with Control of Work Section of the Contract Documents.

D3.b DISINFECTION OF WATER MAINS

1. Procedure During Construction

In addition to the procedures for preventing contamination during pipe laying described in paragraph D2.e.3, the following procedures shall be maintained:

a. The interior of all pipe, fittings, and auxiliary equipment stockpiled on the project shall be kept free of dirt and other foreign matter at all times.

b. Prior to lowering the pipe or auxiliary equipment into the trench each item shall be carefully inspected inside and thoroughly cleaned of any dirt or foreign matter.

c. Cleaning shall consist of brushing or sweeping of fittings and the use of tight-fitting swabs for pipe cleaning.

d. Water used for rinsing or lubricating during construction shall contain 50 ppm chlorine.

e. A tight stopper or bulkhead shall be placed at the open end of the pipe at all times when pipe is not being inserted into the section already laid.

2. Procedure Prior to Operation

Before being placed into service, all new mains and repaired portions of, or extensions to existing mains shall be disinfected by chlorination. Dosage shall not be less than 50 ppm of available chlorine. A chlorine residual of not less than 10 ppm free chlorine shall remain in the water after standing 24 hours in the pipe. The chlorine shall be applied by placement of dry crystals directly in the pipe or the following method:

a. A solution containing approximately 5 percent available chlorine by weight shall be prepared by first making a paste of a chlorine-bearing compound and water and then thinning to the proper proportions with water to insure that all active ingredients are dissolved.

If HTH or Perchloren is used at 70 percent available chlorine, the proportions shall be six (6) pounds of compound per ten (10) gallons of water.

If Clor is used at 15 percent available chlorine, the proportions shall be one (1) part Clor per two (2) parts water.

b. The solution shall be applied through a corporation cock inserted in the horizontal axis of the pipe located at the beginning of the Extension or any valved section thereof. Injection of the solution shall be by means of a hypochlorinator, hand operated pump or motor operated pump approved by the District/Engineer.

c. Water from the existing distribution system, or other source of supply

approved by the District/Engineer, shall be controlled to flow very slowly into the newly laid pipe line during application of the chlorine. A color comparator set will be used to determine the chlorine residual of the entering water.

d. No connections shall be made between the existing distribution system and the pipelines not pressure tested and approved for purity constructed under this Contract without a Washington State Department of Health approved backflow prevention device installed in the connecting line. Any connection must be witnessed by the District/Engineer.

e. In the process of chlorinating newly laid pipe, all valves or other appurtenances shall be operated while the pipe line is filled with chlorinating agent and under normal operating pressure.

f. After the twenty-four hour detention period, all treated water shall be thoroughly flushed from the newly laid pipe at its extremity until the replacement water throughout its length shows, upon test, the absence of chlorine in excess of that carried in source of supply for flushing. All flushing methods shall conform to District standard D2.j.1.

g. After flushing, the Inspector will arrange for taking samples for bacterial tests.

h. The Inspector shall arrange the laboratory testing for purity, which normally takes 2 to 5 working days.

i. Should the initial treatment result in an unsatisfactory bacterial test, the original chlorination procedure shall be repeated by the Contractor until satisfactory results are obtained. Failure to get a satisfactory result on the bacterial test shall be considered as a failure of the Contractor to keep the pipe clean during construction, or to properly chlorinate the main, and Contractor shall be required to clean, repair or replace the newly constructed main until a satisfactory test is achieved. Water required for retesting and flushing shall be paid for by the developer.

D3.c HYDROSTATIC PRESSURE TEST

1. General

After the water mains have been disinfected and flushed, they shall be hydrostatically tested in sections of convenient length as approved by the Inspector.

The mains may be pressure tested prior to achieving purity as approved by the Inspector. However, the system to be tested must be physically separated from the District's Water System during such tests.

2. Equipment

The pumps, gauges, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished by the Contractor. Gauges used in the test shall have satisfactory certification of accuracy from a laboratory approved by the Engineer. Water meters used to measure water used to re-pressurize the line shall be positive displacement with a sweep unit hand registering 1 gallon per revolution as approved by the Inspector. Also water used to re-pressurize shall be pumped from a container sized and graduated appropriately to measure the amount of water used.

Where the District has water available for testing, it will be furnished without charge. Where water is not available from the District, the Contractor shall provide water for testing from a source approved by the Inspector.

3. Procedure

a. Preparation

1) Tests shall be made after corporation stops and service lines are installed.

2) Insofar as is practicable, tests shall be made prior to backfilling over any joints or fittings.

3) At points where pressure reaction and movement may occur, the pipe shall be properly blocked or braced. Where permanent blocking is not required, the Contractor shall furnish and install temporary blocking and remove it after testing.

4) Prior to calling out the Inspector to witness the pressure test, the Contractor shall have all equipment set up completely ready for operation and shall have successfully performed the test to assure himself that the pipe is in a satisfactory condition.

b. Test

1) The mains shall be filled with water and all air removed prior to starting the test.

2) The main shall then be pumped up to a hydrostatic pressure equal to 250 psi. In no case shall the test pressure exceed 200 percent of the safe working pressure of the class of pipe tested.

3) The pump shall then be stopped for a period of 15 minutes.

4) The main shall then be pumped up again to the test pressure.

5) The quantity of water required to restore the pressure shall then be recorded.

4. **Acceptance**

Acceptability of the test will be determined by two factors:

a. The quantity of water lost from the main during the 15 minute test period shall not exceed the quantities shown in the following table:

Pipe Diameter (inches)	6	8	10	12	14	16
Water Loss (GPH/1000 L.F. Pipe)	0.71	0.95	1.19	1.42	1.66	1.90
Water Loss/1000 L.F. Pipe (15 minute test)	0.18	0.24	0.30	0.36	0.42	0.48

These figures are established by the Ductile Iron Pipe Research Association.

b. There shall not be an appreciable or abrupt loss in pressure during the fifteen (15) minute test period.

D3.d OPERATIONAL TEST

After the Extension has been disinfected, passed the hydrostatic test and before final acceptance, the entire system shall be operated by the Contractor at normal pressure for a period of not less than ten (10) days. Any leaks or defects discovered in the system shall be repaired and the operational test continued until the system is satisfactory to the Inspector. Contractor shall verify that all service lines are active prior to final acceptance. No provision of this section shall be construed as waiving any provision of the Contractor's guarantee.

D4 WATER CONSTRUCTION STANDARD PLANS

PLAN 1 FIRE HYDRANT ASSEMBLY

PLAN 2 FIRE HYDRANT INSTALLATION SPECIAL CONDITIONS

PLAN 3 1-INCH SERVICE CONNECTION

PLAN 4 2-INCH SERVICE CONNECTION

PLAN 5 2-INCH BLOW-OFF

PLAN 6 CUT-IN TO EXISTING LINES

PLAN 7 HORIZONTAL CONCRETE BLOCKING

PLAN 8 VERTICAL CONCRETE BLOCKING

PLAN 9 PIPE ANCHORS

PLAN 10 VALVE BOX ASSEMBLY DETAIL

PLAN 11 VALVE BOX EXTENSION DETAIL

PLAN 12 FIRE SPRINKLER CONNECTION DETAIL FOR DDCV

PLAN 13 PRESSURE REDUCING VALVE VAULT DETAIL

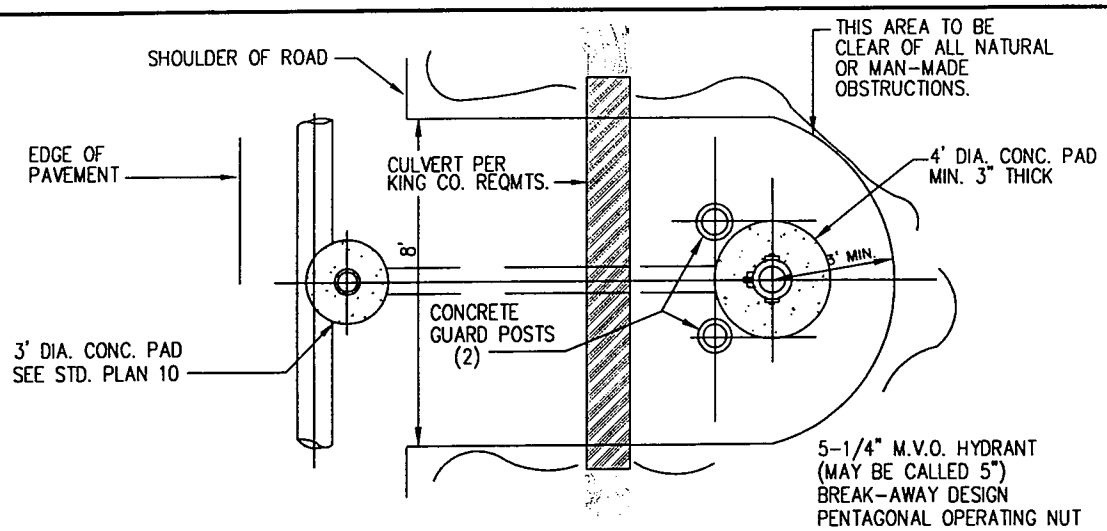
PLAN 14 DOUBLE DETECTOR CHECK ASSEMBLY

PLAN 15 STANDARD CASING DETAIL

PLAN 16 2-INCH AIR & VACUUM RELIEF VALVE

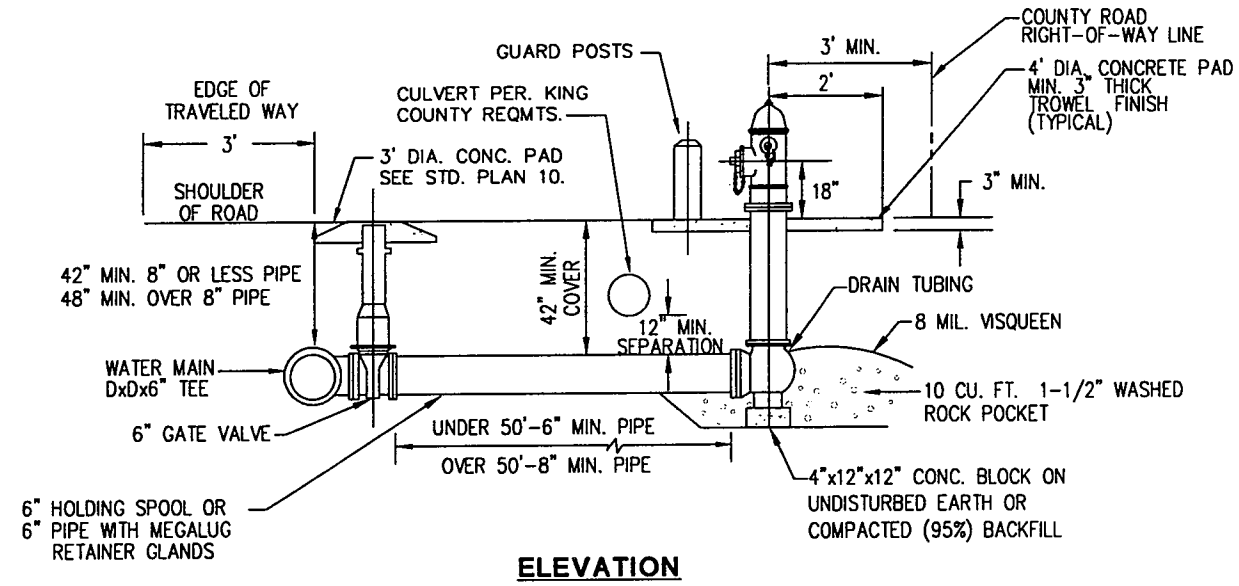
PLAN 17 GUARD AND MARKER POSTS

PLAN 18 HILL HOLDER



ADJUST ELEVATION OF THE MAIN, ADD VALVE CASE AND STEM EXTENSIONS, AND HYDRANT BARREL AND OPERATING STEM EXTENSIONS TO SUIT.

PLAN



ELEVATION

GENERAL NOTES:

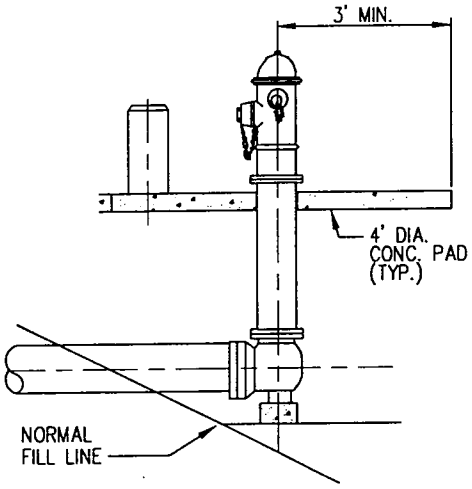
1. USE RESTRAINED JOINTS (MEGALUG RETAINER GLANDS, OR "FIELD LOK" GASKETS) AT ALL JOINTS WITHIN HYDRANT LATERAL. IF FIELD LOK GASKETS ARE USED, BELLS TO BE PAINTED BLUE.
2. TOP OF GATE VALVE OPERATING NUT SHALL BE A MAXIMUM OF 4' BELOW FINISHED GRADE. EXTEND AS REQUIRED.
3. HYDRANT SHALL BE PRIME-COATED WITH STEELCOTE SR-53, HEAVY DUTY BRUSH TYPE OR APPROVED EQUAL. TOP COATS SHALL BE STEELCOTE ACID AND OIL RESISTANT ENAMEL NO. 44-68, COLOR: WHITE, BRUSH TYPE OR APPROVED EQUAL.
4. STENCIL ON FACE OF HYDRANT BARREL WITH 2" CONTRASTING LETTERS. THE DISTANCE FROM THE HYDRANT TO G.V. IN FEET AND INCHES.
5. FINISH ALL EXPOSED METAL PER SPECIFICATIONS.
6. GUARD POSTS TO BE USED ONLY AS DIRECTED BY DISTRICT INSPECTOR.

FIRE HYDRANT ASSEMBLY

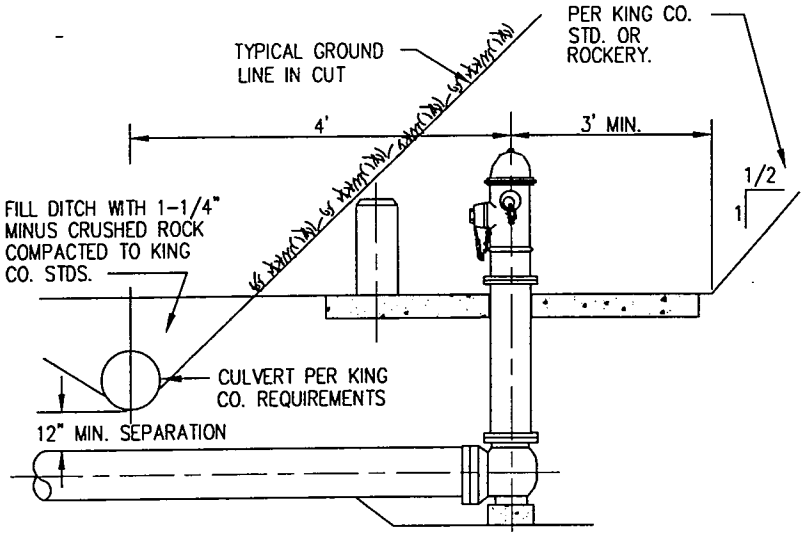
Penhallegon Associates
Consulting Engineers, Inc.

WATER CONSTRUCTION STD. PLAN NO. 01

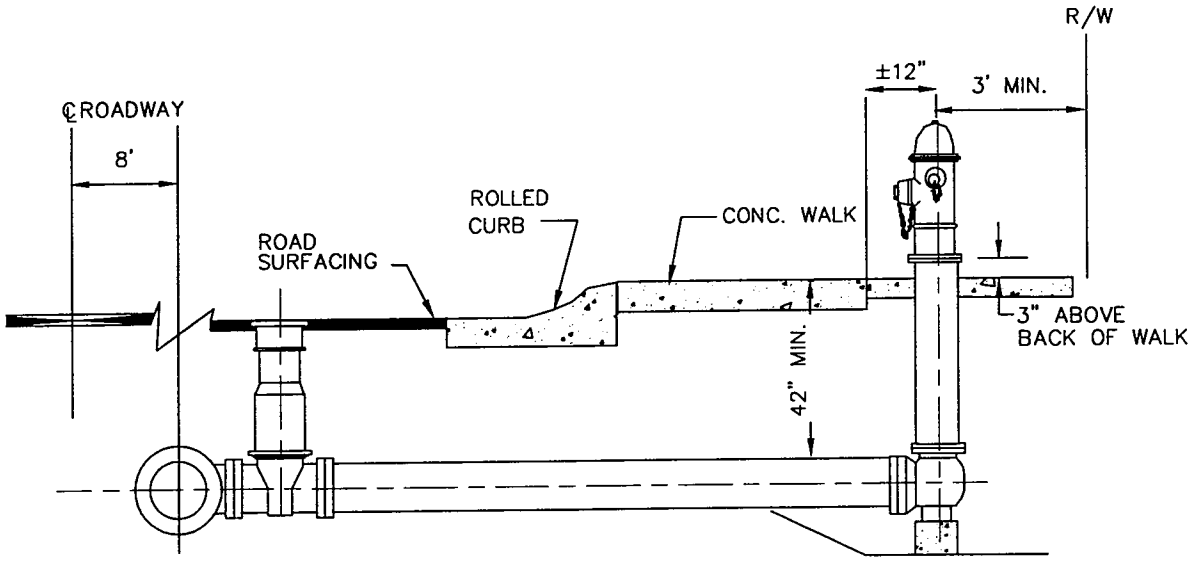
CEDAR RIVER WATER & SEWER



INSTALLATION IN ROAD FILL



INSTALLATION IN ROAD CUT

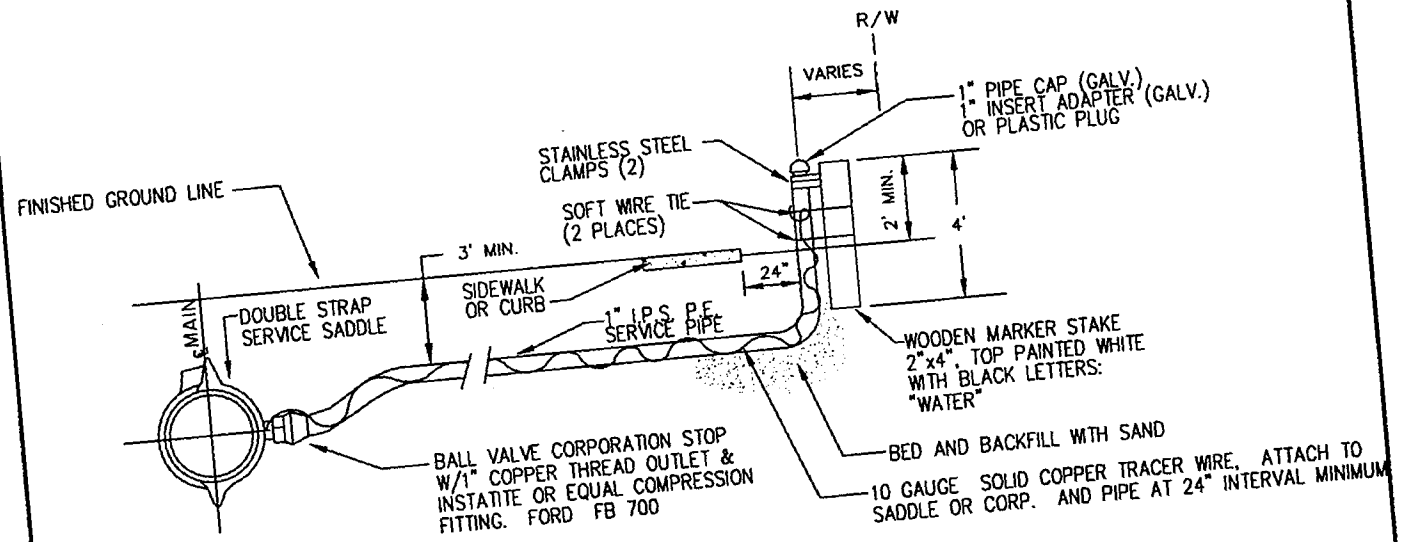


NOTE:
GUARD POSTS NOT REQUIRED UNLESS SPECIFIED BY THE ENGINEER.

INSTALLATION WITH CURB & SIDEWALK

FIRE HYDRANT INSTALLATION SPECIAL CONDITIONS

Penhallegon Associates Consulting Engineers, Inc.	**WATER CONSTRUCTION STD. PLAN No. 02**	CEDAR RIVER WATER & SEWER CRWS



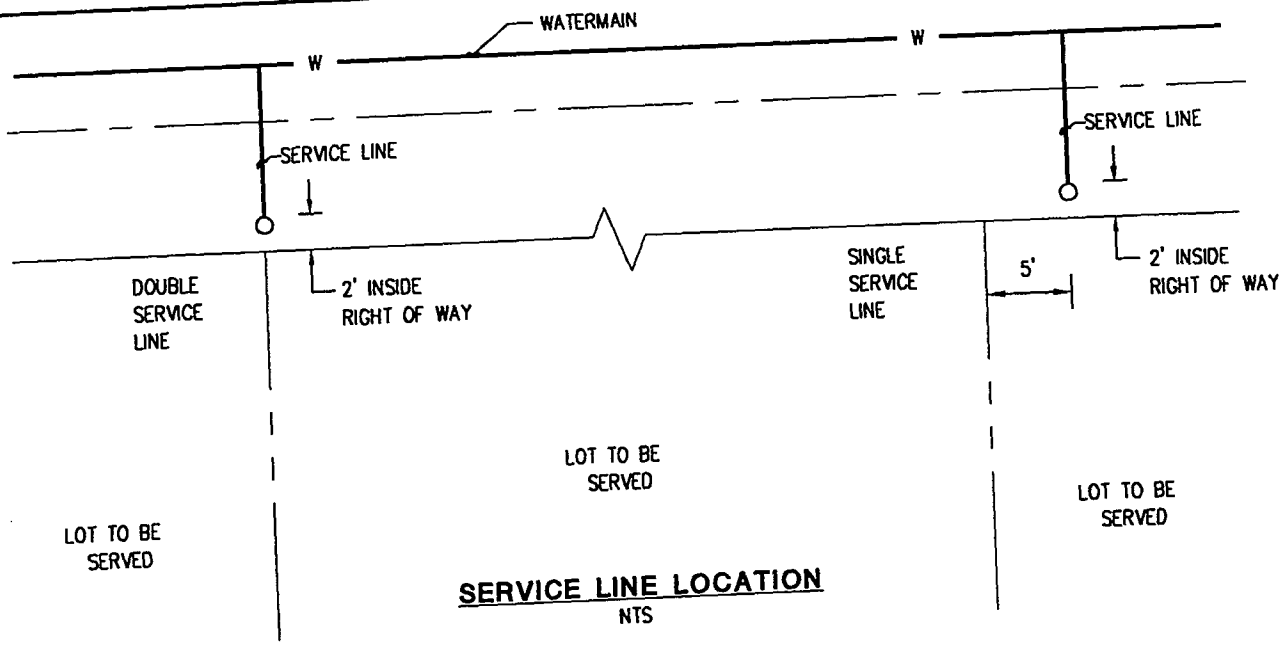
1 INCH SERVICE CONNECTION

NTS

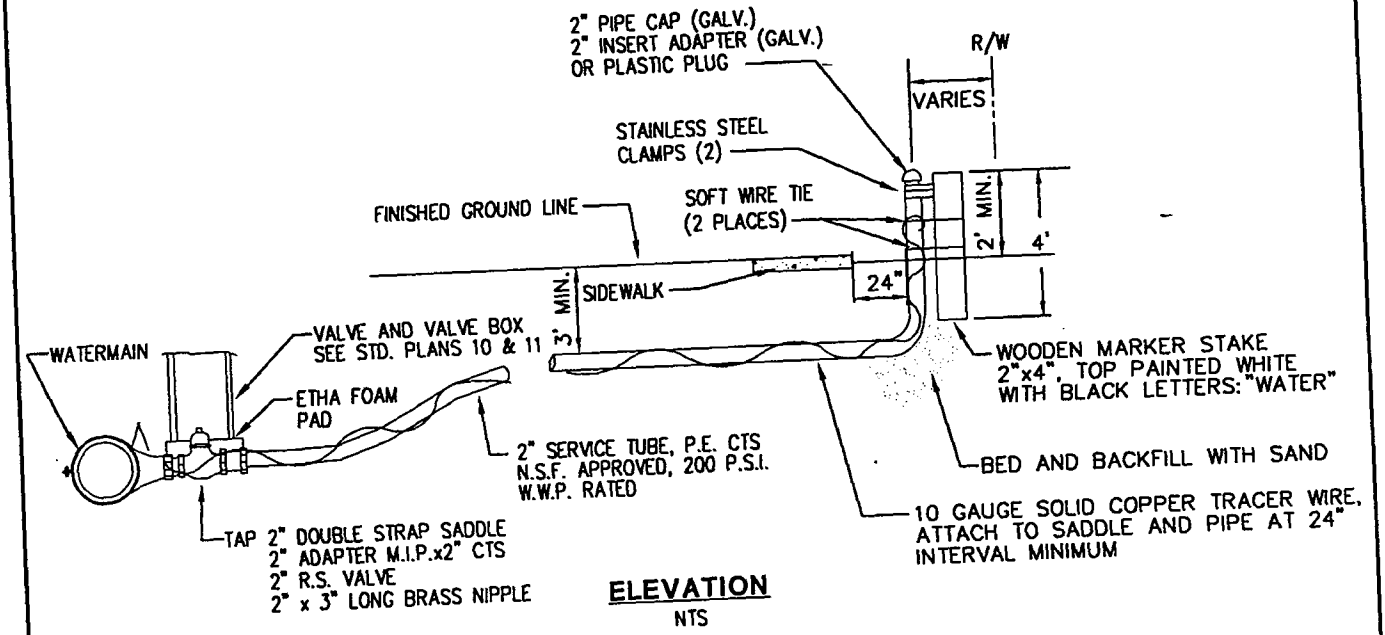
Penhallegon Associates
Consulting Engineers, Inc.

WATER CONSTRUCTION
STD. PLAN No. 03

CEDAR RIVER WATER & SEWER
CRWS



SERVICE LINE LOCATION
NTS



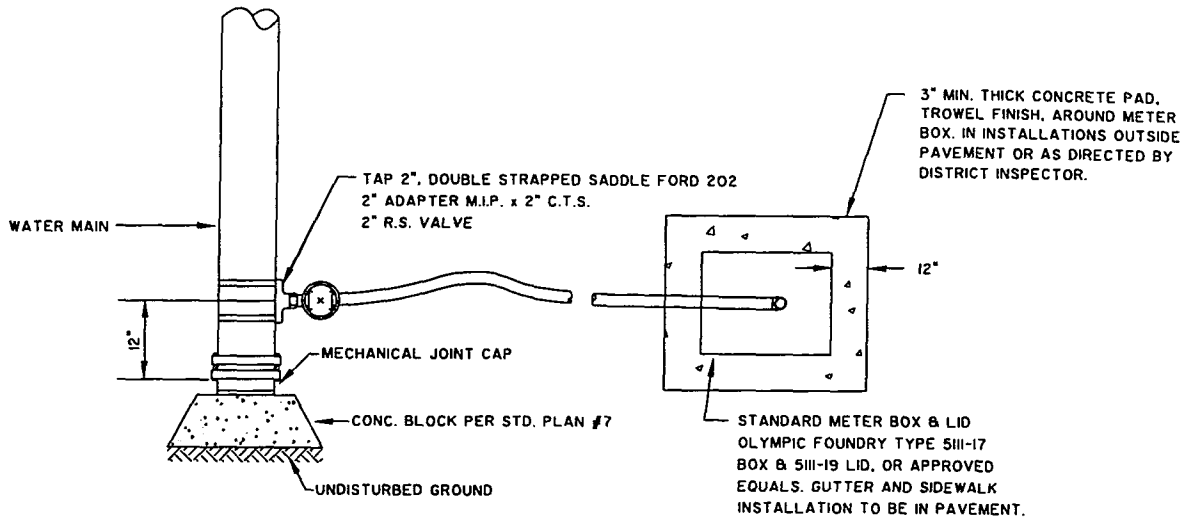
ELEVATION
NTS

2 INCH SERVICE CONNECTION

Penhallegon Associates
Consulting Engineers, Inc.

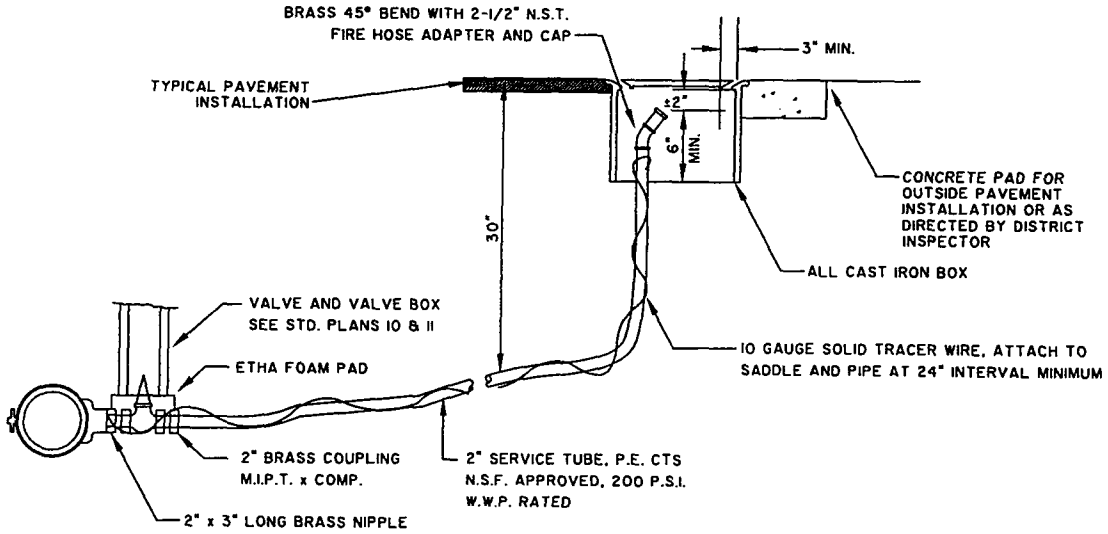
WATER CONSTRUCTION STD. PLAN No. 04

CEDAR RIVER WATER & SEWER
CRWS



PLAN

N.T.S.



ELEVATION

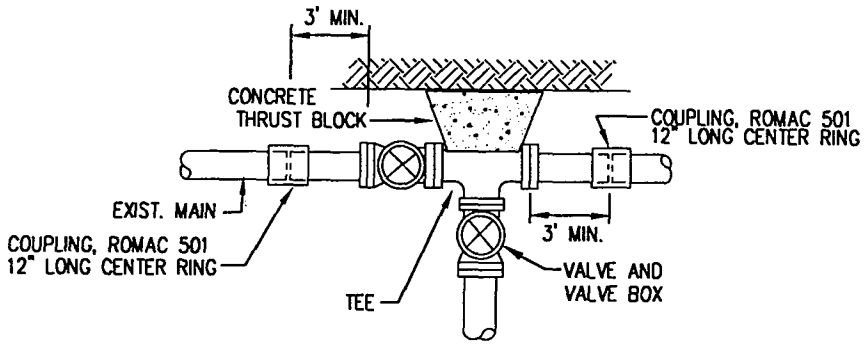
N.T.S.

2" BLOW-OFF

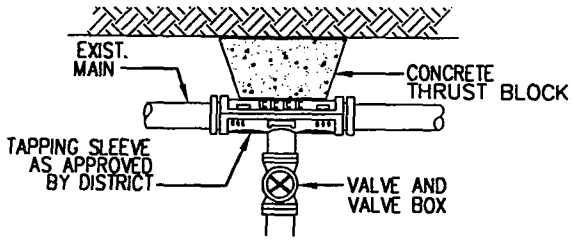
Penhallegon Associates
Consulting Engineers, Inc.

WATER CONSTRUCTION
STD. PLAN No. 05

CEDAR RIVER WATER & SEWER

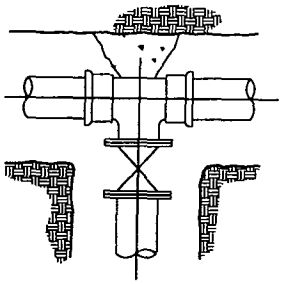


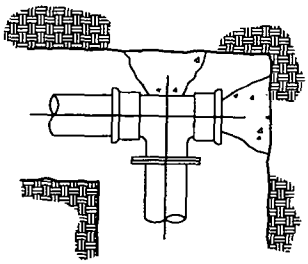
NON-PRESSURIZED

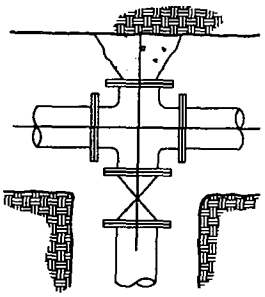


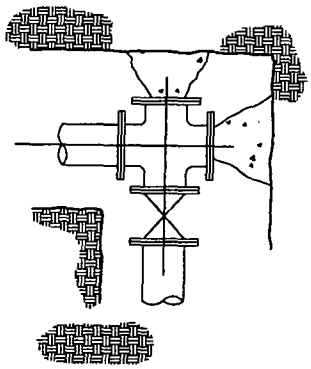
PRESSURIZED

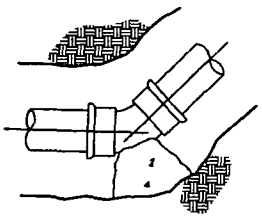
CUT-IN TO EXISTING LINES











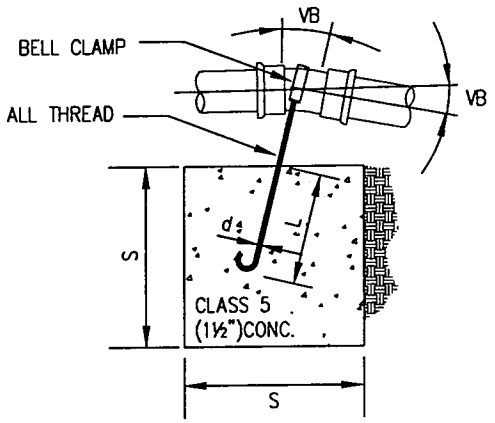
PIPE SIZE dia. in.	BEARING AREA of BLOCK sq. ft.					
	TEES & BENDS	90° BEND	45° BEND	22½° BEND	11¼° BEND	11¼° BEND
4"	3	3	1	1	1	1
6"	4	4	2	1	1	1
8"	7	7	4	2	1	1
10"	11	11	6	3	2	2
12"	16	16	9	5	3	3
16"	20	28.5	16	8	4	4

Notes:

1. All thrust blocks shall be formed in place. Blocks shall not be backfilled prior to specific approval by the District inspector, and the first stages of the concrete curing process is evident.
2. Minimum bearing areas based on 250 p.s.i. water pressure, and allowable soil bearing load of 2,000 pounds per square foot.
3. areas shall be adjusted for other pipe sizes, pressures and soil conditions.
4. Concrete blocking shall be cast in place and shall have a minimum or 1/4 square foot bearing against the fitting.
5. Concrete blocking shall bear against fittings only and shall be clear of joints to permit dismantling or other work.
6. Blocking shall withstand full test pressure as well as normal operating pressures under all conditions of service.
7. Gate valves shall be anchored to concrete blocking with bearing areas as shown in table.
8. See D2.e.4 blocking or bracing.

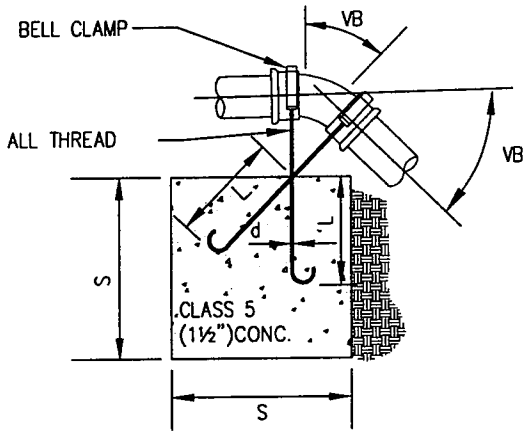
HORIZONTAL CONCRETE BLOCKING

TYPE "A" BLOCKING
FOR 11¼°/22½° VERTICAL BENDS



TYPE "A" BLOCKING FOR 11¼°/22½° VERTICAL BENDS						
		VB		S	d	L
PIPE SIZE Nom. diameter – inches	TEST PRESSURE psi	VERTICAL BEND degrees	CONC. BLOCKING cu. ft.	SIZE OF BLOCK feet	DIAMETER OF SHACKLE RODS inches	DEPTH OF RODS IN CONCRETE feet
4"	300	11¼°	8	2.0	3/4"	1.5
		22½°	11	2.2		2.0
6"	300	11¼°	11	2.2	7/8"	2.0
		22½°	25	2.9		
8"	300	11¼°	16	2.5	7/8"	2.0
		22½°	47	3.6		
12"	250	11¼°	32	3.2	7/8"	2.0
		22½°	88	4.5	7/8"	3.0
16"	225	11¼°	96	4.5	7/8"	3.0
		22½°	215	6.0	1–¼"	4.0

TYPE "B" BLOCKING
FOR 45° VERTICAL BENDS



PAINT SHACKLE RODS WITH
2 COATS OF COAL TAR OR
ASPHALT PAINT

TYPE "B" BLOCKING FOR 45° VERTICAL BENDS						
4"	300	45°	30	3.1	5/8"	2.0
6"			68	4.1		
8"			123	5.0		
12"	250		232	6.1	7/8"	2.5
16"	225		478	7.8	1–1/8"	4.0

All others To be designed by Engineer

VERTICAL CONCRETE BLOCKING

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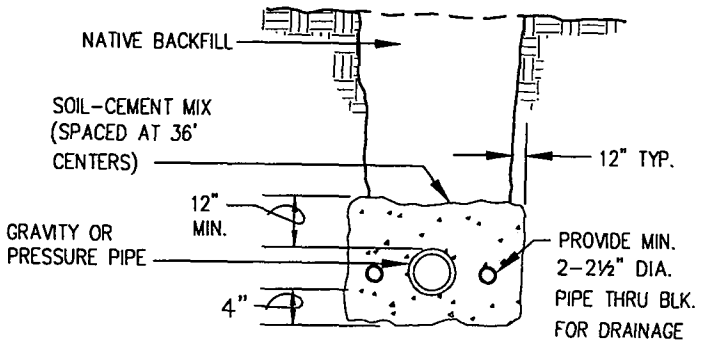
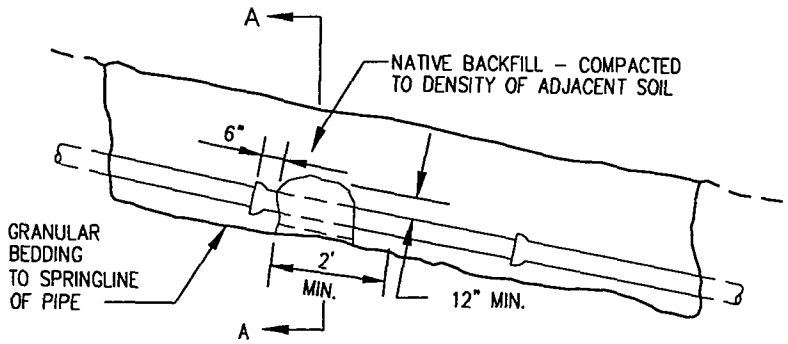
WATER CONSTRUCTION
STD. PLAN No. 08

CEDAR RIVER WATER & SEWER

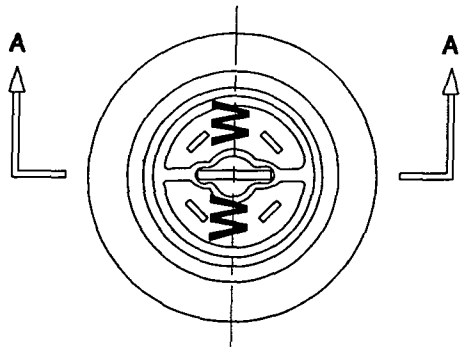




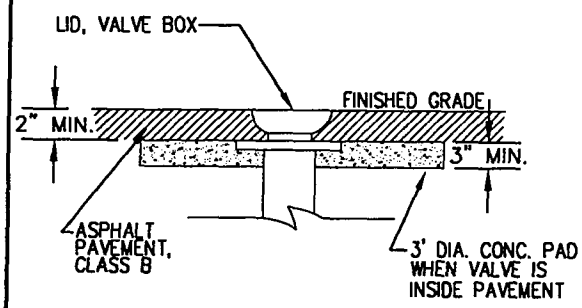
Soil cement blocks placed over and around pipe. Tamped into place before placing backfill. Use 10 percent cement with 90 percent native soil and water to suit to form a dry mix that will hold its shape when molded into a ball. Omit soil cement blocks on slopes less than 15 percent

PIPE ANCHORS

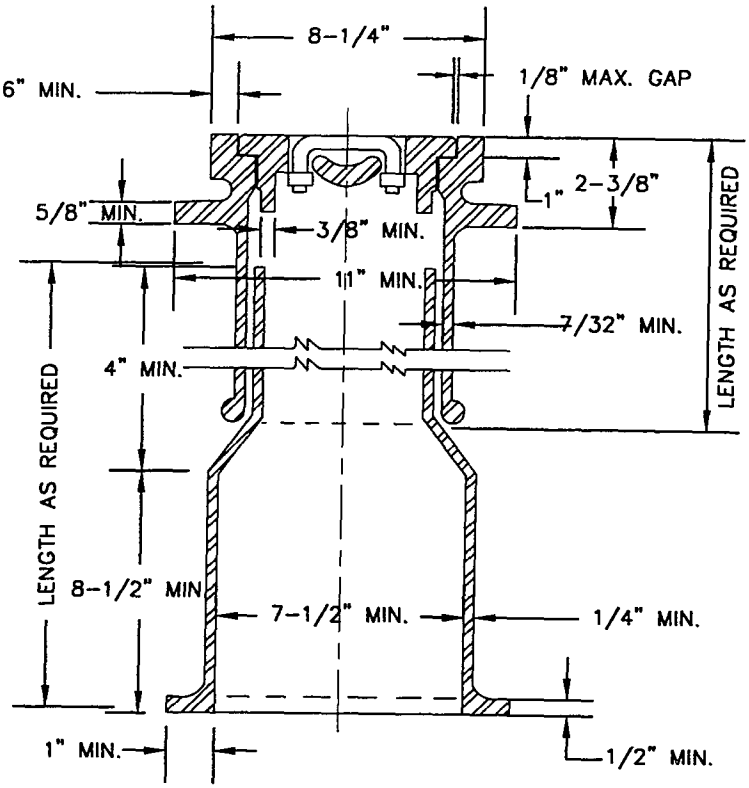
Note: " Field-Lok® Gasket can be used as an alternate to Pipe Anchors.



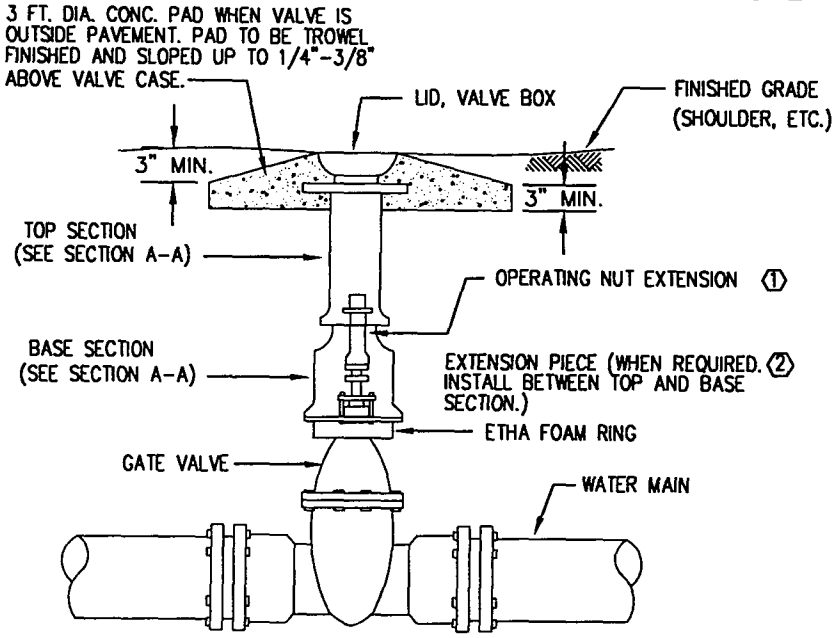
PLAN



TOP SECTION
PAVEMENT INSTALLATION



SECTION A-A



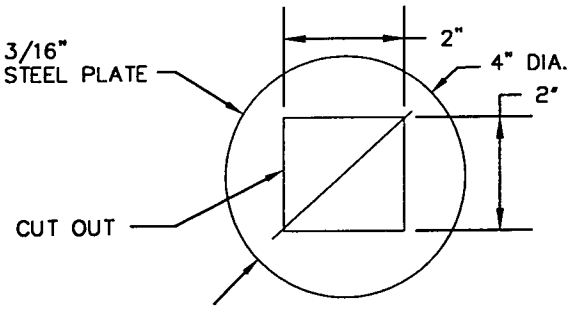
CAST IRON VALVE BOX ASSEMBLY
TYPICAL SETTING DETAIL

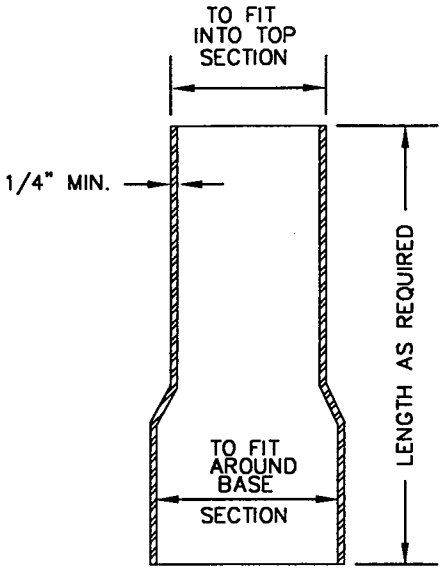
VALVE BOX ASSEMBLY DETAIL

Penhallegon Associates
Consulting Engineers, Inc.

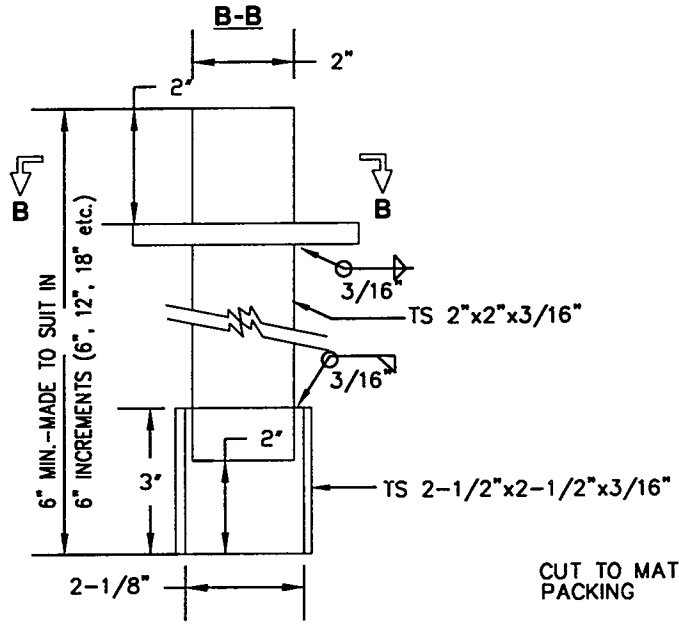
WATER CONSTRUCTION
STD. PLAN No. 10

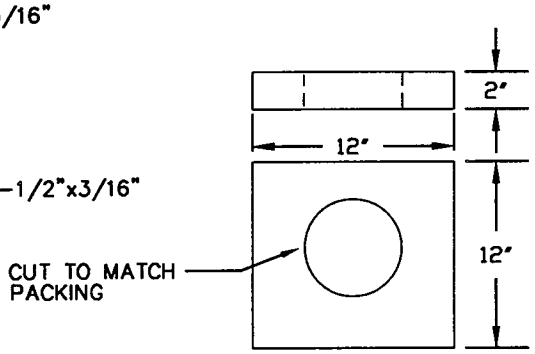
CEDAR RIVER WATER & SEWER
CRWS





EXTENSION PIECE ② (WHEN REQUIRED)





OPERATING NUT EXTENSION DETAIL

PLASTIC FOAM GASKET DETAIL
ETHA FOAM PAD RING

NOTES:

FRAME AND COVER SHALL BE TESTED FOR ACCURACY OF FIT AND SHALL BE MARKED IN SETS FOR DELIVERY.

CASTINGS AND EXTENSIONS SHALL BE HOT-DIPPED IN ASPHALTIC VARNISH, ROYSTON ROSKOTE #612XM OR APPROVED EQUAL.

VALVE BOXES SHALL BE RICH #045, TOP SECTION, LID, AND BASE; OR OLYMPIC FOUNDRY LID #1908-33, TOP SECTION #1106-33, BASE SECTION #1301-33; OR APPROVED EQUAL.

ALL CASTINGS SHALL BE DUCTILE OR GREY CAST IRON.

① AN OPERATING NUT EXTENSION SHALL BE INSTALLED WHEN THE GROUND SURFACE IS MORE THAN 40" ABOVE THE VALVE OPERATING NUT. THE OPERATING NUT EXTENSION SHALL EXTEND TO APPROXIMATELY 24" FROM FINISHED GRADE.

② EXTENSION PIECES (WHEN USED) SHALL CONFORM TO THE MINIMUM THICKNESS REQUIREMENTS AND SHALL FIT INTO THE TOP SECTION AND OVER THE BOTTOM SECTION.

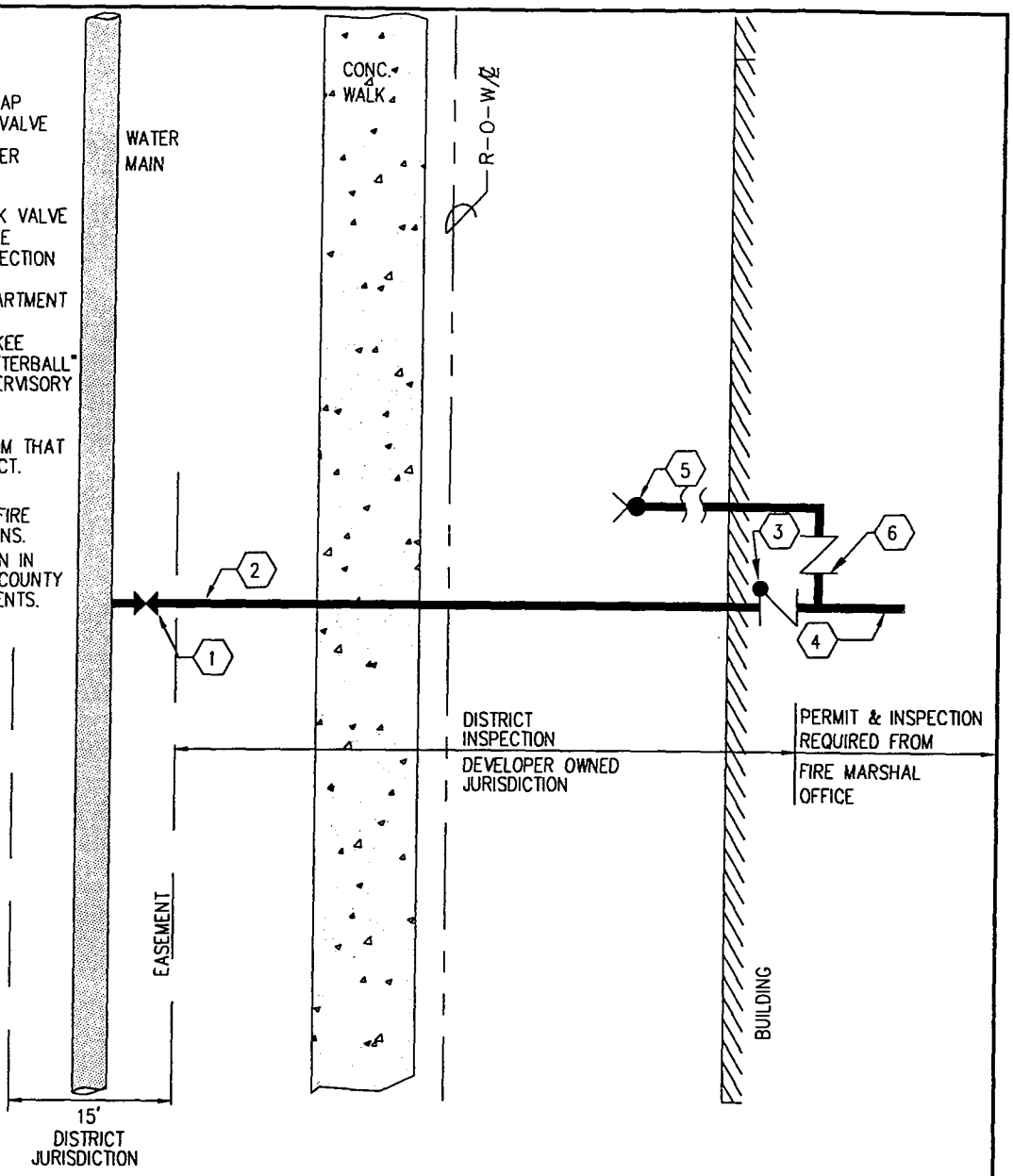
VALVE BOX EXTENSION DETAIL

Penhallegon Associates
Consulting Engineers, Inc.

WATER CONSTRUCTION
STD. PLAN No. 11

CEDAR RIVER WATER & SEWER
CRWS

1. D.I. TEE OR DOUBLE STRAP SADDLE AND R.S. GATE VALVE
2. TYPE K ANNEALED COPPER OR D.I. PIPE
3. DOUBLE DETECTOR CHECK VALVE IN ACCORDANCE WITH THE CURRENT U.L. FIRE PROTECTION SPECIFICATIONS AND THE WASHINGTON STATE DEPARTMENT HEALTH APPROVED LIST. INSTALLED W/2" MILWAUKEE VALVE SLOW CLOSE "BUTTERBALL" VALVE W/ MONITOR SUPERVISORY SWITCH, OR EQUAL. INSTALL DDCU IN FIRE SPRINKLER CONTROL ROOM THAT IS ACCESSIBLE TO DISTRICT.
4. PIPING IN ACCORDANCE WITH THE CURRENT U.L. FIRE PROTECTION SPECIFICATIONS.
5. FIRE DISTRICT CONNECTION IN ACCORDANCE WITH KING COUNTY FIRE MARSHAL REQUIREMENTS.
6. CHECK VALVE



FIRE SPRINKLER CONNECTION DETAIL FOR 3" AND UNDER SUPPLY LINE

NTS

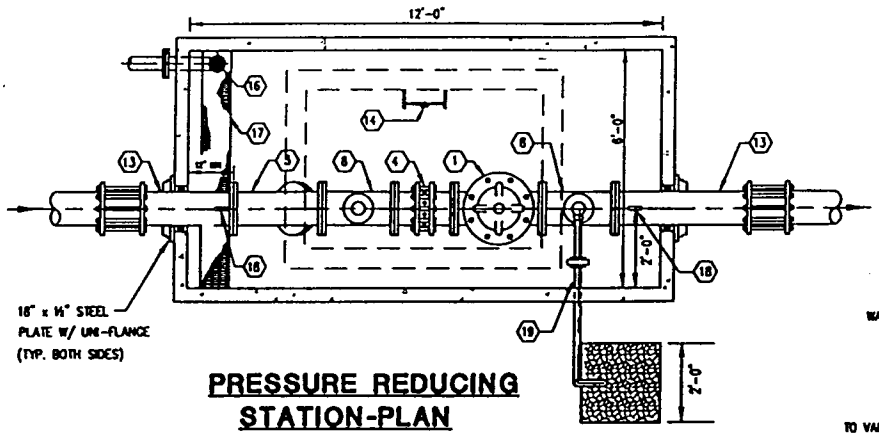
(FOR LARGER SUPPLY LINE SEE STANDARD PLAN 14)

NOTES:

1. PIPING, VALVE AND METER SIZES SHALL BE DESIGNED, SIZED AND CERTIFIED BY A CERTIFIED FIRE SYSTEMS DESIGNER, AND APPROVED BY THE KING COUNTY FIRE MARSHAL AND THE CEDAR RIVER WATER AND SEWER DISTRICT, PRIOR TO CONSTRUCTION.
2. ALL CONSTRUCTION SHALL CONFORM TO THE CEDAR RIVER WATER AND SEWER DISTRICT STANDARD SPECIFICATIONS AND THE U.L. FIRE PROTECTION SPECIFICATIONS.

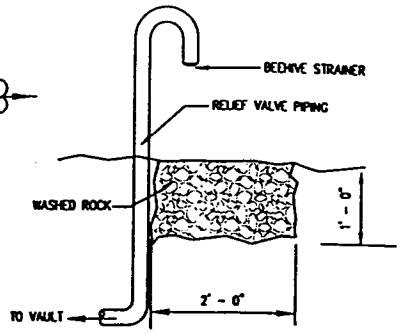
FIRE SPRINKLER CONNECTION DETAIL FOR DDCV

Penhallegon Associates Consulting Engineers, Inc.	**WATER CONNECTION STD. PLAN No. 12**	CEDAR RIVER WATER & SEWER CRWS



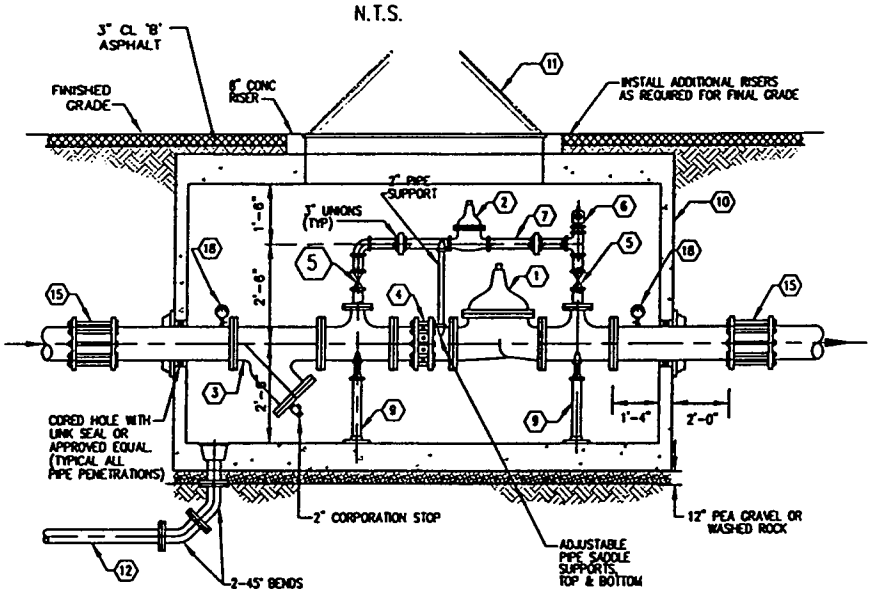
PRESSURE REDUCING STATION-PLAN

N.T.S.



GRAVEL SUMP DETAIL

N.T.S.



SECTION

N.T.S.

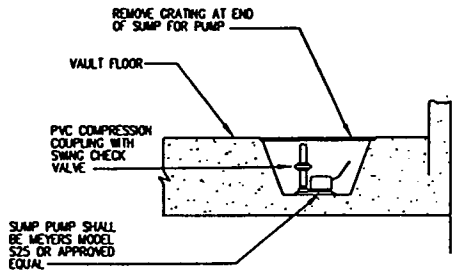
ITEM	DESCRIPTION
1	8" PRV, CLA VAL NO. 92-01 BCS W/ EPOXY LINING, VALVE POSITION INDICATOR, & SIGHT GAUGE SPEED CONTROL.
2	3" PRV, CLA VAL NO. 92-01 BCS W/ EPOXY LINING, AND VALVE POSITION INDICATOR, & SIGHT GAUGE SPEED CONTROL.
3	8" STRAINER, MUELLER NO. 751 Y TYPE OR APPROVED EQUAL, FL X FL.
4	FLANGED COUPLING ADAPTER, SMITH-BLAIR NO. 912 OR APPROVED EQUAL W/ ANCHOR STUDS.
5	3" R.S. GATE VALVE W/ HANDWHEEL, THREADED.
6	2" PRESSURE RELIEF VALVE, CLA VAL NO. 50-A01.
7	3" THREADED BRASS PIPE, UNION & FITTINGS (ALL BYPASS PIPING).
8	8" X 4" D.I. TEE, FL X FL, W/ 4" BLIND FLANGE TAPPED FOR 3".
9	ADJUSTABLE PIPE SUPPORT, GRINNEL NO. 264 OR APPROVED EQUAL.
10	6' X 12' END SUMP VAULT W/SOLID WALLS (NO KNOCKOUTS), UTILITY VAULT NO. 612-LA OR APPROVED EQUAL. ALL JOINTS ARE TO BE GROUTED.
11	4' X 6' DOUBLE LEAF ALUMINUM HATCH, LW PRODUCTS CO. HD-2C FOR TRAFFIC AREAS, H-2C FOR FOR NON-TRAFFIC AREAS.
12	4" D.I. DRAIN TO DAYLIGHT W/ RODENT-PROOF SCREEN AT DAYLIGHT OR CONNECT TO STORM STRUCTURE.
13	8" D.I. FL X PE SPOOL.
14	FREESTANDING ALUMINUM LADDER, WITH "LADDER-UP" SAFETY POST, BILCO CO. MODEL 2 OR APPROVED EQUAL, ATTACH TO SIDE OF HATCH AND FLOOR.
15	LONG SLEEVE C.I. COUPLING, SMITH-BLAIR NO. 441 OR APPROVED EQUAL.
16	4" FLOOR DRAIN, ZURN NO. 551 W/ GRATING ON INLET.
17	FLOOR SUMP W/GALVANIZED GRATING.
18	1/2" BRASS BALL VALVE TAPPED INTO PIPE CONNECT 2" S.S. GLYCERINE FILLED PRESSURE GAUGE, 0-160 PSI ON OUTLET SIDE, 0-200 PSI ON INLET SIDE . FIGURE INTERVAL AT 2 PSI GRADUATION INTERVAL, MOSHOK 40.500 OR EQUAL.
19	2" BRASS PRESSURE RELIEF DISCHARGE LINE WITH UNION, 180° RETURN ELBOW & BEEHIVE STRAINER 2' ABOVE GRADE. DRILL 1/8" HOLE IN PIPE DIRECTLY ABOVE RELIEF VALVE, COORDINATE DISCHARGE LOCATION W/DISTRICT.

NOTES:

1. PROVIDE RECESSED DOOR HANDLE BOX IN ACCESS HATCH FOR PADLOCK W/BOLT-DOWN COVER OVER LOCK, BOX LARGE ENOUGH FOR "MASTER LOCK".
2. ALL PIPING TO BE PAINTED WITH ONE COAT PRIMER & 2 COATS KRYLON LIGHT FORD ENGINE BLUE (COLOR TO BE APPROVED BY DISTRICT) SUBMIT SUPPLIER CUTS ON ALL MATERIALS TO BE USED FOR APPROVAL.

   EXTERIOR OF VAULT TO BE COATED WITH 2 COATS OF BLACK BITUMASTIC SOLUTION. VAULT SHALL BE DRY PRIOR TO APPLICATION

NOTE: SUMP PUMP MAY BE SUBSTITUTED FOR FLOOR DRAIN IF DRAIN LINE CANNOT BE DAYLIGHTED. (DETERMINATION TO BE MADE BY DISTRICT.)



SUMP PUMP DETAIL

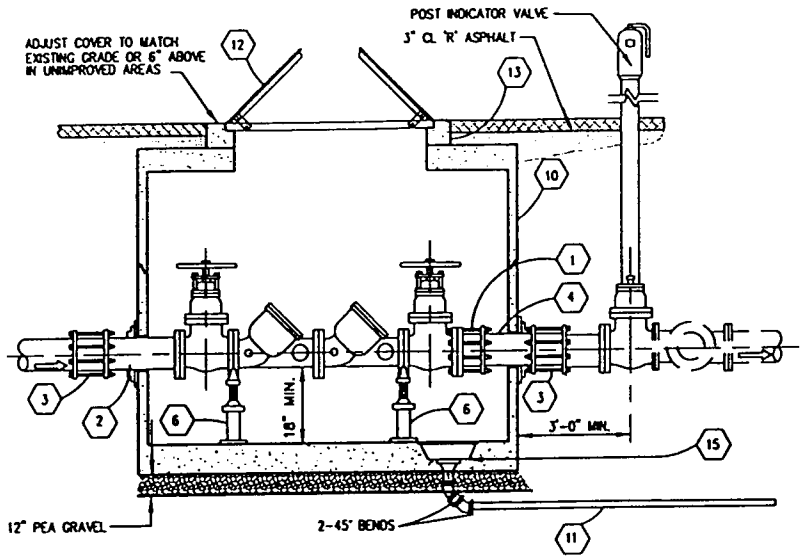
N.T.S.

PRESSURE REDUCING VALVE VAULT DETAIL

Penhallegon Associates
Consulting Engineers, Inc.

WATER CONSTRUCTION STANDARD PLAN No. 13

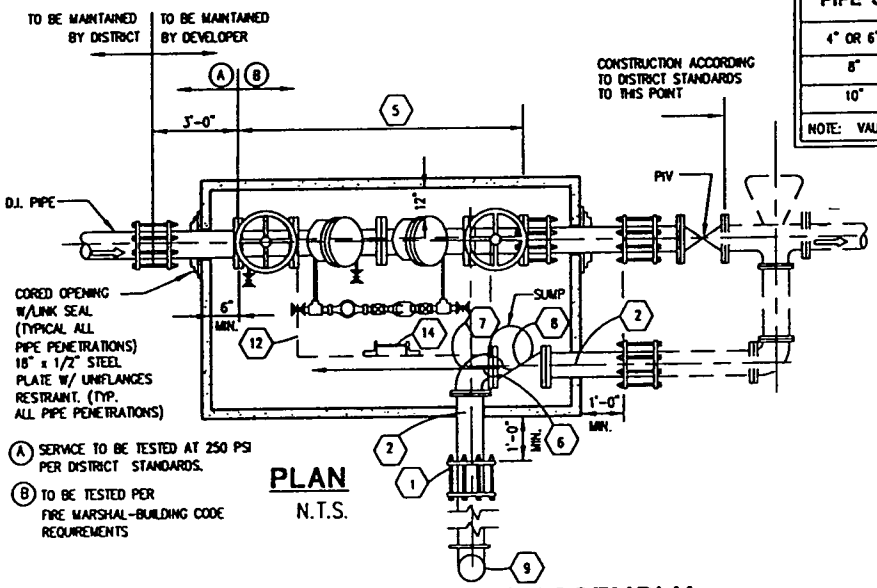
CEDAR RIVER WATER & SEWER



ELEVATION

NTS

ITEM	DESCRIPTION
1	FL COUPLING ADAPTER
2	FL X PE SPOOL
3	MJ COUPLING
4	PE SPOOL
5	U.L. APPROVED DOUBLE DETECTOR CHECK VALVE ASSEMBLY, FEBCO MODEL 806 DOC OR EQUAL
6	ADJUSTABLE PIPE SUPPORT, GRINNEL NO. 264 OR APPROVED EQUAL
7	FL 90° BEND
8	FL CHECK VALVE
9	FIRE DEPARTMENT CONNECTION - BASED ON FIRE MARSHAL REQUIREMENTS
10	PRE-CAST VAULT, SEE CALL OUT BELOW
11	4" D.I. DRAIN PIPE TO DAYLIGHT. PROVIDE RODENT-PROOF SCREEN AT DAYLIGHT OR CONNECT TO STRUCTURE
12	4' X 6' ALUMINUM HATCH, LW PRODUCTS COMPANY HD-2C OR EQUAL FOR TRAFFIC AREAS, D-2C FOR NON-TRAFFIC AREAS
13	8" CONC. RISER
14	ALUMINUM LADDER W/"LADDER UP" EXTENSION. ATTACH TO SIDE OF HATCH AND FLOOR
15	4" FLOOR DRAIN, ZURN NO. 551 W/GRATING ON INLET



PLAN

N.T.S.

PIPE SIZE	UTILITY VAULT NO. (OR APPROVED EQUAL)
4" OR 6"	675-LA W/676-LA BOTTOM SECTION
8"	687-LA
10"	5106-LA
NOTE: VAULTS TO BE SOLID WALL WITH NO KNOCKOUTS	

NOTES:

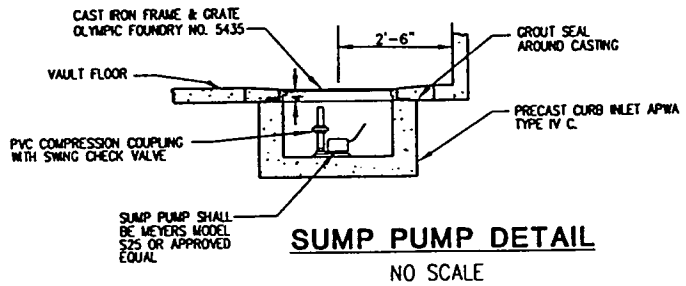
1. ALL VAULT PENETRATIONS SHALL BE CORED, WITH LINK -SEAL OR APPROVED EQUAL INSTALLED AROUND PIPE.
2. ALL PIPE AND FITTINGS TO BE DUCTILE OR CAST IRON.
3. ALL PIPING SHALL BE PAINTED WITH ONE COAT PRIMER AND TWO COATS OF KRYLON LIGHT FORD ENGINE BLUE (COLOR TO BE APPROVED BY THE DISTRICT). SUBMIT SUPPLIER CUTS ON ALL MATERIALS TO BE USED, FOR APPROVAL.
4. IF SUMP PUMP IS REQUIRED, DEVELOPER SHALL SUPPLY POWER TO THE VAULT IN CONFORMANCE WITH ALL LOCAL AND STATE CODES.
5. ALL TEST COCKS SHALL BE PLUGGED.
6. EXTERIOR VAULT TO BE COATED WITH 2 COATS OF BLACK BITUMASTIC SOLUTION. VAULT TO BE DRY PRIOR TO APPLICATION.

DOUBLE DETECTOR CHECK ASSEMBLY

NO SCALE

PIPING, VALVE AND METER SIZES SHALL BE DESIGNED, SIZED AND CERTIFIED BY A CERTIFIED FIRE SYSTEM DESIGNER, AND APPROVED BY THE KING COUNTY FIRE MARSHAL AND THE CEDAR RIVER WATER AND SEWER PRIOR TO CONSTRUCTION.

ALL CONSTRUCTION SHALL CONFORM TO THE CEDAR RIVER WATER AND SEWER DISTRICT STANDARD SPECIFICATIONS AND THE U.L. FIRE PROTECTION SPECIFICATIONS.



NOTE:
SUMP PUMP MAY BE SUBSTITUTED FOR FLOOR DRAIN IF DRAIN LINE CANNOT BE DAYLIGHTED. (DETERMINATION TO BE MADE BY DISTRICT.)

SUMP PUMP DETAIL

NO SCALE

DOUBLE DETECTOR CHECK ASSEMBLY

Penhallegon Associates
Consulting Engineers, Inc.

WATER CONSTRUCTION STD. PLAN NO. 14

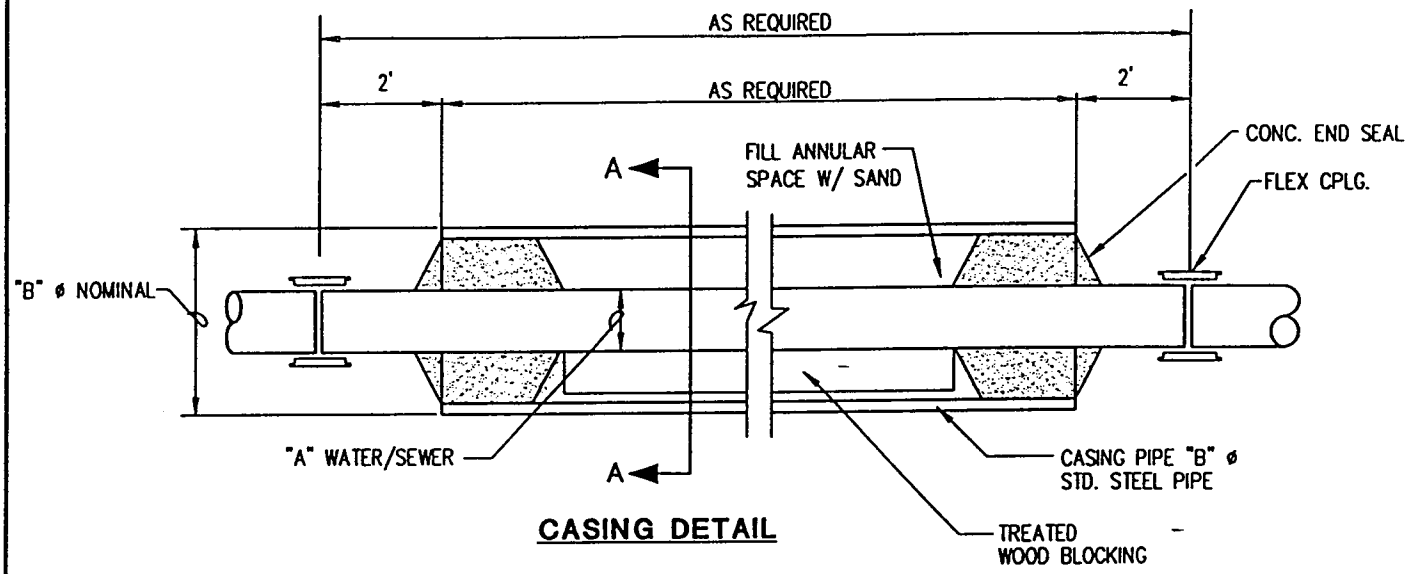
CEDAR RIVER WATER & SEWER

"A" PIPE SIZES	"B" CASING SIZES	CASING WALL THICKNESS
6"	12"	1/4"
8"	16"	1/4"
10"	20"	3/8"
12"	24"	3/8"
14"	28"	3/8"
16"	32"	3/8"

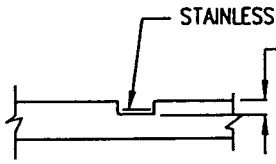
WATER PIPE SCHEDULE

"A" PIPE SIZES	"B" CASING SIZES	CASING WALL THICKNESS
6"	12"	1/4"
8"	16"	1/4"
10"	18"	1/4"
12"	20"	3/8"
15"	24"	3/8"

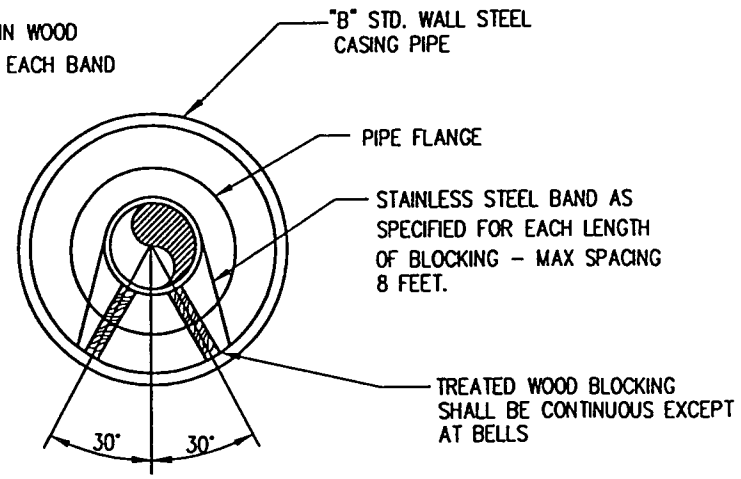
SEWER PIPE SCHEDULE



CASING DETAIL



BANDING DETAIL



SECTION A-A

NO SCALE

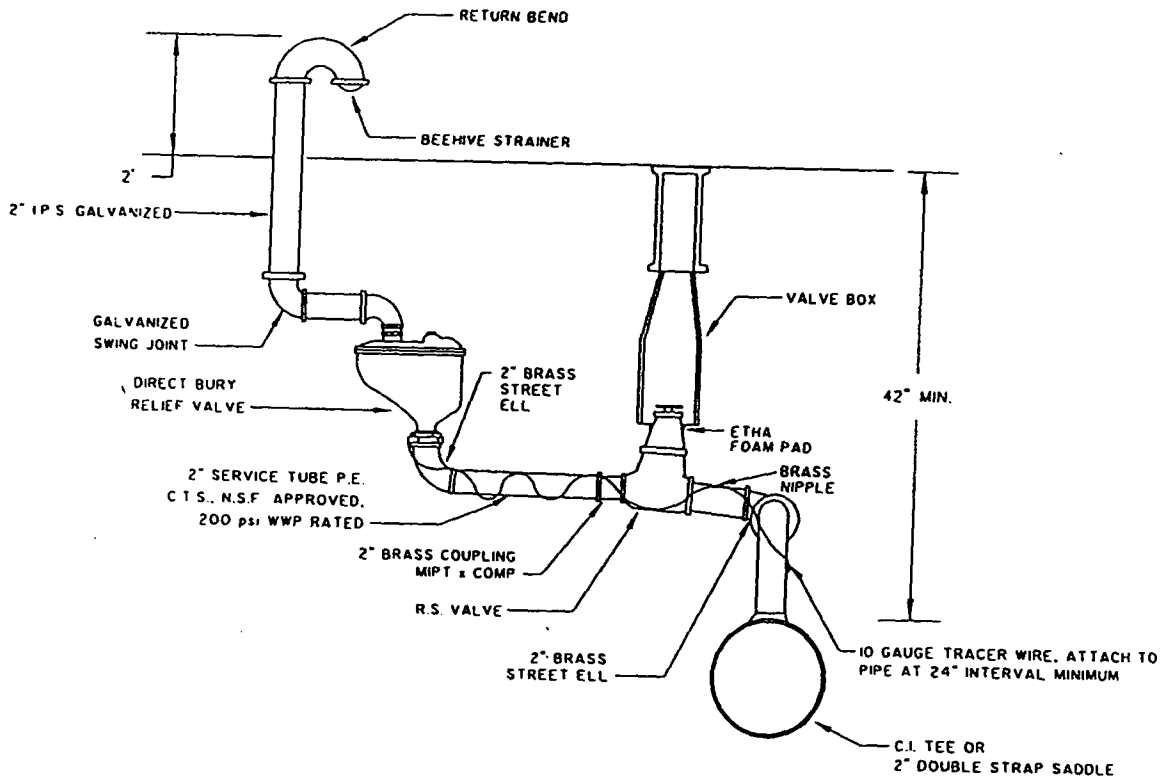
NOTE: CARBON STEEL OR NYLON SPACERS MAY BE SUBSTITUTED FOR TREATED WOOD BLOCKING UPON APPROVAL BY THE DISTRICT.

STANDARD CASING DETAIL

Penhallegon Associates Consulting Engineers, Inc.

WATER OR SEWER STD. PLAN No. 15

CEDAR RIVER WATER & SEWER

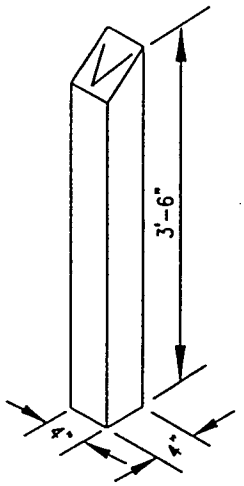


2" AIR & VACUUM RELIEF VALVE

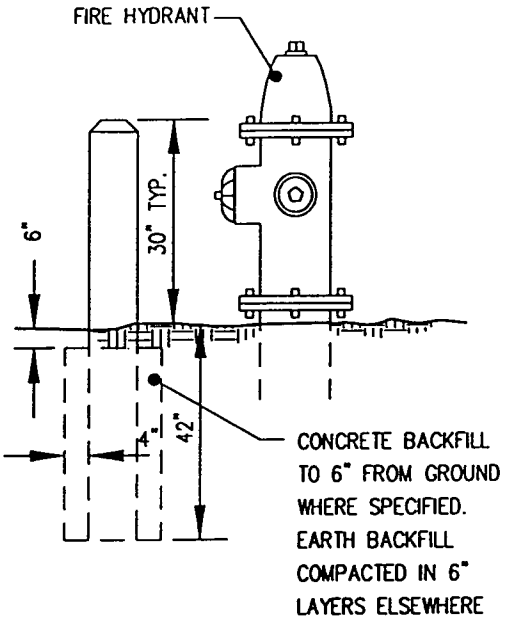
Penhallegon Associates
Consulting Engineers, Inc.

WATER CONSTRUCTION
STD. PLAN No. 16

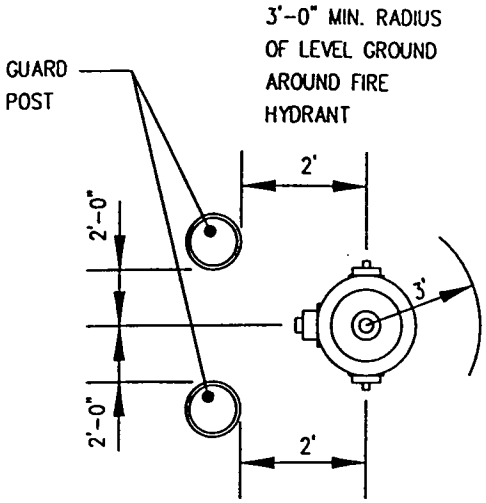
CEDAR RIVER WATER & SEWER



VALVE MARKER POST



ELEVATION



PLAN

FIRE HYDRANT GUARD POST

GUARD POST WILL NOT BE ALLOWED IN THE STREET CLEAR ZONE AS PER KING COUNTY REQUIREMENTS

Notes:

1. Guard post shall be 8" diameter x 6' long precast concrete posts as per technical specifications. Paint with 1 coat primer, Formula H-1-83, and two (2) coats of acid and oil resistant enamel, color white.

2. Valve marker post as specified. Paint as specified for hydrant guard post. Paint distance from the valve marker to the valve on the post with black enamel paint, using 2" high numerals.

GUARD AND MARKER POSTS

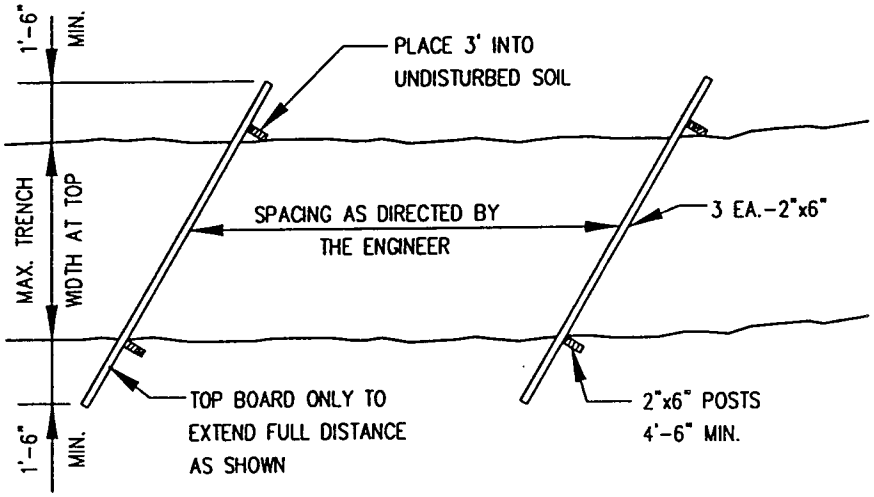
Penhallegon Associates
Consulting Engineers, Inc.

WATER CONSTRUCTION
STD. PLAN No. 17

CEDAR RIVER WATER & SEWER
CRWS

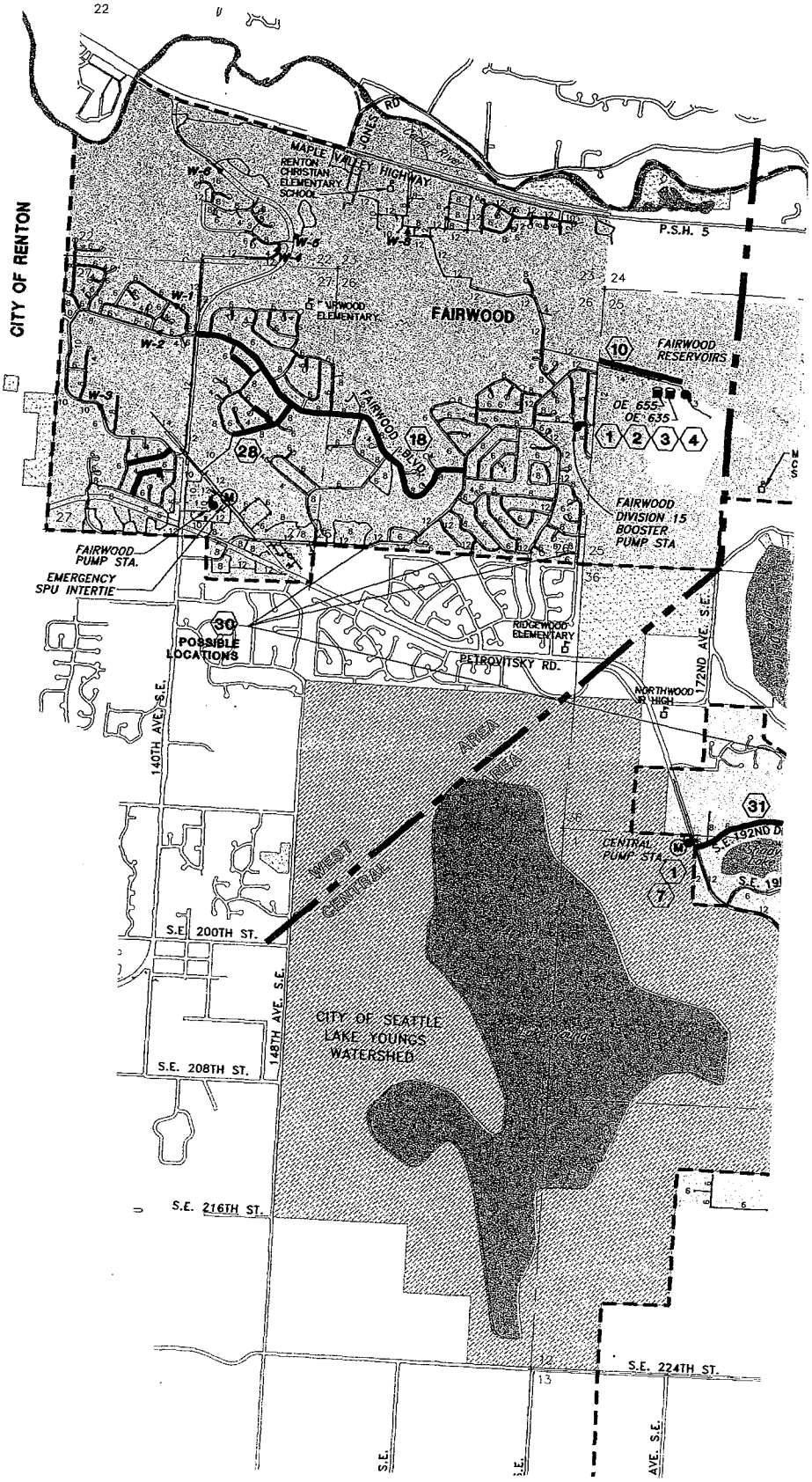
Notes:

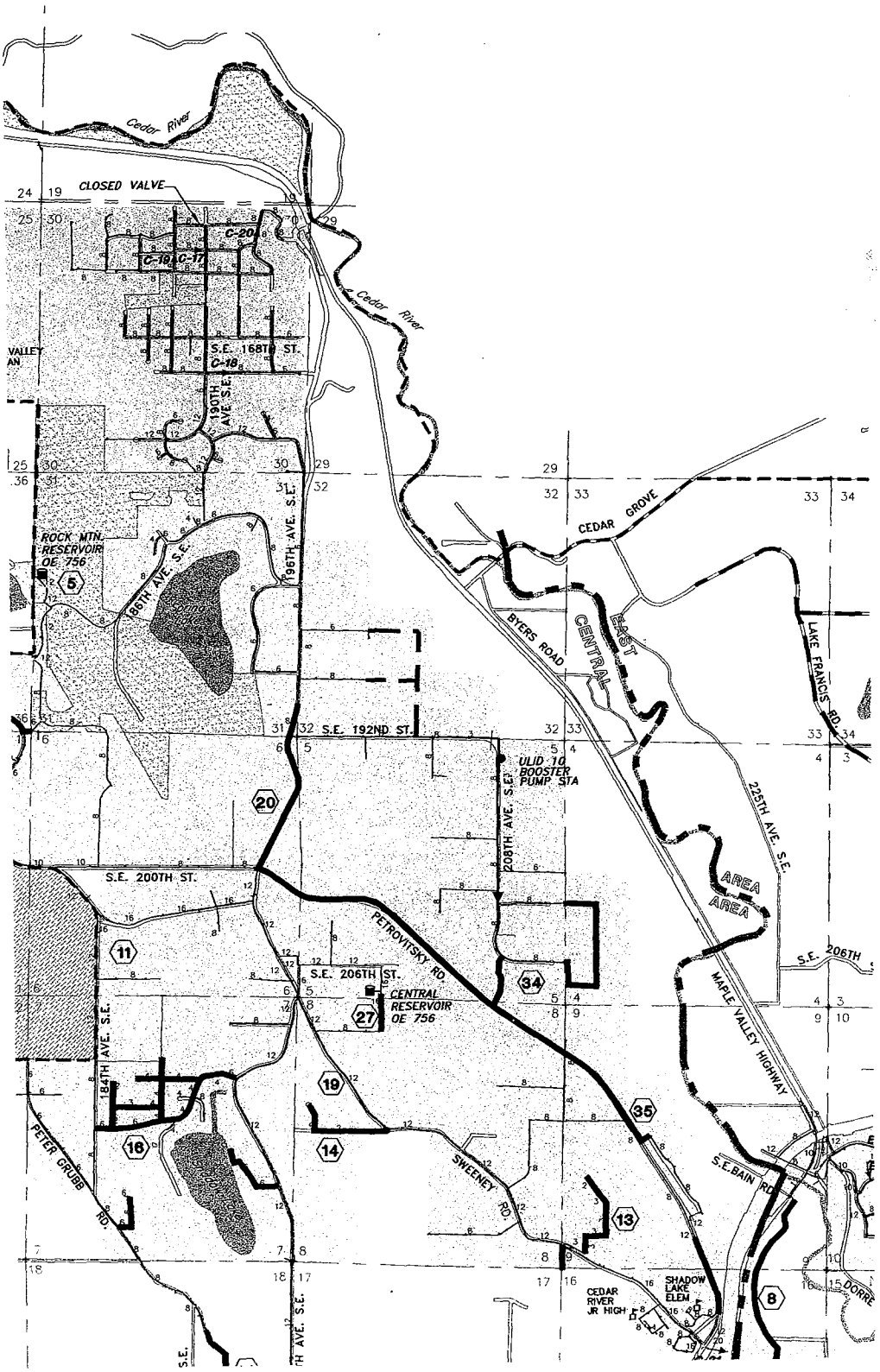
1. Timber baffles to be installed where directed by the Engineer or District Inspector.
2. All backfill shall be seeded.



HILL HOLDER

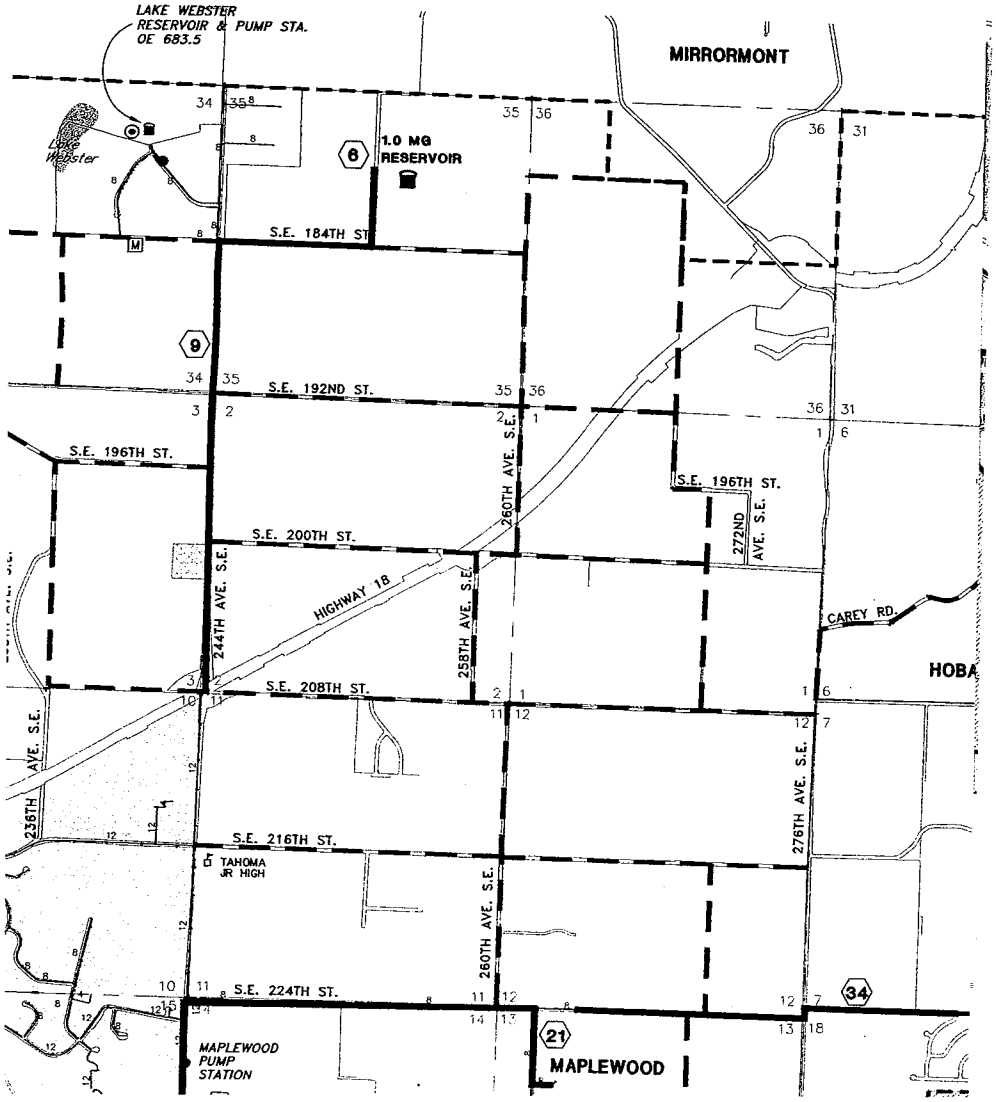
WATER SYSTEM PLAN MAP


CITY OF RENTON
MAPLE VALLEY HIGHWAY
RENTON CHRISTIAN ELEMENTARY SCHOOL
JONES RD
P.S.H. 5
FAIRWOOD
FAIRWOOD ELEMENTARY
FAIRWOOD RESERVOIRS
OE 655
OE 635
FAIRWOOD BLVD.
FAIRWOOD DIVISION 15 BOOSTER PUMP STA
FAIRWOOD PUMP STA.
EMERGENCY SPU INTERTIE
POSSIBLE LOCATIONS
RIDGEWOOD ELEMENTARY
PETROVITSKY RD.
NORTHWOOD JR HIGH
172ND AVE. S.E.
140TH AVE. S.E.
AREA MAP
WEST CENTRAL
CENTRAL PUMP STA.
S.E. 200TH ST.
148TH AVE. S.E.
CITY OF SEATTLE LAKE YOUNGS WATERSHED
S.E. 208TH ST.
S.E. 216TH ST.
S.E. 224TH ST.


Cedar River
CLOSED VALVE
C-20
C-19
C-17
C-18
S.E. 168TH ST.
190TH AVE. S.E.
ROCK MTN. RESERVOIR OE 756
5
186TH AVE. S.E.
196TH AVE. S.E.
CEDAR GROVE
BYERS ROAD
EAST CENTRAL AREA
LAKE FRANCIS RD.
S.E. 192ND ST.
ULID 10 BOOSTER PUMP STA
208TH AVE. S.E.
225TH AVE. S.E.
20
S.E. 200TH ST.
11
PETROVITSKY RD.
S.E. 206TH ST.
CENTRAL RESERVOIR OE 756
27
34
MAPLE VALLEY HIGHWAY
S.E. 206TH
184TH AVE. S.E.
19
35
16
14
PETER CRUBB RD.
SWEENEY RD.
S.E. BAIN RD.
13
8
CEDAR RIVER JR HIGH
SHADOW LAKE ELEM

LEGEND

- CORPORATE AREA
- SERVICE AREA BOUNDARY
- PARKS
- WATERSHED
- SCHOOL SITE
- EXISTING WATER LINE
- PUMP STATION
- RESERVOIR
- RESERVOIR OVERFLOW ELEVATION
- (M)
- (6)



L SITE

ER

SSURE REDUCING VALVE

MALLY CLOSED VALVE

TEM INTERTIE

POSED IMPROVEMENTS

JRE SYSTEM GRID